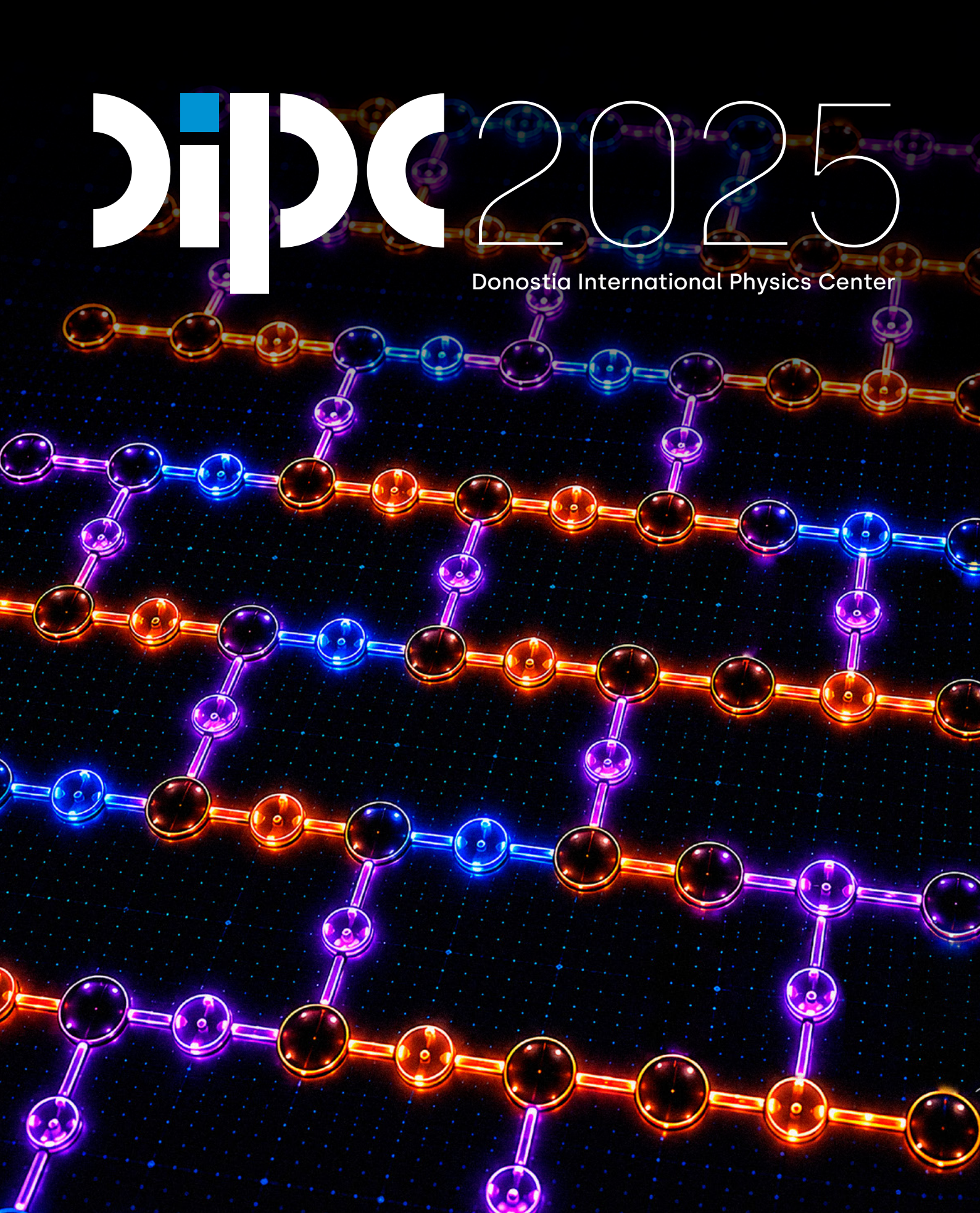
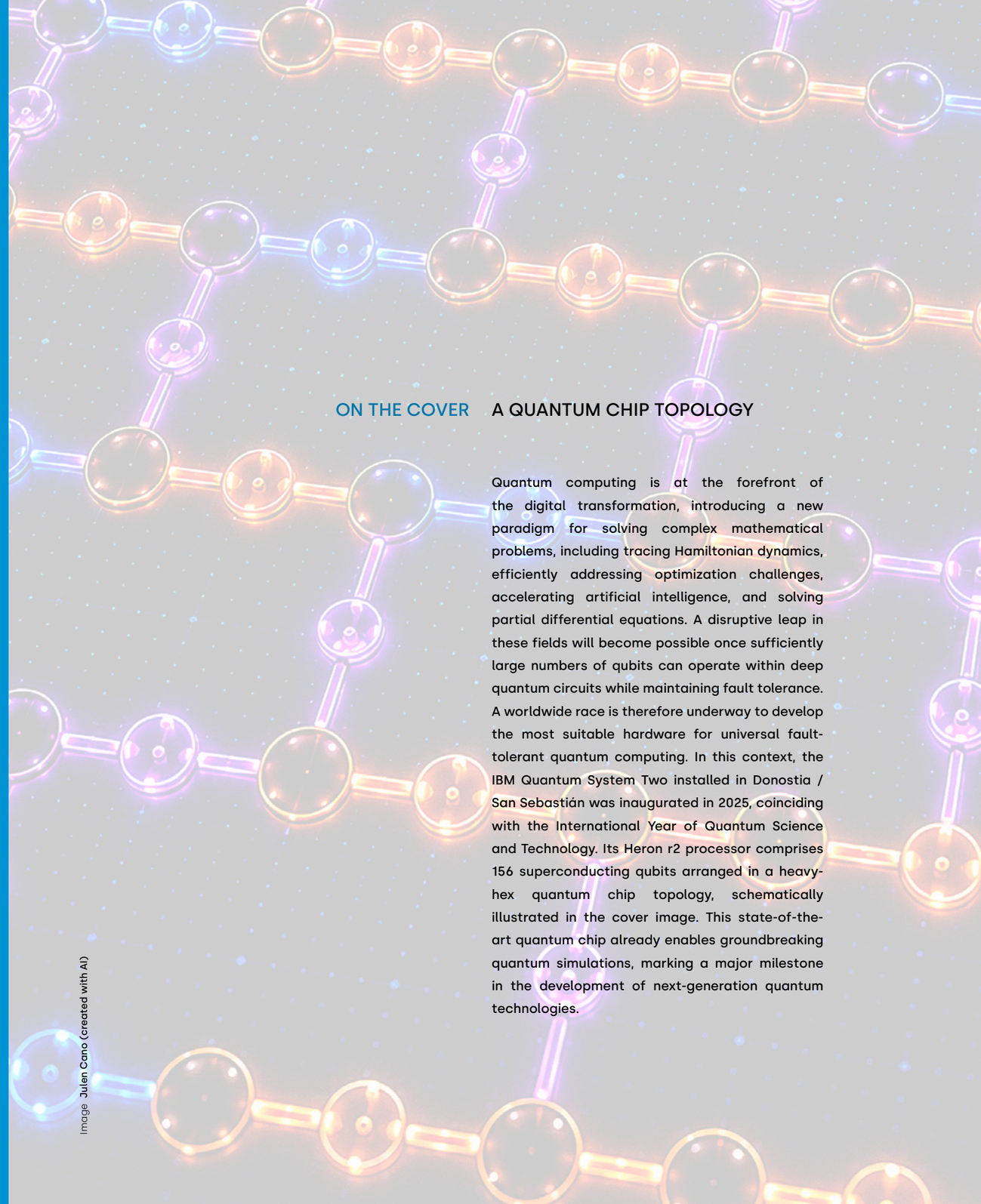
DIPC 2025

Donostia International Physics Center





ON THE COVER A QUANTUM CHIP TOPOLOGY

Quantum computing is at the forefront of the digital transformation, introducing a new paradigm for solving complex mathematical problems, including tracing Hamiltonian dynamics, efficiently addressing optimization challenges, accelerating artificial intelligence, and solving partial differential equations. A disruptive leap in these fields will become possible once sufficiently large numbers of qubits can operate within deep quantum circuits while maintaining fault tolerance. A worldwide race is therefore underway to develop the most suitable hardware for universal fault-tolerant quantum computing. In this context, the IBM Quantum System Two installed in Donostia / San Sebastián was inaugurated in 2025, coinciding with the International Year of Quantum Science and Technology. Its Heron r2 processor comprises 156 superconducting qubits arranged in a heavy-hex quantum chip topology, schematically illustrated in the cover image. This state-of-the-art quantum chip already enables groundbreaking quantum simulations, marking a major milestone in the development of next-generation quantum technologies.

Image **Julen Cano (created with AI)**

2025

DIPC ACTIVITY REPORT

A quantum leap for DIPC

The year 2025 has been celebrated as the International Year of Quantum Science and Technology. One hundred years ago, the pioneering work of Erwin Schrödinger and Werner Heisenberg provided the necessary mathematical formalization for ideas and concepts that were being developed by several of the brightest scientists in the history of physics.

This commemoration invites us to reflect on the profound transformation brought about by quantum physics over the past century. Quantum theory has reshaped our understanding of nature at its most fundamental level. It has also triggered numerous technologies that have completely modified the world economy as well as our societies, from microelectronics and modern communications to computing, lasers, and medical imaging, to name just a few. Beyond science and technology, quantum theory has left a lasting influence on culture and philosophy, challenging long-held notions about determinism, knowledge, and the limits of observation. Quantum science will continue to play a central role in the decades to come. New developments in quantum computing, communication, and sensing, for instance, are opening promising avenues for fundamental research and technological innovation.

The trajectory of DIPC is closely linked to quantum science. A large part of the research carried out at DIPC in condensed matter physics, nanoscience, materials science, theoretical chemistry or related disciplines, has relied, directly or indirectly, on quantum principles. Today, this long-standing expertise places the Center in a strong position within emerging initiatives such as BasQ, the Basque Strategy for Quantum Technologies. The arrival of an IBM System Two Quantum Computer to Donostia / San Sebastián, in the context of BasQ, represents a significant milestone in this process and reinforces the contribution of DIPC to a rapidly evolving scientific and technological ecosystem.

There were other important commemorations in 2025. The year 2025 has also marked the 25th anniversary of DIPC. Since its creation in 2000, the Center has experienced a solid and sustainable growth, progressively consolidating itself as an internationally recognized research institution. Over these years, DIPC has developed a distinctive scientific culture based on excellence, openness, and collaboration, while maintaining the flexibility required to adapt to a changing global environment. In addition to the research fields mentioned above, DIPC scientists are currently contributing significantly to others, such as cosmology, astrophysics, neutrino physics, organic and inorganic chemistry, and biosciences. The 25th anniversary has offered an opportunity to reflect on this trajectory and to acknowledge the solid foundations on which the Center continues to build its future.

«New developments in quantum computing, communication, and sensing, for instance, are opening promising avenues for fundamental research and technological innovation.»

Ricardo Díez Muiño, Director and **Pedro Miguel Echenique,** President

At the same time, 2025 has been an important year in terms of infrastructures, leading to a new phase in the development of DIPC. The construction of a new building, funded by the Department of Science, Universities, and Innovation of the Basque Government and scheduled to become fully operational in 2026, represents more than an expansion of space. It reflects the maturity reached by the Center and the need to develop a stronger experimental dimension. The new facilities will allow the integration of theory, computation, and experiment in a single location, fostering new lines of research and strengthening existing ones. Together with the continued development of advanced computational resources, including the DIPC Supercomputing Center and emerging hybrid classical-quantum capabilities, this new infrastructure will create the conditions for a qualitative transformation of the Center's scientific activity. We hope it leads to a truly quantum leap in DIPC's activity and impact.

None of these achievements would be possible without the dedication, talent, and commitment of the people who make up DIPC. Our scientific, technical, and administrative staff constitute the core of the Center's activity. Their work, carried out with rigor and enthusiasm, is the true driving force behind every result and every new initiative. ■

Donostia International Physics Center (DIPC) is a research center opened in the year 2000. DIPC's mission is to perform and catalyze research in physics and related disciplines, as well as to convey scientific culture to society. DIPC is a Foundation in which both public institutions (Basque Government, Gipuzkoa Provincial Council, San Sebastian City Council, and University of the Basque Country) and private companies (currently Kutxa Fundazioa, CAF, Telefónica, EDP, IBM, and Kutxabank) participate and contribute to its funding. In 2008, DIPC was awarded the distinction of 'Basque Excellence Research Center' (BERC) by the Basque Government's Department of Education. In 2019, DIPC was recognized as a 'Severo Ochoa' Center of Excellence by the Spanish Ministry of Science and Innovation.

Board of Partners

Pedro Miguel Echenique Landiribar President
Juan Colmenero de León Vice President
Ricardo Díez Muiño Director
Alberto López Basaguren Secretary

Basque Government
Science, Universities and Innovation Department
Industry, Energy Transition and Sustainability Department

Juan Ignacio Pérez Iglesias, Minister of Science, Universities and Innovation
Jaione Ganzarain Epelde, Deputy Minister for Technology, Innovation and Digital Transformation
Mikel Jauregi Letemendia, Minister of Industry, Energy Transition and Sustainability
Adolfo Moráis Ezquerro, Deputy Minister of Science and Innovation
Amaia Esquisabel Alegría, Director of Scientific Policy

University of the Basque Country

Eva Ferreira García, Rector (until June 2025)
Inmaculada Arostegui Madariaga, Vice Rector for Research (until June 2025)
José Ramón Bengoetxea Caballero, Rector (as of June 2025)
Jon Umerez Urrezola, Vice Rector for Research (as of June 2025)

Gipuzkoa Provincial Council

Miriam Oca Pascual, Director of Environmental Management (until November 2025)
Ane Insausti Altuna, Deputy of Economic Development and Strategic Projects (until June 2025)
Gloria Vázquez Herranz, Director of Environmental Management (as of November 2025)
Unai Andueza Iraeta, Deputy of Economic Development and Strategic Projects (as of June 2025)
Eider Mendoza Larrañaga, General Deputy

Donostia / San Sebastián City Council

Eneko Goia Laso, Mayor (until November 2025)
Jon Insausti Maisterrena, Mayor (as of November 2025)

Kutxa Fundazioa

Rafael Amasorrain Zabala, President
Ander Aizpurua Susperregui, General Director

Fundación EDP

Manuel Menéndez Menéndez, President

Telefónica S.A.U.

Manuel Ángel Alonso Pérez, Director of Northern Territory at Telefónica España

Construcciones y Auxiliar de Ferrocarriles

Andrés Arizkorreta García, President

IBM

Horacio Morell Gálvez, General Manager for Spain, Portugal, Greece and Israel

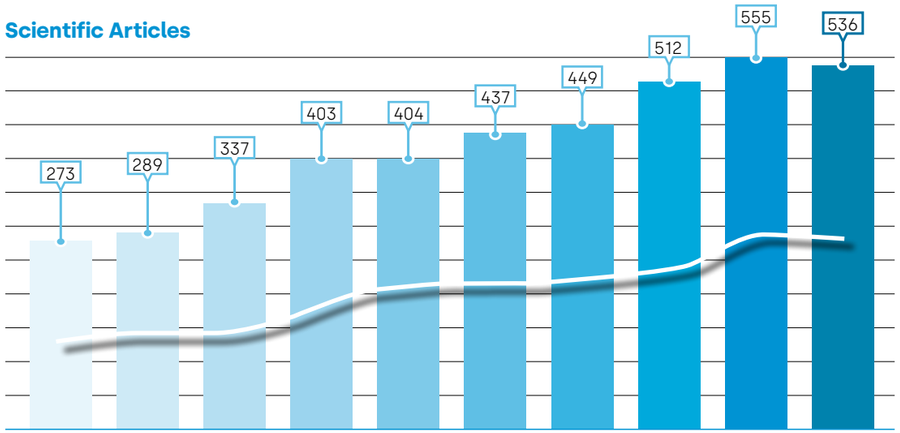
KUTXABANK

Anton Arriola Boneta, President (as of June 2025)

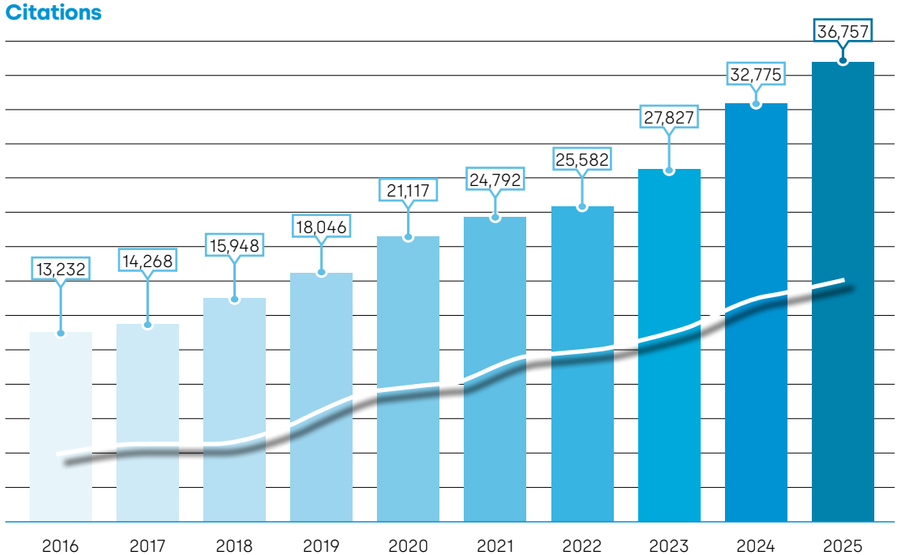
Research Activity at a Glance

The scientific output and influence of DIPC have steadily increased over the years. In 2025, the center produced 536 articles. Even more significant is the strong growth in citations of DIPC's work, which has now surpassed the milestone of 300,000 total citations. Since 2000, DIPC has produced 6,886 indexed publications.

Scientific Articles



Citations



Source Web of Science Core Collection (all years and all indexes, 30/04/2026)

Scientific Activity in 2025

113 Seminars

22 Workshops

1 DIPC Schools

4 Courses + Transferable Skills Courses

3 DIPC Colloquia

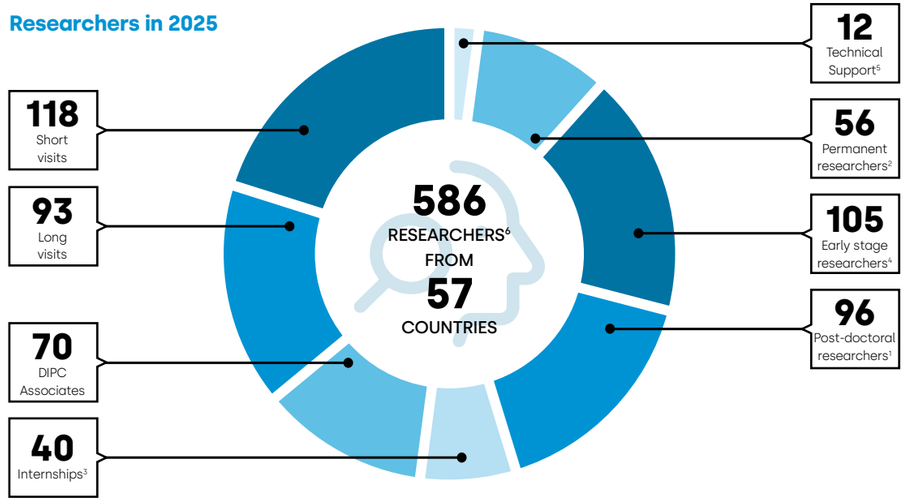
7034 ATTENDEES

Beyond research itself, DIPC's annual strategic program fosters the exchange of ideas and knowledge with scientists from around the world. Through a diverse portfolio of Scientific Events, the center creates opportunities for dialogue, collaboration, and learning. International experts share cutting-edge research through our Seminar series, while Workshops bring together specialists to explore focused topics in depth. DIPC Schools, specialized Courses and Transferable Skills Courses provide early-career researchers with opportunities to develop new skills and expand their expertise. Complementing these activities, DIPC Colloquia feature outstanding speakers addressing major questions across the natural sciences. To reach broader audiences, most of these events were also streamed live.

The Driving Force Behind DIPC's Research: A Dynamic Scientific Community

At the heart of DIPC is a vibrant and diverse research community made up of senior scientists, postdoctoral researchers, PhD students, and technical staff. Early-career scientists play a central role in the life of the center, advancing their training while contributing fresh perspectives and new ideas. DIPC's collaborative ecosystem is strengthened by DIPC Associates; researchers affiliated with other institutions who develop part of their research activity at the center; and further enriched by a strong international network of visiting researchers, whose short- and long-term stays make a significant contribution to the center's research activity. Together, these connections foster creativity, exchange, and scientific excellence.

Researchers in 2025



1 Postdoctoral Positions and Research Collaborators **2** Ikerbasque, Distinguished Researchers and Fellows **3** Internships and Undergraduate Students
4 PhD Students and Research Assistants **5** Technical Assistants and Engineers **6** Non-unique records

DIPC Supercomputing Center

The Supercomputing Center at DIPC is its great strategic infrastructure and serves as a fundamental tool for the excellent research carried out by our researchers and those of other research centers in the Basque Country.

Computational physics and chemistry are among the strongest research fields in the Basque Country and the Supercomputing Center is one of its key resources. In recent years the Supercomputing Center has also started offering its services to other types of research lines related to Cosmology, Genetics, Artificial Intelligence, Mathematics... With its current level of physical, human and technical resources, this high-performance computing (HPC) center has become a focus of technological knowledge, training, and innovation. Its status and influence transcend its primary mission, not only as a tool but also as a discipline in itself. There is no more powerful computing center of its type in the Basque Country.

DIPC Supercomputing Center's team.

Current computing resources

The Center has two rooms to host the HPC systems. These rooms have an isolated electrical connection, communications infrastructure, humidity, electricity consumption and temperature control sensors, various uninterrupted power supply systems, refrigeration systems, automatic fire-extinguishing systems and intrusion detection.

As of 2025, the Center operates several supercomputers covering a wide range of computational needs. Its flagship system is the HYPERION supercomputer, inaugurated in February 2024 with the attendance of the Minister of Education of the Basque Government, Jokin Bildarratz, and the Deputy Minister for Universities and Research, Adolfo Morais.

HYPERION is a cluster featuring Xeon nodes, ranging from small nodes with 48 cores and 96 GB of RAM to large shared-memory nodes with 128 cores and 2 TB of RAM under a single operating system image. The supercomputing infrastructure includes 72 NVIDIA Tesla A100 GPUs, which are particularly suited for training large AI models. With over 17,000 cores and 200 TB of RAM, it ranks among the most powerful supercomputers in Spain. Currently, the Center is leading, in partnership with IBM, the direct interconnection of Hyperion with the new quantum computer in the Basque Country, enabling direct hybrid quantum-classical workloads and making the Basque Country the second region in the world to offer such advanced computing capabilities to its researchers.

TOTAL CAPACITY

CORES	RAM	SCRATCH DISKS	HOME DIRECTORIES
17,084	219 TB	1 PB	850 TB

NON-STOP SERVICE: 24 HOURS 365 DAYS

More than 650 researchers from DIPC and other research centers of the Basque Country such as BERC DIPC, BERC Achucarro, BERC BC3, BERC BCAM, BERC BCBL, BERC BCMaterials, BERC FBB, BERC MPC, BERC POLYMAT, CIC bioGUNE, CIC nanoGUNE, CIC biomaGUNE, CIC energiGUNE, University of the Basque Country (EHU), Materials Physics Center (CFM), University of Deusto, University of Navarra, TECNUN, Bioaraba, Biobizkaia, Biogipuzkoa, Biosistemak, Aranzadi, Vicomtech, CEIT, MC³ (Mondragon Components Competence Center), AZTI, BioComp, IKERLAN, NEIKER, TEKNALIA, Orai, BIC Gipuzkoa or MeteoBit used this computational infrastructure in 2025.

The construction of Hyperion is part of the overall strategy of the Basque Government to provide the scientific community with the necessary tools and infrastructures to carry out its work, in alignment with the strategic areas identified by the IKUR Strategy.

The Supercomputing Center team together with DIPC representatives and Basque Government officials Jokin Bildarratz, Adolfo Moráis and Amaia Esquisabel during the inauguration of the HYPERION supercomputer at DIPC in 2024.

Science Communication

Marked by DIPC's 25th anniversary and the International Year of Quantum Science and Technology, 2025 was a landmark year for DIPC's outreach program. Throughout the year, DIPC organized more than 200 activities, reaching nearly 76,000 participants through festivals, exhibitions, public lectures, educational programs and interdisciplinary collaborations. From cinema, literature and contemporary art to quantum technologies, astrophysics and materials science, the program reflected DIPC's commitment to bringing frontier research closer to society and promoting science as a cultural, creative and inclusive endeavor. ■

Lehendakari Imanol Pradales, institutional representatives, members of the Board of Partners, and the DIPC management team at DIPC's 25th anniversary celebration at the Victoria Eugenia Theatre.

DIPC'S 25th ANNIVERSARY

04/12/2025
Victoria Eugenia Theatre, Donostia / San Sebastián

In December 2025, DIPC celebrated its 25th anniversary with a public commemorative gala at the Victoria Eugenia Theatre in Donostia / San Sebastián. The trilingual ceremony (Basque, Spanish, and English), featuring simultaneous interpretation, was attended by the Lehendakari **Imanol Pradales**, as well as representatives from institutions and collaborating organizations, members of the DIPC scientific community, and the general public.

During the ceremony, DIPC's management team revisited some of the most significant milestones from its first quarter century, combining speeches with audiovisual pieces that reflected both the evolution of the institution and the scientific work carried out within its laboratories. The event offered a journey through DIPC's history, from its founding vision to the major scientific and technological challenges that will shape its future.

The program also featured the performance of the iconic song *Izarren Hautsa* (Star Dust), by the singer-songwriter **Eñaut Elorrieta** and the pianist **Iñar Sastre**, specially chosen for the occasion. One of the most celebrated moments was the surprise appearance of the Basque *bertsolari* **Maialen Lujanbio**, who dedicated an improvised verse to DIPC and to its president, Pedro Miguel Echenique, the driving force behind the creation and development of the center.

Beyond commemorating the achievements of the past 25 years, the gala also highlighted the importance of continuing to build DIPC's future through projects such as the new building, funded by the Basque Government's Department of Science, Universities and Innovation, which will strengthen the center's scientific capabilities and international projection in the years ahead.

Hosts: **Nora Gonzalez (DIPC)** and **Iñaki Leturia (Elhuyar)**
DIPC Speakers: **Ricardo Díez Muiño, Aran García-Lekue, Nora Gonzalez**, and **Pedro Miguel Echenique**
Musicians: **Eñaut Elorrieta** and **Iñar Sastre**
Bertsolari: **Maialen Lujanbio**

CINEMA AND SCIENCE

The eighth edition of the Cinema and Science Festival, organized jointly by DIPC, the Basque Film Archive, and the San Sebastian International Film Festival, focused on a concept that has generated extraordinary interest within the scientific community: time. Twelve films were screened across multiple venues, each session introduced by inspiring presentations and followed by dialogues with renowned scientists. Screenings took place at Tabakalera (Donostia / San Sebastián), Bizkaia Aretoa of EHU (Bilbao), Artium (Vitoria-Gasteiz), Cinéma Le Sélect (Saint-Jean-de-Luz, France), and Golem Baiona cinemas (Iruñea / Pamplona). This edition also included the traditional school sessions and several special activities. Overall, **more than 6,500 people** participated in the festival.

General Sessions

Films screened in
(1) Vitoria-Gasteiz (2) Donostia / San Sebastián
(3) Bilbao (4) Iruñea / Pamplona
(5) Saint-Jean-de-Luz.

*Subtitles and presentation in *Spanish, **French, and ***Basque.*

The Theory of Everything (James Marsh, 2014)*/**
(1) 09/01/2025 (2) 10/01/2025 (3) 11/01/2025
(4) 14/01/2025 (5) 01/02/2025
Physicist **Aran Garcia-Lekue**, DIPC, Ikerbasque / Physicist **Pedro Miguel Echenique**, EHU, DIPC / Physicochemist **Didier Roux,** Member of the French Academy of Sciences and Curator of the Abbadia Castle-Observatory.

The Time Machine (George Pal, 1960)***
(1) 16/01/2025 (2) 17/01/2025 (3) 18/01/2025
(4) 21/01/2025
Physicist **Maria Navarro Gastiasoro**, DIPC

Vincere (Marco Bellocchio, 2009)*/**
(1) 23/01/2025 (2) 24/01/2025 (3) 25/01/2025
(4) 28/01/2025 (5) 27/01/2025
Historian **Julián Casanova**, Universidad de Zaragoza / Historian Antonio Rivera, EHU / Historian **Joxean Fernández**, Basque Film Archive

High Life (Claire Denis, 2018)***
(1) 30/01/2025 (2) 31/01/2025 (3) 01/02/2025
(4) 04/02/2025
Philosopher **Antonio Casado da Rocha**, EHU / Biologist **Iraia Muñoa Hoyos**, EHU

Djúpið-The deep (Baltasar Kormákur, 2012)*
(1) 06/02/2025 (2) 07/02/2025 (3) 08/02/2025
(4) 11/02/2025
Biologist **Juan Ignacio Pérez Iglesias**, Basque Government / Oceanographer **Anna Rubio**, AZTI

Le théorème de Marguerite (Anna Novion, 2023)*/**
(1) 13/02/2025 (2) 14/02/2025 (3) 16/02/2025
(4) 18/02/2025 (5) 17/02/2025
Physicist and Engineer **Ainhize Barrainkua**, BCAM / Engineer **Daniela Moreno**, BCAM / Physicist **Amaia Arregi**, DIPC
In collaboration with *Emakumeak Zientzian*

Frankenstein / The bride of Frankenstein (James Whale, 1931 / James Whale, 1935)* – Double session
(1) 20/02/2025 (2) 21/02/2025 (3) 22/02/2025
(4) 25/02/2025
Chemist **Fernando Cossío**, EHU, DIPC / Veterinarian and science journalist **Ana Galarraga**, Elhuyar Fundazioa

La maladie de Sachs (Michel Deville, 1999)*
(1) 27/02/2025 (2) 28/02/2025 (3) 01/03/2025
(4) 04/03/2025
Physician **Rafael Rotaeche**, IIS Biogipuzkoa
In collaboration with *Biogipuzkoa*
Erin Brockovich (Steven Soderbergh, 2000)***
(1) 06/03/2025 (2) 07/03/2025 (3) 08/03/2025
(4) 11/03/2025
Biologist **Miren Cajaraville**, EHU, Plentzia Marine Station (PiE-EHU)

The Thing (John Carpenter, 1982)***
(1) 13/03/2025 (2) 14/03/2025 (3) 15/03/2025
(4) 18/03/2025
Chemist **Xabier Lopez**, EHU, DIPC

Kampen om Tungvannet-La bataille de l'eau lourde (Jean Dréville, Titus Vibe-Müller, 1948)*
(1) 20/03/2025 (2) 21/03/2025 (3) 22/03/2025
(4) 25/03/2025
Physicist **Daniel Sánchez-Portal**, CFM CSIC-EHU, DIPC / Physicist **Silvina Cerveny**, CFM CSIC-EHU, DIPC

Everything Everywhere All at Once (Daniel Kwan, Daniel Scheinert, 2022)***
(1) 27/03/2025 (2) 28/03/2025 (3) 29/03/2025
(4) 01/04/2025
Physicist **Idoia García de Gurtubay**, EHU, DIPC / Physicist **Javier Aizpurua**, BasQ, DIPC, Ikerbasque

School Sessions

Special morning sessions for students took place in Donostia / San Sebastián, Bilbao, and Vitoria-Gasteiz, featuring the film ***Gravity*** (Alfonso Cuarón, 2013). The screenings were introduced by physicists from DIPC's COSMOS research area: **Leire Larizgoitia** (experimental particle physicist, DIPC), Francesc Monrabal (experimental particle physicist, DIPC, Ikerbasque), **Lurdes Ondaro** (computational cosmologist, DIPC), and **Sara Ortega** (computational cosmologist, DIPC), who discussed the scientific concepts explored in the film from the perspective of contemporary physics.

Tabakalera, Donostia / San Sebastián: 11/03/2025*** and 13/03/2025*

Bizkaia Aretoa EHU, Bilbao: 17/03/2025*** and 19/03/2025*

Artium Musea, Vitoria-Gasteiz: 27/03/2025*

The same film, ***Gravity*** (Alfonso Cuarón, 2013), was also screened at Cinéma Le Sélect (Saint-Jean-de-Luz) for the general public and introduced by DIPC Director, **Ricardo Díez Muiño**.

Special activities

The program also included a public lecture and a documentary screening followed by a round table discussion:

24/01/2025 Z Aretoa, Tabakalera, Donostia / San Sebastián
"The Seed of Fascism", a lecture by historian **Julián Casanova**, Universidad de Zaragoza

11/03/2025 Kutxa Kultur Kluba, Tabakalera, Donostia / San Sebastián
Screening of ***El misterio de los cristales gigantes*** (Javier Trueba, Juan Manuel García Ruiz, 2010), followed by a round table discussion with director and producer **Javier Trueba** and geologist and writer **Juan Manuel García Ruiz**

Representatives from different institutions during the presentation of the eighth edition of Cinema and Science.

ART AND SCIENCE "VISIONES CUÁNTICAS"

DIPC collaborates closely with the Art, Science, Technology and Society program promoted by Tabakalera since its inception. This collaboration explores the intersections between art, science and technology in response to the challenges of our time.

On the occasion of the International Year of Quantum Science and Technology celebrated in 2025, Tabakalera presented ***Visiones Cuánticas*** (*Quantum Visions*), a contemporary art exhibition curated by **Mónica Bello**, then director of Arts at CERN. The exhibition was open to the public at Tabakalera from February 21 to June 8, and later traveled to other venues, attracting more than **35,000 visitors** during 2025.

The exhibition was the result of a collaboration between Tabakalera, CERN through Arts at CERN, and DIPC, with the support of Tekniker, HEK (Haus der Elektronischen Künste) in Basel, and MU Hybrid Art House in Eindhoven, where it was presented in August and December 2025.

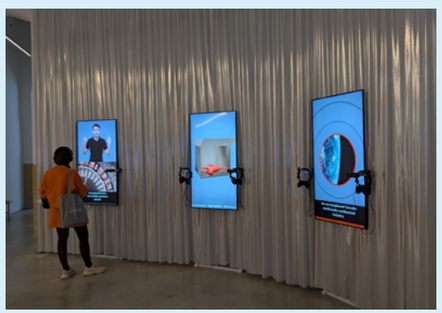
Visiones Cuánticas reimagined the physical world as a kaleidoscope of perspectives with the participation of artists such as Abelardo Gil-Fournier, Libby Heany, Marina Rosenfeld, and Semiconductor, among others.

DIPC directly contributed to the creation of the piece ***"Ensayo fílmico sobre la sordoceguera"***, conceived by filmmaker **Jaione Camborda**, winner of the Golden Shell at the San Sebastián Film Festival in 2023, as well as to the conceptualization and content production of the **mediation space** located at the entrance to the exhibition. This installation introduced visitors to the fundamental concepts of quantum physics and quantum technologies already present in everyday life, as well as emerging technologies, such as quantum computers, currently under development.

Visiones Cuánticas also developed a broad parallel program of public activities, ranging from family workshops to talks and dialogues on quantum physics. All these activities formed part of a broader program promoted by the Basque Government's Department of Science, Universities, and Innovation within the framework of the BasQ strategy to celebrate the International Year of Quantum Science and Technology. As part of this initiative, the mediation space conceived by DIPC traveled to different cities across the Basque Country between September and December 2025.

Visiones Cuánticas mediation space tour in 2025

05/09/2025–02/10/2025 Hibridalab, Vitoria-Gasteiz
10/10/2025–26/10/2025 Azkuna Zentroa – Alhóndiga, Bilbao
29/10/2025–14/12/2025 Laboratorium, Bergara.



Encounter between Rainer Blatt and Jaione Camborda
09/05/2025 Tabakalera, Donostia / San Sebastián
100 Years of Quantum Physics – And That's Just the Beginning
18:00 Public lecture by Rainer Blatt, Institute for Quantum Optics and Quantum Information (IQOQI) Alpine Quantum Technologies GmbH (AQT)
19:00 Conversation between filmmaker **Jaione Camborda** and physicist **Rainer Blatt**.

Naukas Kids Workshop
21/09/2025 10:00 & 12:00
"Eskalatu zure mundua / Escala tu mundo"

In this workshop, organized in collaboration with CFM, families explored macro-, micro- and nanoscale worlds using magnifying glasses and microscopes, approaching key concepts of quantum physics through hands-on activities and observation.

KUANTIKAZ BLAI! - collaboration with Kutxa Fundazioa

In 2025, Kutxa Fundazioa and DIPC organized a special program to celebrate the International Year of Quantum Science and Technology, as well as another major milestone for the Basque Country's quantum ecosystem: the inauguration of IBM's Quantum System Two in Donostia / San Sebastián.

Through talks delivered by leading scientists and science communicators, the program aimed to explain the fundamental principles of quantum physics in an accessible way, highlighting the potential of emerging quantum technologies and their possible applications.

14/06/2025 Kutxa Fundazioa Kluba, Tabakalera, Donostia / San Sebastian
Aldatu txipa, murgildu kuantikan
Aran Garcia-Lekue, Physicist, DIPC, Ikerbasque

This talk also served as the basis for a series of audiovisual clips aimed at the Basque Country's educational community, designed to introduce younger audiences to the world of quantum physics in an accessible and engaging way. The clips will be released in 2026.

02/09/2025 Kutxa Fundazioa Kluba, Tabakalera, Donostia / San Sebastian
Manotazos en una habitación oscura. La llegada de la computación cuántica
Eduardo Sáenz de Cabezón, Mathematician, University of La Rioja

STRØM Inclusive Exhibition

STRØM – Inclusive Astronomy is a traveling exhibition conceived and produced by DIPC to promote more accessible science communication. Since 2023, DIPC has made STRØM available free of charge to institutions interested in hosting the exhibition. To date, **more than 17,000 people** across the Basque Autonomous Community and Navarre have explored basic concepts of astrophysics and cosmology through STRØM, regardless of their sensory, cognitive or physical abilities.

The exhibition was curated by DIPC's Ikerbasque Associate Professor **Silvia Bonol**i and DIPC Outreach and Communications Officer **Valentina Rodríguez**. The museographic design and production were developed by **Morgancrea**.

In 2025, STRØM toured Navarre through three venues:

19/12/2024 - 14/01/2025 Planetario de Pamplona, Pamplona
11/04/2025 - 22/06/2025 Baluarte Jauregia, Pamplona
25/11/2025 - 11/02/2026 Tafalla Kulturgunea, Tafalla

At Planetario de Pamplona, the exhibition received 1,063 visitors before a fire affected the facilities in January 2025, forcing STRØM to be dismantled and stored. Due to the strong public response, the exhibition was later reinstalled at Baluarte Jauregia.

Across its exhibitions at Baluarte Jauregia and Tafalla, STRØM welcomed 4,187 visitors, including 3,380 members of the general public and 807 participants from schools and associations. The educational program involved 72 schools and 7 associations, including several groups with special needs.

STRØM's tour across Navarre was made possible through a collaboration agreement with Planetario de Pamplona and NICDO, which included the development of educational resources for schools in Spanish and Basque.

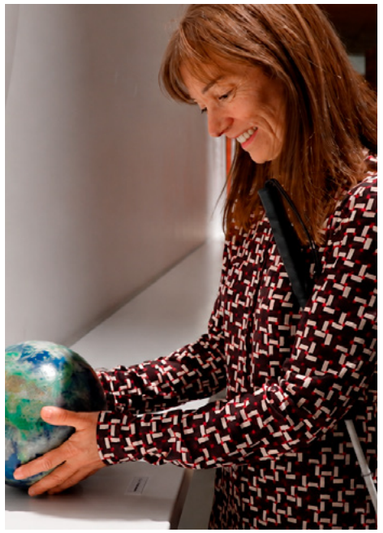


Image: NICDO-Planetario Pamplona

Beyond its own touring program, STRØM was also incorporated into exhibitions developed by other cultural institutions.

24/10/2025 - 24/05/2026
Museo de Reproducciones Artísticas, Bilbao
Mitoak orbitan. El Universo a la vista (Myths in Orbit: The Universe in View)
The exhibition, curated by Itziar Martija and produced by the museum, explored the relationship between classical mythology and astronomical observation through Renaissance artworks and tactile resources. The exhibition incorporated a module from DIPC's STRØM – Inclusive Astronomy exhibition, allowing visitors to touch the planets of the Solar System and compare their sizes.

EMAKUMEAK ZIENTZIAN

07-14/02/2025

The ninth edition of Emakumeak Zientzian brought together **35 science and technology institutions** across the Basque Country to celebrate the International Day of Women and Girls in Science on February 11. The initiative aims to increase the visibility of women in science, challenge gender stereotypes associated with scientific and technical careers and encourage girls and young women to pursue STEM studies and professions.

Under the slogan, *Hazia erein / Sow the Seed*, the 2025 edition highlighted how small actions can contribute to advancing equality in science. The program featured more than **60 activities**, reaching **10,632 participants** across the Basque Country. Its success is largely due to the enthusiasm and commitment of hundreds of volunteer scientists, as well as the support of participating institutions.

DIPC was directly involved in the organization of the following activities:

06/02/2025
Bilbo Rock, Bilbao
Opening ceremony with all the volunteers and collaborating institutions

14/02/2025
Virtual tour of DIPC and CFM centers with our female scientists
Schools

10/02/2025 Victoria Eugenia Theatre's Club Room, Donostia / San Sebastián
11/02/2025 Barandiaran Room - Europa Conference Center, Vitoria - Gasteiz
13/02/2025 Ensanche Building, Bilbao
Women scientists of yesterday and today
Public lectures featuring 15 female scientists from the Emakumeak Zientzian alliance, including DIPC Ramon y Cajal researcher **María Navarro Gastiasoro** who paid tribute to *Emmy Noether*.
General public

13/02/2025 Artium Museum, Vitoria-Gasteiz
14/02/2025 Tabakalera, Donostia / San Sebastián
16/02/2025 Bizkaia Hall (EHU), Bilbao
17/02/2025 Le Select, Saint-Jean-de-Luz
18/02/2025 Golem Baiona Cinema, Iruñea / Pamplona
As part of the Cinema and Science festival
Le Théorème de Marguerite (Anna Novion, 2023)
Screening presented by:
Physicist and Electronic Engineer, **Ainhize Barrainkua**, BCAM
Mechanical Engineer **Daniela Moreno**, BCAM
Physicist and Science Communicator **Amaia Arregi**, DIPC
General public

For more information visit:
www.emakumeakzientzian.eus

ON ZIENTZIA

The On Zientzia video contest, organized annually by DIPC and Elhuyar since 2010, celebrated its 15th edition in 2025. The competition showcases short, original videos that bring science and technology closer to society and encourage creative science communication. On the occasion of the International Year of Quantum Science and Technology, the contest featured a special BasQ Prize, sponsored by the BasQ initiative, recognizing the best video on quantum-related topics. A total of **94 videos** were submitted, mostly in Basque, with additional entries in Spanish and English, reflecting the international reach of the participants. The awards ceremony took place on May 29 at Tabakalera and was later broadcast as a special episode of Teknopolis.

The awarded videos in each category were the following:

BEST DISSEMINATION VIDEO
Ex aequo. *¿Cómo se forman realmente los bebés?*
Isadora, Renata and Leonel Virosta.
Ex aequo. *Etorkizuna gaur*
Unai García.

BEST VIDEO IN BASQUE
Ezkutuko erraldoien eragina
Joseba Zabala.

YOUNG PRIZE
Platano erreaktiboak
Ubay Moll.

BASQ PRIZE
Quantum Café
Enric Ponce de León

To watch the videos visit www.onzientzia.tv

STUDENT VISITS

Since 2014, DIPC and the Materials Physics Center (CFM, CSIC-EHU) have jointly welcomed high school and vocational training students to explore the world of cutting-edge science and visit their research facilities. Within the regular Student Visits program, seven on-site visits and two online sessions were organized throughout 2025, one of them as part of the Emakumeak Zientzian initiative. These activities not only spark curiosity about science but also provide guidance and inspiration for those students considering future studies and careers in STEM fields. This year, the program reached more than 700 students and teachers from 20 schools.

Additional visits were organized for Mondragon Unibertsitatea, the Students' Group of the Spanish Royal Physical Society (RSEF), participants in the EHU Egokitu program, and winners of the Zientzia Azoka contests of Elhuyar, involving a further 102 participants. Moreover, three visits were organized exclusively at the DIPC supercomputing center for 94 vocational training students.

SESSIONS FOR KIDS
San Sebastian International Film Festival

19, 22-26/09/2025
Ikastetxeak Belodromoan, Anoeta Velodrome,
Donostia / San Sebastián

In 2025, thousands of children aged 6 to 11 gathered at the Anoeta Velodrome for the traditional children's screening jointly organized by the San Sebastian International Film Festival (SSIFF), DIPC and the Basque Film Archive.

The selected film was ***My Neighbour Totoro***, the acclaimed animated classic by Hayao Miyazaki, which introduced young audiences to a fascinating natural ecosystem and its inhabitants while highlighting the importance of preserving biodiversity and ecological balance.

As is now tradition, the session was co-presented by the **social robot Pepper**, who once again interacted with the audience and helped guide children through the scientific themes explored in the film.

The guest scientist for this edition was biologist **Nahia Gartzia-Bengoetxea**, from the **Department of Forestry Science at Neiker**, the Basque Institute for Agricultural Research and Development. She explained how she analyses forest soils and their relationship with human activities and the environment, with the aim of developing new forestry practices that foster sustainability and resilience to climate change. Together with Nahia, the audience embarked on a journey into the heart of the forest to discover how trees, fungi and tiny organisms coexist and support one another.

top@DIPC ENCOUNTERS - ZIENTZIAREKIN SOLASEAN!

The 15th edition of top@DIPC - Zientziarekin Solasean! took place at Eureka! Zientzia Museoa in Donostia / San Sebastián, with the collaboration of the Basque Government, Telefónica, and Kutxa Fundazioa. The initiative aims to connect young people with world-class scientists and inspire a lasting curiosity about science.

Around 240 students and teachers from 36 schools across the Basque Country had the opportunity to meet **Nobel Laureates Jack Szostak** (Physiology or Medicine) and **Jean-Marie Lehn** (Chemistry), as well as **Yamuna Krishnan**, a pioneer in DNA nanotechnology. During the session, students were able to ask questions directly to the invited speakers, who shared both their scientific careers and personal experiences, showing their human side and emphasizing that scientific achievements are driven by curiosity, perseverance and a deep desire to understand the world around us.

As in previous editions, the session was moderated by **Pedro Miguel Echenique**, and the Telefónica Prize was awarded to the student who posed the most creative question.

Participants in the 15th edition of top@DIPC – Zientziarekin Solasean! gathered in front of Eureka! Zientzia Museoa.

16/10/2025 Eureka! Zientzia Museoa, Donostia / San Sebastián
Jack Szostak, University of Chicago
Yamuna Krishnan, University of Chicago
Jean-Marie Lehn, Université de Strasbourg
Moderated by **Pedro Miguel Echenique**, president of DIPC

Hosts:
Garbiñe Etxezarreta, Head of the Kutxa Fundazioa Project program
Amaia Esquisabel, Director of Scientific Policy in the Basque Government's Department of Science, Universities and Innovation.
Ricardo Díez Muiño, Director of DIPC

ORIGINS OF LIFE

16-17/10/2025
San Telmo Museoa, Donostia / San Sebastián

As part of *Donostia Zientzia Hiria*, the science outreach initiative jointly promoted by DIPC and Donostia Kultura within San Telmo Museoa's Challenges program, the 2025 edition explored one of humanity's most fundamental questions: how did life emerge from an apparently lifeless world?

Through a public lecture and a round table discussion, leading scientists examined current hypotheses on the origin of life, from the formation of prebiotic molecules and the emergence of the first living systems to the search for life beyond Earth. The program also addressed the philosophical implications of these discoveries and the ongoing debate about how life should be defined.

16/10/2025
The Origin of Life
Jack Szostak, University of Chicago

17/10/2025
What is life and how does it arise?
Round table discussion
Izaskun Jiménez Serra, CAB, CSIC-INTA
Juan Manuel García-Ruiz, Ikerbasque, DIPC
Kepa Ruiz Mirazo, EHU, Biofisika Institute
Moderator: **Valentina Rodríguez**, DIPC

NEW PATHS OF SCIENCE

Since 2012, the Ernest Lluch Cultural Center in Amara, part of the Donostia Kultura network, and DIPC have jointly organized *New Paths of Science*, a lecture series that has become a regular meeting point between researchers and citizens. The program offers audiences the opportunity to engage directly with local scientists, learn about their work, and discover the cutting-edge research carried out within the DIPC community.

In 2025, two talks, one in spring and one in autumn, were held, attracting more than **150 attendees**. Since 2023, the talks have also been made available as a podcast through Donostia Kultura Irratia, allowing audiences to revisit the lectures.

01/04/2025 Ernest Lluch Cultural Center, Donostia / San Sebastián
Todo lo que siempre quiso saber del universo, pero nunca se atrevió a preguntar
Juan José Gómez Cadenas, Ikerbasque, DIPC

04/11/2025 Ernest Lluch Cultural Center, Donostia / San Sebastián
Lege klasikoetatik harago, material kuantikoak gure gizartean
Maria Navarro Gastiasoro, DIPC

MESTIZAJES

Mestizajes is an interdisciplinary program that brings together artists, writers, scientists, and humanists to foster dialogue, critical thinking, and the creation of new forms of knowledge. By crossing the boundaries between art, literature, and science, the program promotes innovative perspectives through lectures, performances, research projects, and collaborations.

5th International Conference on Science and Humanities

14-15/10/2025
Donostia / San Sebastian, Spain

The fifth edition of the International Conference on Science and Humanities brought together researchers, writers, and thinkers to explore the intersections between science, culture, and society. Discussions addressed topics such as the relationship between genius and madness, the evolution of intelligence, and the use of quantitative methods to study culture. The conference also examined how scientific approaches can help us understand cultural networks and the production of knowledge.

The program combined specialized workshops at DIPC with public lectures at Tabakalera, fostering dialogue between the sciences and the humanities.

Public lectures held as part of the conference:

14/10/2025 Kutxa Fundazioa Kluba, Tabakalera, Donostia / San Sebastián
La magnífica familia de los nerviosos
Rosa Montero, writer

15/10/2025 Kutxa Fundazioa Kluba, Tabakalera, Donostia / San Sebastián
Inventar futuros. Los cruces de la imaginación científica y la imaginación artística
Jorge Volpi, writer

The Interview (La Entrevista)

In January 2025, the website https://laentrevista.mestizajes.es/ was launched, providing open-access materials related to the theatre play *The Interview*, including staging information, author profiles, press materials, and the full script in both Spanish and English.

Written by **Luisa Etxenike** and **Gustavo Ariel Schwartz**, the play explores the relationship between science and society through a dialogue between a renowned scientist and a journalist. Inspired by the historical relationship between Niels Bohr and Werner Heisenberg, the work combines scientific, ethical, and personal dimensions.

Originally premiered at DIPC's *Passion for Knowledge* festival in 2013, the play returned to the stage in 2025 at Madrid's Círculo de Bellas Artes as part of the second Bienal Ciudad y Ciencia.

21-22/10/2025 Teatro Fernando de Rojas, Círculo de Bellas Artes, Madrid
La Entrevista
by **Luisa Etxenike** and **Gustavo Ariel Schwartz**
Cast: **José A. Cembranos** and **Tiberio Ezquerra**
Directed by **José Vicente García Ramos** and **Pilar Martín García**

Complex networks reveal emergent knowledge in Wikipedia

In collaboration with The CulturePlex Lab (Canada), Mestizajes continued its long-term research on cultural systems and interdisciplinary knowledge through the analysis of complex networks. This line of work explores Wikipedia as a large-scale cultural ecosystem, revealing connections between disciplines such as science, art, and literature.

In 2025, this research resulted in two scientific publications and laid the foundations for future outreach and cultural initiatives.

JOT DOWN SCIENCE

03-04/10/2025
Laboratorium Museoa, Bergara

Since 2015, DIPC has collaborated with the cultural magazine Jot Down in the annual Jot Down Science outreach contest, which recognizes outstanding works in science communication, science fiction, scientific illustration, and photography.

The winners are announced each year during *Jot Down Science*, a public event that combines the awards ceremony with lectures, workshops, exhibitions, and activities aimed at bringing science closer to society.

In 2025, *Jot Down Science* took place in Bergara under the theme ***Critical Elements: From Tungsten to Rare Earths***. Centered at Laboratorium Museoa, the program brought together leading science communicators, researchers, and members of the public through talks, family activities, and guided visits. The event also featured *Bedelkar Jaia*, a town-wide celebration that transformed Bergara into an open-air science laboratory through themed decorations, gastronomic activities, and the involvement of local businesses.

Jot Down Science Outreach Awards 2025

BEST SCIENTIFIC DISSEMINATION ESSAY
El ánodo del mundo by **José Antonio Bustelo**

BEST SCIENCE FICTION NARRATIVE
El código W by **Alicia Giner**

BEST SCIENTIFIC ILLUSTRATION
Elemento 74 by **Amanda Salas**

BEST PHOTOGRAPHY
No award granted in this category

KOSMOS La epopeya de las partículas
Antoine Letessier-Selvon

COLLECTION
DIPC Kultura / Cultura DIPC

In 2025, DIPC and Jot Down Books launched DIPC Kultura / Cultura DIPC, a new editorial series devoted to fostering dialogue between science, art, thought, and society. Conceived as a long-term collaboration between a scientific institution and a cultural publisher, the initiative aims to publish accessible yet rigorous works that explore the intersections between scientific knowledge, culture, and contemporary society.

The collection was designed as a bilingual project, with titles published alternately in Basque and Spanish. It includes both original works and translations of books that had not previously been available in either language.

The series kicked off in May 2025 with the publication of Kosmos. ***La epopeya de las partículas*** by **Antoine Letessier-Selvon**, a particle physicist who has turned the history of the universe into an accessible narrative without compromising scientific rigor. This first title set the tone for a collection intended for curious readers interested in engaging with complex ideas beyond disciplinary boundaries.

ARTEUPARTE

Arteuparte by Jot Down is a biannual print magazine dedicated to contemporary art and culture through essays, interviews, visual narratives, and creative projects. Since 2024, DIPC has collaborated with the magazine through a dedicated Art and Science section, exploring scientific ideas from artistic and cultural perspectives.

In 2025, the following contributions were published:

Number 31 + 3 July 2025
Un paseo cuántico por el arte de lo indeterminado
Ángel L. Fernández
Micropifánicas
Mesalina

Number 31 + 4 December 2025
Los lienzos atómicos
Ángel L. Fernández
Entre lo invisible y lo incomprensible
Laura Linares

MAPPING IGNORANCE

Mapping Ignorance is an English-language science communication platform and an initiative of the EHU Chair of Scientific Culture under the Project Campus of International Excellence - Euskampus. Coordinated by science communicator **César Tomé**, the platform publishes articles on cutting-edge research aimed at making science accessible to a broad educated audience.

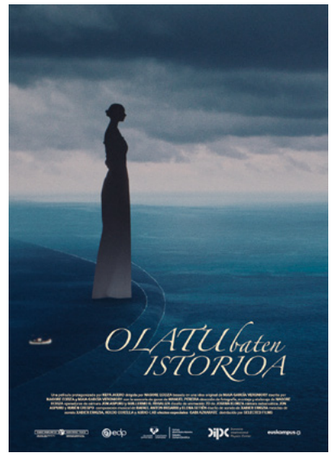
Since 2015, DIPC has contributed weekly articles covering all the center's research areas. By the end of 2025, **a total of 482 articles based on DIPC research** had been published on the platform.

Link to the blog:
www.mappingignorance.org/author/dipc

OTHER COLLABORATIONS

In addition to its own outreach program, DIPC actively collaborates with a range of initiatives organized by partner institutions in the fields of science, culture, and education, often through the participation of its researchers and science communicators.

In 2025, these collaborations included *Inspira Bizitzak*, an initiative organized by Kutxa Fundazioa to encourage young people, especially girls, to consider careers in science and technology; *Pint of Science*, the international festival that brings researchers and the public together through informal talks in bars and cafés, featuring contributions from DIPC researchers **Esteban Zingales**, **Manuel Sánchez del Castillo**, and **Francesc Balleste**r; and *Open Dialogue on Art and Science*, organized in collaboration with the Cristina Enea Foundation in the framework of the exhibition *Latires*, featuring a public conversation between artist **Nisa Goiburu** and DIPC Director **Ricardo Díez Muiño** on the complementary perspectives of art and science in understanding our relationship with nature.



Short film *OLATU BATEN ISTORIOA*

Olatu Baten Istorioa (The Story of a Wave) is a spin-off of the Surf and Science cycle jointly organized by DIPC and the EHU Chair of Scientific Culture in collaboration with Donostia Kultura. Directed by **Nagore Eceiza** and produced by El Santo Films, the short film follows surfer **Kepa Acero** while exploring the physics of waves through the scientific contributions of DIPC senior researcher **Maia García-Vergniory**.

Following its premiere in 2024, the film continued its successful international festival run throughout 2025, receiving awards and being selected for screenings at festivals in Spain, Greece, Portugal, and the United States. Highlights included the **Best Short Film Award at the II Festival de Cine y Cortometraje en el Medio Rural** (Cantabria) and the **Miquel Fàbregas Award** in Spain.

Selected festivals and screenings in 2025 included:

- International Documentary Festival of Ierapetra (Greece)
- Portuguese Surf Film Festival (Portugal)
- Lighthouse International Film Festival (USA)
- Bilbao Surf Film Festival (Spain)
- Altafulla International Film Festival (Spain)
- New Spanish Shorts - Spanish Kaleidoscope (Spain)

Screening of EL SECRETO DE LA NATURALEZA

El secreto de la naturaleza / The secret of Nature (José Antonio Pérez Ledo, 2018), co-produced by EHU Chair of Scientific Culture and K2000, traces the life and work of Pedro Miguel Echenique, offering a biographical portrait in which he reflects on the relationship between science and beauty.

Since 2024, DIPC and the EHU Chair of Scientific Culture have jointly organized public screenings of the documentary followed by conversations with Pedro Miguel Echenique. In 2025, two special sessions were held in Pamplona and Ondarroa, bringing together audiences from different backgrounds to reflect on science, culture, and society through the film.

03/04/2025 Navarra Film Archive, Pamplona
Following the screening, **Pedro Miguel Echenique** was interviewed by **Icíar Astiasarán**, Professor of Nutrition and Bromatology at the University of Navarra and member of Jakiunde.

26/05/2025 Kofradia Zaharra, Ondarroa
Organized as part of the 10th anniversary celebrations of Zientziaren Giltzak, the screening was followed by a public dialogue between **Pedro Miguel Echenique** and A**na Urkiza**, President of Eusko Ikaskuntza.

QUANTUM MILE

In 2025, the Basque Government's Department of Science, Universities and Innovation launched *Quantum Mile*, a scientific and technological route designed to showcase the quantum research ecosystem of the Ibaeta campus in Donostia / San Sebastián, one of the most active quantum hubs in Europe.

The initiative was presented in the context of the inauguration of the IBM Quantum System Two computer, housed in the new Ikerbasque building, which also serves as the headquarters of the Basque Quantum alliance. *Quantum Mile* brings together **seven research and academic institutions**, including DIPC, CFM, CIC nanoGUNE, Tecnun, the EHU Faculties of Computer Science and Chemistry, and the new Ikerbasque building.

Presented in October 2025, the route offers two complementary ways to explore the quantum ecosystem of the Ibaeta campus. A **walking route** connects the participating institutions through a series of physical information points installed across the campus, while an **interactive virtual tour** based on 360-degree images allows visitors to explore facilities such as the IBM quantum computer, DIPC's Hyperion supercomputer, and laboratories dedicated to nanotechnology, microscopy, and quantum algorithms.

The virtual tour is available at
www.quantummile.basquequantum.eus

SCIENCE WEEK (EHU)

06-08/11/2025
Tabakalera, Donostia / San Sebastián

Each year, researchers and science communicators from DIPC join colleagues from the Materials Physics Center (CFM, CSIC-EHU), CIC nanoGUNE, and POLYMAT in the Science Week organized by EHU at Tabakalera. Through exhibitions, workshops, and public activities, the initiative brings current research closer to schoolchildren and the general public.

As part of the stand *Exploring the World of Materials*, visitors were invited to discover the properties of materials and explore the microscopic world through hands-on activities. DIPC researchers also contributed to the program through talks and workshops for different audiences.

06-08/11/2025
Exploring the world of materials
Interactive stand

07/11/2025
Light and colours: How do we distinguish them?
Jon Mattin Matxain, EHU, DIPC
Zientzia Club stand-up monologues

08/11/2025
Scale your World
Workshop for children (4-8 years old)

SPECIAL EVENTS AND ACTIVITIES

DIPC's outreach program remains open and flexible, allowing the incorporation of special activities linked to visits by distinguished scientists, artistic collaborations, and unique opportunities of interest to the public.

Searching for Life on Mars with the Rosalind Franklin Rover

12/03/2025 Kutxa Fundazioa Kluba, Tabakalera, Donostia / San Sebastián
Public lecture by **Jorge Vago**, European Space Agency (ESA)

In 2028, ESA's ExoMars mission is expected to send the Rosalind Franklin rover to Mars. Equipped with advanced instruments capable of drilling up to two meters below the Martian surface, the rover will search for evidence of past or present life and investigate the planet's geological history. Jorge Vago, lead scientist of the European Space Agency's ExoMars mission, delivered a public lecture to explain the scientific objectives of the mission and the technological challenges involved in one of ESA's most ambitious planetary exploration projects.

Crystallization of Dance

12/06/2025 Victoria Eugenia Theatre's Club Room, Donostia / San Sebastián
Performance

Crystallization of Dance is an interdisciplinary performance created by crystallographer **Juan Manuel García-Ruiz** and flamenco dancer and choreographer **Vanesa Aibar**. The show explores the dialogue between science and art through a staged encounter between two complementary ways of understanding the world: abstraction, represented by crystalline and inorganic structures, and empathy, embodied in the organic and the living.

Following its tour across Spain, the show arrived in San Sebastián in 2025, attracting a full audience at the Victoria Eugenia Theatre's Club Room.

Vanesa Aibar, dancer
Juan Manuel García-Ruiz, Ikerbasque, DIPC
María Marín, musician

DIPC 2025 THE YEAR IN MEDIA

324	52	19	+800
newspaper articles	radio broadcasts	television appearances	online impacts

R&D+i Projects

R&D+i Projects Office

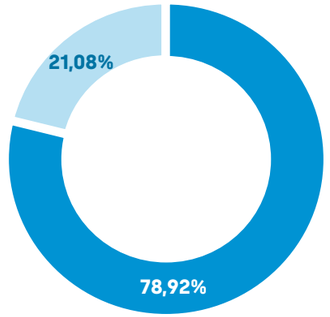
DIPC R&D+i Projects Office is dedicated to the management and coordination of R&D+i Projects. We also provide support for transversal topics within the center, such as Open Science and Technology transfer.

As part of our commitment to fostering high-quality research and innovation, DIPC R&D+i Projects Office provides support throughout the entire lifecycle of the research projects, from proposal preparation to project implementation and reporting.

Competitive Funding Analysis

DIPC Funding Distribution — 2025

Competitive funding vs. structural funding



Competitive funding — 78,92%
Grants obtained through public or private competitive calls at the level of:

- European
- National
- Local
- Private

Structural funding — 21,08%
Recurring institutional support and agreements with:

- Basque Government
- Provincial Council of Gipuzkoa
- Donostia City Council
- Corporate sponsorships and earmarked grants

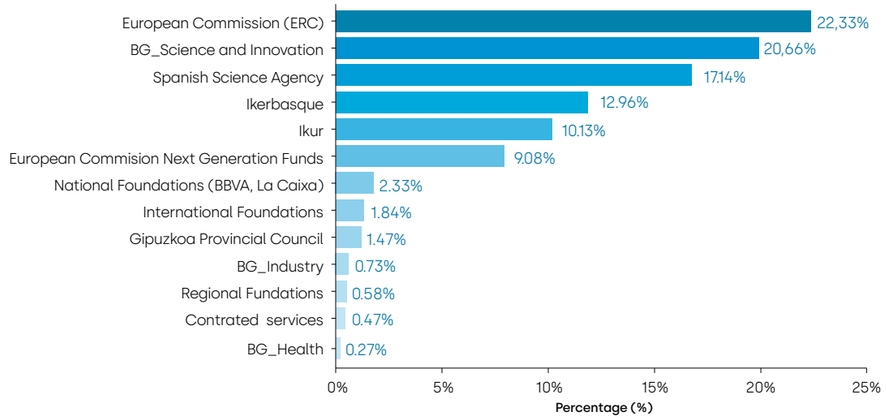
The predominance of competitive funding reflects DIPC's position as an internationally recognized center of research excellence.

Distribution by funding source

Competitive funding is distributed across 156 grants and 17 distinct funding sources. The breakdown consists of 84.22% current expenditure and 15.78% investment. Investment represents a substantially higher share within competitive funding than within structural funding, reflecting the strategic equipment associated with major scientific projects.

Competitive funding: distribution by source

(% relative to total competitive funding)



Competitive funding: executed amount in 2025 by source and percentage relative to total competitive funding.

The European Commission (combining ERC grants and NextGenerationEU) represents the largest competitive funding stream, accounting for approximately 31.4% of competitive funding executed in 2025. The competitive lines linked to the Basque Government (Science, Industry and Health Departments, IKUR Strategy and Ikerbasque jointly) account for 45% of the competitive total funding. The BERC (Basque Excellence Research Centers) program of the Basque Government is the single largest competitive grant in the Center's portfolio in fiscal year 2025 representing 16.38% of total competitive funding and 12.93% of the total funds received by DIPC. This illustrates both the scale of the Basque Government's commitment to scientific excellence and the central role played by the BERC program in the financial sustainability of DIPC as a research center.

The "Ikerbasque funding 2025" represents 12.96% of total competitive funding and 8.40% of the total funds received by the Center, making it the second largest competitive grant after the BERC accreditation. Together, BERC and Ikerbasque co-funding account for over a quarter of DIPC's competitive funding, underscoring the structural importance of the Basque public research system in supporting both institutional excellence and individual scientific careers at the Center.

The Spanish Ministry / State Research Agency accounts for the 17.14% of the total competitive funding. In 2025, DIPC has been re-accredited as a Severo Ochoa Center of Excellence by the Spanish State Research Agency (AEI). The Severo Ochoa program distinguishes research centers whose scientific output, leadership and international impact place them among the world's leading institutions in their fields. In financial terms, it represents 6.39% of total competitive funding and 5.04% of the total funds received by DIPC in 2025.

This distribution illustrates a balanced portfolio spanning European, national, local, and institutional competitive instruments, underpinning DIPC's standing as an internationally competitive research center.

Flagship projects

BERC

DIPC is one of the research centers accredited under the BERC (Basque Excellence Research Centers) program of the Basque Government, administered by the Department of Science, Universities and Innovation. The BERC scheme is a flagship instrument designed to provide stable, multi-year support to non-university research centers of demonstrated scientific excellence in the Basque Country, ensuring the continuity of strategic research lines and the consolidation of high-impact research teams.

IKERBASQUE

Ikerbasque, the Basque Foundation for Science, is the Basque Government-affiliated agency in charge of attracting, retaining and consolidating top-tier scientific talent across the Basque research ecosystem. DIPC hosts a significant number of Ikerbasque Research Professors, Research Associate Professors and Research Fellows, who form a core part of the Center's scientific staff. Ikerbasque constitutes a vital mechanism for attracting and retaining international talent, world-class researchers and emerging scientific leaders to the Basque research system.

European Research Council

DIPC currently holds seven (7) active European Research Council (ERC) grants – covering the full range of ERC instruments (Synergy, Advanced, Consolidator and Starting grants) – which jointly contributed 22% of competitive funding. This portfolio is one of the strongest indicators of DIPC's scientific excellence at the European level.

Active ERC portfolio

7 grants

IKUR 2030 Strategy

Within IKUR 2030, promoted by the Department of Science, Universities and Innovation of the Basque Government, DIPC strengthened its role as a leading scientific actor in areas considered strategic for the Basque Country. In particular, DIPC acts as the leading scientific coordinator for Quantum Technologies and High Performance Supercomputing and Artificial Intelligence (HPC&AI), coordinating strategic planning, scientific guidance and collaboration among research centers, universities and technology agents. In Quantum Technologies, DIPC contributed to articulating the Basque roadmap for quantum science and technology, facilitating inter-institutional cooperation and representing the Basque quantum ecosystem in national and European forums. In HPC&AI, DIPC promoted the integration of advanced computing and artificial intelligence capabilities across the Basque research system, supported by its own infrastructures, including the Hyperion and Atlas HPC clusters, which are available to the wider research community. In addition, within the Neurobiosciences area, NanoNeuro was consolidated as a strategic project in its own right, led by DIPC and focused on connecting nanoscience and neuroscience.

Next Generation EU

With regard to the European Next Generation EU funds, DIPC maintained a central position as Basque coordinator of two Complementary Plans: Quantum Communications and Advanced Materials. In both cases, DIPC supported the scientific and administrative coordination of the Basque agents involved, the monitoring of milestones and deliverables, the management of reporting obligations, and alignment with national objectives. In the Complementary Quantum Communications Plan, which entered its final implementation phase in 2025, DIPC coordinated the consolidation of results and the transition towards longer-term sustainability frameworks. In the Advanced Materials Plan, DIPC supported the structure of Basque collaboration in areas such as two-dimensional and quantum materials, functional nanomaterials, and materials for energy and biomedical applications.

Beyond these coordination responsibilities, DIPC also participated in other PRTR-funded initiatives, including Quantum Spain, contributing to the development of quantum algorithms and software; Hyper-Kamiokande, the international neutrino experiment in Japan; and the Quantum Communications Hub, awarded in 2025, which positions DIPC as a national reference point in quantum communications and reinforces the connection between research, technological development and industry.

Research Knowledge Transfer

As part of our mission to promote the societal and economic impact of scientific research, we support researchers in identifying, protecting, and exploiting the innovative potential of their research work. DIPC R&D+i Projects Office works closely with specialized Basque partners and external experts who bring complementary knowledge, tools, and networks to strengthen DIPC's transfer and innovation efforts.

One of the main outcomes of this effort has been the development of a broad intellectual property portfolio, covering fields such as advanced materials, biomedical technologies, chemistry, sensing technologies, and quantum science. As of 2025, DIPC is involved in 9 active patent families. Many of these results have been produced thanks to collaborations with national and international research institutions, which reflects the interdisciplinary and applied potential of the Center's work.

Furthermore, DIPC actively participates in collaborative innovation projects and partnerships with companies, technology centers, and public institutions. Along with institutional support for patent protection, collaboration agreements, and engagement with investors, these activities strengthen the pathways through which scientific knowledge is transformed into technological innovation with social and economic impact.

The current patent portfolio of DIPC is shown in the following table:

DIPC Patents

Patents ordered by publication date, from most recent to oldest

DATE	PATENT NUMBER	TYPE	DESCRIPTION AND INVENTORS
2025	EP 25383197.8	European Patent Appl.	**Functionalized Nanoparticles for Use in the Treatment of Cerebral Ischemia** Ander Ramos Murguialday; Héctor Lozano Peiteado; Iñaki Ortego Isasa; Aitzol García Echarri; Marek Grzelczak, Rafael Yuste Rojas
2025	WO 2025/088598 A1 PCT/EP2025/088598	PCT International Appl.	**Biodegradable Nanoparticle Compositions for RNA Delivery** Amanda Ribeiro Guimarães; Luis Liz Marzán; Thomas Schäfer
2025	EP 25382661.4	European Patent Appl.	**Gantry for Positron Emission Tomography** Juan José Gómez Cadenas; Roberto Soleti; Francisco López Gejo
2025	WO 025/132825 A1 PCT/EP2024/078454	PCT International Appl.	**1H-Imidazo[4,5-c]quinoline Metal Based Complexes Useful as Medicaments** Luca Salassa; Ricardo Moro; Ana C. Carrasco; Miguel Huertos
2025	EP 4255626 B1 EP 21816114.9	European Patent (granted)	**Catalytic Systems Based on Isoalloxazines and Their Uses** Fernando López Gallego; Luca Salassa
2025	EP 253821490	European Patent Appl.	**Methods and Compounds for the Treatment of Cancer** Luca Salassa; Ricardo Moro; Ana C. Carrasco; Miguel Huertos
2025	PCT/EP2025/084344	PCT International Appl.	**Catalytic Membrane Comprising a Nucleic Acid** Iván Rivilla de la Cruz; Fernando Pedro Cossío Mora; Amanda Ribeiro Guimarães; Thomas Schäfer
2024	US 2024/0091754 A1	U.S. Patent Appl.	**Heterogeneous Redox Catalytic System** Fernando López Gallego; Luca Salassa
2022	WO 2022/003201 EP 4176077 A1	PCT & European Appl.	**Method for Colorimetric Detection of Analytes in Biological Samples** María Jesús Grillo Dolset; Victoria Eugenia Garrido González; Francisco Javier Aizpurua Iriazabal; María Sanromán Iglesias; Marek Grzelczak; Inés Echeverría Goñi

Open Science

DIPC is firmly committed to fostering a culture of openness and transparency in research. The Center actively aligns its practices with national and international Open Science standards, while recognizing the complexity and continuously evolving nature of this topic.

In 2025, DIPC established an Open Science Working Group (OS WG), tasked with designing and guiding the implementation of the center's Open Science strategy. The group brings together researchers from different scientific areas, as well as management and research support staff, ensuring a comprehensive and inclusive approach.

During 2025, the following progress has been achieved:

Training and awareness within the community: Members of the DIPC community, particularly those involved in the Open Science Working Group, have participated in training activities, covering topics such as Data Management Plans (DMPs), data curation, and research data management.

Implementation of Open Science practices and researcher support

- **Open Access to research publications:** An analysis of current Open Access practices within DIPC has been carried out, providing the basis for the development of Center-wide Open Access guidelines.

- **Open Data:** DIPC secured competitive funding to establish an institutional data repository which aims to become the data repository for Basque research organizations. This infrastructure will enable researchers to deposit, manage, and share their research data. Importantly, the funding includes the recruitment of a dedicated data steward, who will support researchers in data management practices and ensure that DIPC research data complies with FAIR principles.

Equality, Diversity and Inclusion

At DIPC, we reaffirm our commitment to advancing gender equality and to fostering an inclusive, diverse and respectful organizational culture. Following the launch of the First Equality Plan in 2020, the Center has spent the past years consolidating structural measures and advancing key initiatives in this area. This work has also laid the foundations for the Second Equality Plan, scheduled to be launched in 2026.

Organizational Culture and Governance

Throughout 2025, DIPC maintained a set of structural actions aimed at embedding equality, diversity and inclusion in governance and organizational culture. The Equality Committee operated on a regular basis, combining continuity with the incorporation of new members to ensure diverse perspectives. Periodic follow-up meetings and the systematic inclusion of the gender variable in administrative databases have reinforced transparency and accountability.

Equality-related policies, including the Equality Plan, the harassment prevention protocol, and diversity-promoting guidelines, were continuously communicated to DIPC community. Training sessions on inclusive language and communication were also been delivered, particularly targeting staff involved in outreach and communications activities.

Prevention of Sexual Harassment and Gender-Based Violence

The Protocol for the Prevention of Sexual Harassment and Gender-Based Harassment, including harassment based on sexual orientation or gender identity, remained fully active throughout 2025. Awareness-raising initiatives and targeted training for confidential counsellors ensured that all members of DIPC community remain informed about their rights and responsibilities, reinforcing a safe and respectful working environment.

Work-life balance and co-responsibility

Measures to support work-life balance and co-responsibility were fully consolidated at DIPC. Meetings were scheduled within core hours, parental and paternity leave were duly considered in evaluation processes, and temporary replacements were funded to adjust workloads when staff reduced hours or took a leave. In addition, the working time registration system continued to monitor hours and overtime, contributing to a balanced and sustainable work environment.

Diversity, recruitment, and career development

During 2025, DIPC maintained its commitment to promoting diversity and addressing horizontal segregation in recruitment and career development. Positive actions encouraged applications from underrepresented groups, and diversity-related factors are incorporated in evaluation criteria.

A notable achievement in 2025 was the strong representation of women in leadership and management positions, accounting for 57% of such roles. This reflected tangible progress in achieving gender balance at decision-making levels. Exit questionnaires also provided valuable insight into staff retention and career progression, helping to inform future policies.

In addition, DIPC continued its involvement in the Women and Science program, launched in 2021 by the Gipuzkoa Provincial Council and DIPC. The program aims to promote the presence of women of excellence in science, in line with DIPC's mission and the Council's objective of advancing gender equality, particularly in fields where underrepresentation is most pronounced.

In 2025, within this framework, DIPC hosted an *Inspiring Careers* session featuring a lecture by **Yamuna Krishnan** (The University of Chicago), followed by an interview with **Luca Salassa** (DIPC, Ikerbasque).

Outreach, visibility, and inclusion

Gender equality, diversity and inclusion remained central to the outreach strategy of DIPC throughout 2025. In this context, DIPC continued to support initiatives such as *Emakumeak Zientzian*, aimed at promoting diverse scientific role models, fostering inclusion, and challenging traditional stereotypes about careers in science. DIPC is also the producer of STRØM – Inclusive Astronomy, a multisensory and accessible exhibition created in 2023 and currently touring different venues, designed to bring astronomy closer to all audiences, including people with functional diversity. Through these initiatives, DIPC reinforced its commitment to inclusive science communication and to inspiring new generations to engage with research.

Preparation of the Second Equality Plan

In 2025, DIPC completed the evaluation of the First Equality Plan (2020–2024) and initiated the diagnostic phase for the Second Equality Plan. This process included the standardization of job position audits and evaluation procedures, as well as the formal establishment of the Negotiating Committee required for its registration.

The renewed Gender Equality Committee provided guidance throughout the development process, combining institutional continuity with new perspectives. The Second Equality Plan is scheduled for full approval and registration in 2026.

Image: NICDO-Planetario Pamplona

Personnel Segregated by Gender

	Total Staff	Women	Men
Direction & Management			
Director	1	0%	100%
Management	6	67%	33%
Total	7	57%	43%
Scientific			
Technical Support	11	9%	91%
Early stage Researchers	78	35%	65%
Post-doctoral Researchers	67	25%	75%
Research Fellows	7	57%	43%
Permanent Researchers	44	11%	89%
Total	207	27%	73%
Administration & Services			
Administration	11	82%	18%
IT Personnel	9	33%	67%
Maintenance	2	0%	100%
Outreach	4	100%	0%
Projects	4	50%	50%
Total	30	60%	40%
TOTAL	**244**	**31%**	**69%**

	Total Staff	Women	Men
Associates and Visiting Researchers			
DIPC Associates	70	23%	77%
Visiting Researchers	211	21%	79%

Data as of 31/12/2025. DIPC includes the non-binary gender definition, but none has been recorded to date.

Scientific Highlights

Emergence of Moiré Dirac Fermions at the interface of topological and 2D magnetic insulators

Klimovskikh II, Hadjadj SE, Thakur A, Saunot A, Rogero C, Tallarida M, Dai J, Trontl VM, Weber AP, Gu GD, Lobo-Checa J, Ilyn M, and Valla T

ACS Nano 19, 41, 36411 (2025)

The observation of superconductivity, magnetism, correlated insulating and quantized anomalous Hall phases in magic-angle twisted double-layered graphene sheets has opened the new field of "twistronics" in condensed matter physics. The exotic effects seen are based on moiré patterning of the electronic structure, realized when two graphene (or some other 2D vdW material) sheets are overlaid with a small ("magic") twist angle between them. So far, the "twistronics" has been exclusively applied to topologically trivial systems, such as graphene and transition metal chalcogenides. It has recently been suggested that even richer physics, with more intriguing phenomena, should be realized if moiré patterning is induced on surfaces of 3D topological insulators. However, to date, such structures have not been synthesized due to the fabrication challenges related to the 3D topological insulators stacking.

In this work, an international collaboration of researchers, that includes scientists from both DIPC and CFM research centers in Donostia, reports the successful realization of a moiré pattern on a 3D topological insulator (Bi_2Se_3) by molecular beam epitaxy deposition of a single slab of FeX_2 (X = Cl or Br) on its surface. Scanning tunneling microscopy measurements unveil the moiré superstructures and their structural parameters, which are tunable by the choice of halogen atoms in the ultrathin film of transition metal dihalide (see Figure 1). The control of moiré periodicity by the film selection is analogous to the twisting angle in graphene layers and represents the tuning knob for controlling the correlation effects in the patterned topological system. Indeed, angle-resolved photoemission data directly show the moiré replicas of the Dirac cone (see Figure 2). Remarkably, the authors found the signature of the replicas' interaction – minigap – not at the K points, as would be expected for a simple moiré model, but at the M points of the moiré Brillouin zone. This indicates that time-reversal symmetry is broken and, therefore, magnetism plays a role. When compared with the theory for a magnetic moiré superlattice, the authors find a perfect match with the case of an exchange moiré potential, expected for an interface of a 2D magnet and a topological insulator.

This method of moiré patterning could also be applied to many other systems, including the topologically trivial ones, and could potentially grow into a cleaner alternative to "twistronics". Contrary to the top-bottom approach of "twistronics", based on often irreproducible manipulations of exfoliated flakes, the new method is a bottom-top approach. Additionally, it could also allow for an easier path to the large-scale applications, as the possible synthesis on a wafer scale.

When magnetism and topology meet, remarkable things happen. But how could these effects be tuned by adding the extra ingredient of a moiré pattern?

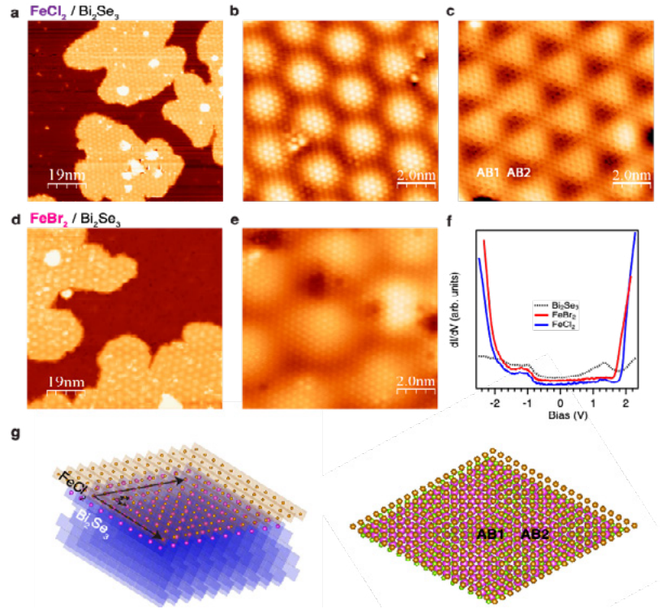


Figure 1: High-resolution LT-STM/STS of $FeCl_2$ and $FeBr_2$ films on Bi_2Se_3. (a) Topographic STM overview of the 0.5-0.6 ML sample $FeCl_2$/Bi_2Se_3. (b,c) Atomic-resolution STM images of the FeCl2 monolayer islands on Bi2Se3 at two selected bias voltages (-1.0 V and -0.25 V). (d) The same as (a) for $FeBr_2$/Bi_2Se_3. (e) The same as (b) for $FeBr_2$/Bi_2Se_3. The extracted lattice constant of the outermost Cl (Br) layer is 3.64 ± 0.06 ºA (3.80 ± 0.05 ºA) and the moire pattern has a periodicity of 2.88 ± 0.02 nm (4.43 ± 0.12 nm). (f) Average STS measurements of BS surface and FeX_2 islands after Dirac point energy alignment. The STM measurements have been performed at 4.9 K. (g) Schematic representation of the heterostructure. On the left only topmost Bi atoms (magenta) and Fe atoms (brown) are shown by spheres. On the right Fe atoms, topmost Bi and Se atoms (green) are represented in order to demonstrate the different registries.

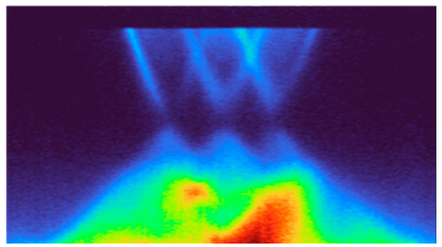


Figure 2: Raw ARPES image of the monolayer $FeBr_2$ on top of Bi_2Se_3 showing the replication of the Dirac cones due to moiré superlattice formation.

Moiré effects can be realized in topological materials — something that had long been theorized but never observed — and could host new topological and superconducting phases, potentially useful for quantum computing and low-power electronics.

Iridium-based time-resolved luminescent sensor for Ba^{2+} detection

Aranburu AI, Elorza M, Valle PRG, Pazos A, Brodolin A, Herrero-Gómez P, Barcelon JE, Molina-Terriza G, Monrabal F, Rogero C, Cossío FP, Gómez-Cadenas JJ, Tonnelé C, Freixa Z, and the NEXT Collaboration
ACS Sensors 10, 4, 2487 (2025)

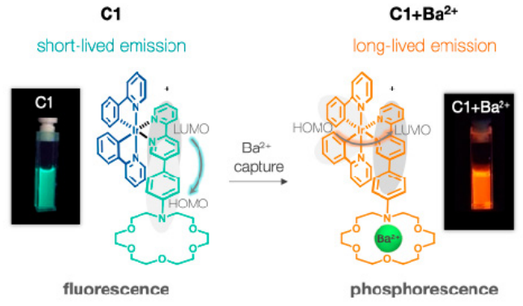
Many open questions remain in the field of particle physics, the matter/antimatter imbalance being one of the most compelling. According to the Big Bang theory, equal amounts of matter and antimatter were created during the formation of the universe, and should have yielded only pure energy as they annihilate on contact. Yet, something must have tipped the balance, as we live in a world dominated by matter. The key to that mystery could come down to a particle that must have behaved inconsistently with the current physics model to break the matter/antimatter symmetry: the neutrino.

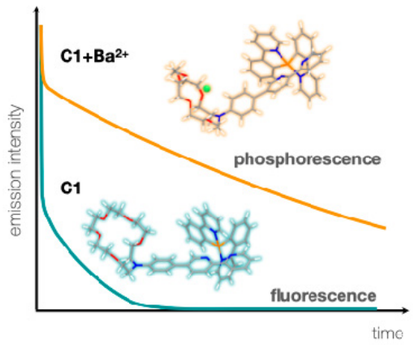
Researchers from the NEXT experiment within the BOLD Synergy Project (https://next.ific.uv.es/next/) are looking for answers in a rare particle process called the neutrinoless double β-decay (ββ0ν). In a regular double β-decay, two neutrons of a nucleus decay into two protons, emitting two electrons and two antineutrinos. However, if the neutrino is a Majorana particle, i.e., identical to its own antiparticle, an otherwise-forbidden reaction producing only two electrons can occur. One of the leading isotopes under investigation is ^{136}Xe, whose ββ0ν would produce a Ba^{2+} dication and two electrons. Distinguishing this elusive process from background radioactivity requires high-resolution setups with background discrimination. One way to achieve a virtually background-free experiment is the in-situ simultaneous detection of the daughter atom of the decay (Ba^{2+}) together with the signature of the two emitted electrons. That is where particle physics meets fluorescent chemosensing.

A molecular chemical sensor consists of a recognition unit for the selective binding of a given species, covalently linked to a chromophore whose optical response is modified upon capture of the analyte. Conventional approaches rely on either an on/off emission behavior, requiring large intensity ratio, or fluorescence spectral shifts large enough to ensure clear signal of the complexation. Both face serious limitations in a dense sensor layer, where a single chelated molecule is surrounded by many unchelated sensors. An elegant alternative is to impart the chemosensor with temporal resolution so that free and chelated states emit in different regimes, namely short-lived fluorescence and long-lived phosphorescence. In this context, researchers from the NEXT collaboration developed a new iridium-based chemosensor for Ba^{2+} detection exhibiting such luminescence temporal resolution. In a joint theoretical/experimental study, they demonstrated that the compound's response occurs in different time regimes in the free and chelated states. In the unchelated molecule, the excitation wavelength controls the relaxation pathway: low-energy excitation leads to intersystem crossing to the triplet manifold, killing the fluorescence, while higher-energy excitation allows for interconversion within the singlet manifold to ultimately relax to the emissive singlet state (fluorescence). Upon Ba^{2+} complexation, the system relaxes to a dark singlet, followed by efficient intersystem crossing and emission from the lowest triplet state (phosphorescence).

This unusual photophysical behavior was further characterized by measuring time-resolved emission spectra maps to reconstruct the stationary spectra that would be obtained by applying the specified time-gate. Applying a 500 ns delayed acquisition, the residual phosphorescence signal from the unchelated molecule is greatly rejected, allowing for virtually background-free detection.

The designed Ba^{2+} chemosensor behaves as a dual fluorescent/phosphorescent emitter, not only enabling time-resolved ratiometric sensing, crucial in the context of the NEXT experiment, but also paving the way for a new class of fluo-to-phosphorescent time-resolved sensors with broad applications in low-background detection.





Conceptual design of the time-resolved ratiometric iridium-based Ba^{2+} chemosensor C1: the unchelated organometallic luminescent sensor mainly relaxes through a ligand-centered emissive singlet state (fluorescence), swapping to the expected phosphorescent response upon dication complexation, endowing temporal resolution to Ba^{2+} detection.

A new modular iridium-based sensor for Ba^{2+} that behaves as a dual fluorescent/phosphorescent emitter enables time-resolved ratiometric cation sensing.

Size-dependent penetration depth of colloidal nanoparticles into cell spheroids

Zhu D, Brueckner D, Sosniok M, Skiba M, Feliu N, Gallego M, Liu Y, Schulz F, Falkenberg G, Parak WJ, and Sanchez-Cano C

Advanced Drug Delivery Reviews 222, 115593 (2025)

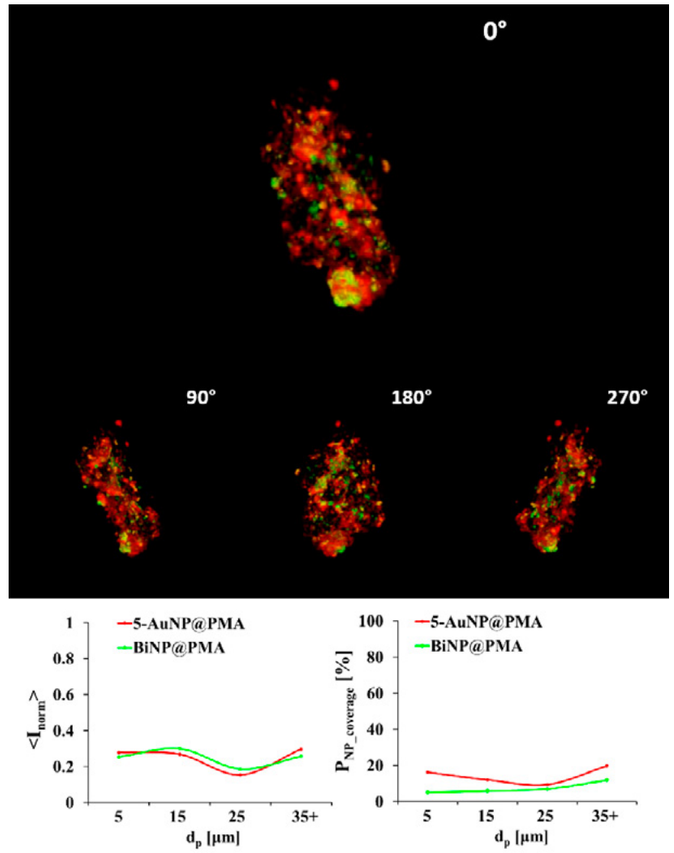
Nanoparticles (NPs) are essential for nanomedicine. They are used as therapeutic and drug-delivery systems, but also as diagnostic or contrast agents. However, to develop safe and effective NPs for nanomedicine, their behavior once inside the patient needs to be fully understood.

In this work, a team including researchers from DIPC, CIC biomaGUNE, DESY and the University of Hamburg compared some of the different analytical methods currently used to assess the penetration of NPs inside biological tissues. The techniques studied included inductively coupled mass spectrometry (ICP-MS), flow cytometry, optical fluorescence microscopy, X-ray fluorescence tomography (XRF-CT), and transmission electron microscopy (TEM), and they were used to probe the distribution of Au and Bi NPs of different sizes within 3D cell spheroid tumor models. This was done using experimental facilities at CIC biomaGUNE (TEM), Center for Hybrid Nanostructures (CHyN) at the University of Hamburg (optical microscopy and ICP-MS) and PETRA III X-ray storage source (XRF-CT).

The results confirmed that each of those methods offers advantages and disadvantages.

ICP-MS and flow cytometry provide very precise information on the accumulation of NPs in tumor models, but not on their distribution, as these techniques require digestion or disaggregation of the cellular components of the spheroid. TEM provides superb spatial and structural information from the studied tissues, with resolutions below 1 nm^2. However, it is limited to thin samples only a few tens of nanometers thick and normally requires extensive dehydration and staining, which alter the tissue being studied. Finally, optical microscopy methods can be used on unmodified tissues to observe penetration of NPs live down to depths of 100 μm, but with lateral resolution limited by the diffraction limit. Yet, most NPs require labeling with fluorescent molecules, which alters their behavior and interaction with biological matter.

Instead, XRF-CT offers a good compromise among these factors. X-rays penetrate deep into tissue and permit the detection of metal NPs directly. Thus, XRF-CT provides information on the 3D distribution of non-labeled NPs with good resolution on full spheroids after little or no tissue modification (see Figure). Unfortunately, acquisition of those images is slow, and X-rays cannot be used on living tissues for long periods of time as they can damage them. Nevertheless, ongoing or planned updates at most synchrotron facilities to fourth-generation X-ray sources should permit improving the speed and precision during the acquisition of similar XRF-CT experiments.



X-ray fluorescence maps showing the distribution of AuNP (5 nm diameter; red) and BiNP (40 nm diameter, green) in a tumor spheroid model. 3D remodeling of the tumor spheroid, showing the projection at 0° of rotation (top). Additional projections of the 3D remodeling of the tumor spheroid at 90°, 180° and 270° of rotation (from left to right, middle). Relative distribution of NPs $<I_{norm}>$ (dp) and volume occupied by them $P_{NP\_coverage}(d_p)$ depending on the penetration depth reached inside the tumor spheroid model d_p (bottom)

Studying the interaction between nanoparticles (NPs) and tissues is important for the development of nanomedicine. Different techniques can be used to probe the accumulation, distribution, and penetration of NPs in tissues, each offering distinct advantages and disadvantages. Among them, XRF-CT allows the investigation of NP penetration in thick tissue samples with good resolution after little or no tissue modification.

New platinum derivatives selectively cause double-strand DNA breaks and death in naïve and cisplatin-resistant cholangiocarcinomas

Olaizola I, Odriozola-Gimeno M, Olaizola P, Caballero-Camino FJ, Pastor-Toyos N, Tena-Garitaonaindia M, Lapitz A, Val B, Guimaraes AR, Asensio M, Huici-Izagirre M, Rae C, de Sancho D, Lopez X, Rodrigues PM, Herraez E, Briz O, Izquierdo-Sanchez L, Eleta-Lopez A, Bittner AM, Martinez-Amesti A, Miranda T, Ilyas SI, Braconi C, Perugorria MJ, Bujanda L, Rivilla I, Marin JJG, Cossío FP, and Banales JM

Journal of Hepatology 83, 5, 1077 (2025)

Cholangiocarcinoma (CCA) is a type of cancer that originates within the bile ducts. The best potentially curative option for CCA is surgery followed by a six-month treatment with capecitabine. However, in most cases (70-80%), by the time CCA is detected it is too late for this therapeutic action. The second option consists of a combination of cisplatin, gemcitabine and immune-checkpoint inhibitors, which is considered palliative since it offers modest survival improvements for advanced CCA.

Within this context, Aurkines (from the Basque words *Aurkitu* = to find, *Aurki* = shortly and *Aurka* = against) have been designed in order to circumvent the main weaknesses of cisplatin, namely its high toxicity and its low capacity to escape from DNA repair mechanisms of cancer cells. The concept underlying Aurkines design relies on the polyelectrophilicity concept (Image 1A). In cisplatin, Pt(II) acts as an electrophilic center able to suffer two consecutive nucleophilic attacks from guanine (G) units of DNA. This double attack results —among other substitution effects— in 1,2 (50-65%) and 1,3-intrastrand lesions (6-10%), with a low ratio (5%) of interstrand DNA lesions. Intrastrand lesions can be repaired by CCA cells, thus resulting in the deactivation of cisplatin. In Aurkines, a third electrophilic points is incorporated by means of a bromomethylene group (Figure 1). This carbon-electrophilic moiety necessarily results in a higher proportion of interstrand lesions (Figure 1). In addition, Aurkines incorporate a binding aromatic unit, highlighted in blue in Image B, which intercalates between two consecutive Watson-Crick pairs of DNA. This additional aromatic unit is connected to the platin-binding bicyclic scaffold by a rotatable covalent carbon-carbon bond in order to increase the adaptive features of Aurkines to the environment close to the G-units in order to facilitate the three consecutive nucleophilic attacks.

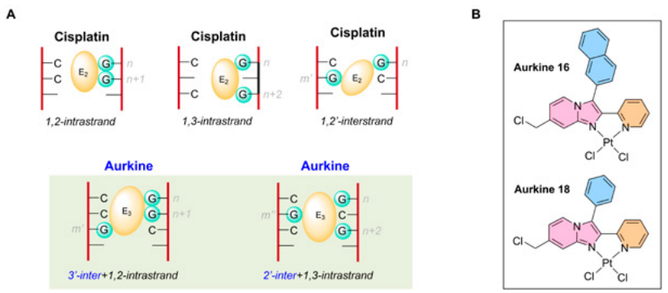


Figure 1: Structure and possible therapeutic action of Aurkines. (A) Inter- and intrastrand attacks expected for cisplatin and Aurkines. (B) Chemical structure of Aurkines.

These hypotheses were verified experimentally in DNA samples and in murine models of CCA. Thus, atomic force microscopy (AFM) experiments showed highly cleaved DNA structures after short incubation of naked DNA with Aurkine 16 (Figure 3). In addition, incubation (1h) with pUC18 plasmid (cyclic small double strand DNA) showed multiple cleavages indicating multiple interstrand lesions (Figure 3). In vivo xenografts in murine CCA models also showed a clear reduction of tumorvolume (Figure 3) in the presence of Aurkine 16. More importantly, Aurkinesd 16 and 18 showed significant decrease in the progression of CCA cisplatin resistant tumor in both ectopic and orthotopic murine models (Figure 3). These in vivo results show taht aurkines modify the tumor microenvironment, which boosts immunogenicity. Importantly, aurkines also triggered apoptosis in cisplatin-resistant CCA cells and cancer-associated fibroblasts without harming healthy cholangiocytes. This low toxicity opens a wider therapeutic window for this novel family of chemotherapeutic agents.

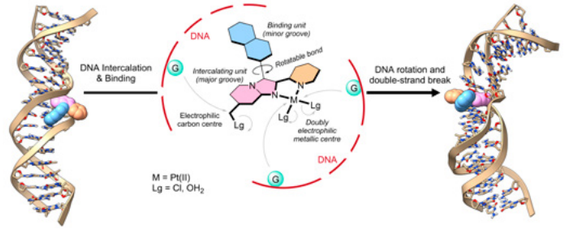


Figure 2: Design of Aurkines. The platinum and carbon electrophilic points for the attack of guanine (G) units of DNA are shown. The intercalating role of the aromatic rings highlighted in blue and the flexibility induced by the rotatable bond are also shown.

Aurkines represent a new generation of chemotherapeutic agents that demonstrate greater efficacy than cisplatin in experimental models of both naïve and cisplatin-resistant cholangiocarcinoma, as well as other cancer models. At therapeutic doses, they show no evident systemic toxicity in mice and also modulate the tumor microenvironment by targeting cancer-associated fibroblasts and boosting immunogenicity.

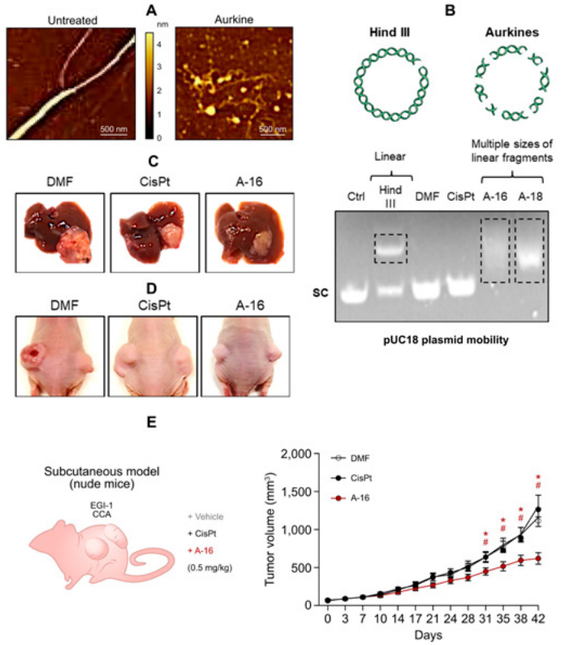


Figure 3: Experimental verification of the DNA damage induced by Aurkines in CCA models. (A) Atomic force microscopy (AFM) of untreated DNA and after incubation with aurkine 16 for 10 min. (B) Agarose gel analysis of pUC18 plasmid after 1 h incubation with vehicle, CisPt and Aurkine 16 or 18. Mobility of linear (Ind III) and supercoiled (SC) plasmid are gathered for comparison. (C) Representative macroscopic images of liver tumors from vehicle-, cisplatin-, and Aurkine 16-treated animals in an experimental murine model of CCA. (D) Representative tumor images in the subcutaneous CCA model. (E) Schematic representation of the subcutaneous CisPt-resistant CCA model and tumor volume growth during treatment with CisPt, Aurkines 16 and 18 (2 mg/kg) in the subcutaneous CisPt-resistant CCA model.

Twisting nanoporous graphene on graphene: electronic decoupling and chiral currents

Diaz de Cerio X, Bach Lorentzen A, Brandbyge M, and Garcia-Lekue A
Nano Letters 25, 4, 1281 (2025)

This study extends the concept of "twisted bilayers" to a combination of nanoporous graphene (NPG) and graphene, aiming to uncover how the introduction of nanopores and the twist angle influence the electronic and transport properties of the resulting structure.

Graphene is a single layer of carbon atoms arranged in a two-dimensional honeycomb lattice, renowned for its exceptional electrical conductivity, mechanical strength, and flexibility. Nanoporous graphene (NPG), on the other hand, is a modified version of graphene that contains a regular array of nanoscale pores, effectively making it a network of interconnected carbon nanoribbons. Nanopores introduce unique and tunable electronic properties, making NPG potentially suitable for applications in nanoelectronics and sensing.

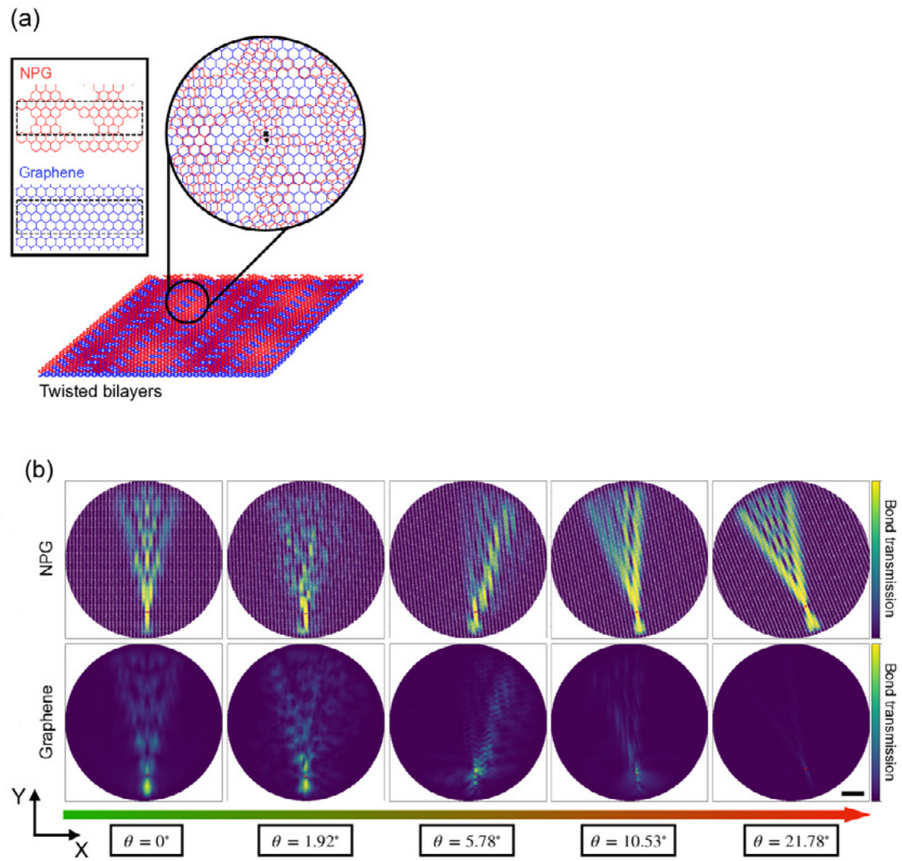
The authors employed an atomistic tight-binding model combined with non-equilibrium Green's functions to study the electronic properties of NPG/graphene bilayers across various interlayer twist angles. They discovered that at small twist angles (less than approximately 10 degrees), the NPG and graphene layers are strongly coupled, as it is evidenced by the hybridization of their electronic bands. As a result, electronic transport reveals that, when electrons are injected into the NPG layer, there is substantial transmission into the graphene layer, leading to observable interference patterns in the current flow on both layers.

However, as the twist angle increases beyond this small-angle regime, the electronic coupling between the layers weakens. As a consequence, each layer behaves independently at sufficiently large twist angles, and their unique individual characteristics are preserved.

An intriguing consequence of introducing a twist between the NPG and graphene layers is the breaking of mirror symmetry in the system. When this symmetry is broken due to the twist, it leads to the emergence of chiral features in the electronic currents. Chirality, in this context, means that the current exhibits a preferred directional flow, similar to how certain molecules can be "left-handed" or "right-handed." This tunable directionality could be exploited in the nanoscale control of electronic currents.

The authors further reveal twist angle-dependent fingerprints in the electronic density of states of the bilayers, providing means of experimentally detecting the twist angle-induced decoupling by means of widely employed spectroscopic techniques.

This research provides valuable insights into how the interplay between twist angle and the intrinsic properties of NPG and graphene can be harnessed to tailor the electronic characteristics of bilayer systems.



System setup and bond-transmissions. (a) Atomic structure of NPG (red), graphene (blue), and a twisted NPG/graphene bilayer. The black cross and the black point indicate the rotation axis and injection site, respectively. (b) Real-space bond-transmission maps in twisted NPG/graphene bilayers at an energy E = −0.4 eV. Top row: NPG layer. Bottom row: graphene layer. The red dot indicates the injection point in theNPG layer. Scale bar is 10 nm.

The van der Waals stacking on graphene can tune the anisotropic electron transport of NPG.
Electronic structure and large-scale transport simulations show that their relative angle works as a continuous knob for the interlayer electronic coupling.

Atomic-scale mapping of superconductivity in the incoherent CDW mosaic phase of a transition metal dichalcogenide

Sajan S, Guo H, Agarwal T, Sánchez-Ramírez I, Patra C, Vergniory MG, de Juan F, Prakash Singh R, and Ugeda MM

Nano Letters 25, 16, 6654 (2025)

Understanding how charge density wave domain structures influence superconductivity is essential for uncovering its microscopic origin in quantum materials. This study investigates the CDW mosaic phase in 1T-TaSSe and demonstrates, through high-resolution scanning tunneling spectroscopic measurements, that superconductivity emerges predominantly within nanoscale CDW domains rather than at domain walls.

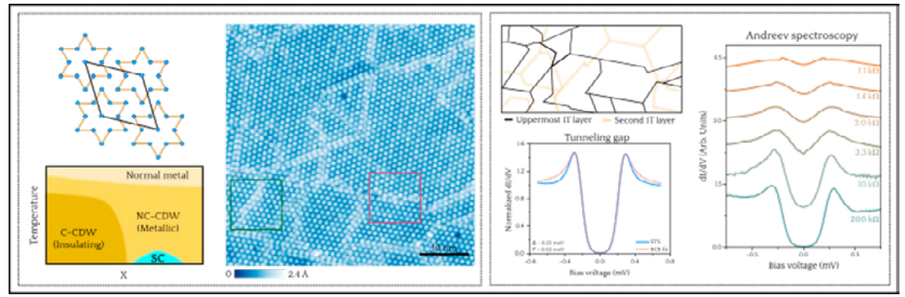
In 1T-phase transition metal dichalcogenides, the octahedral coordination of transition metal atoms produces an electronic structure that is particularly susceptible to charge density wave formation. At low temperatures, these materials typically settle into long-range CDW phases, which reconstruct the Fermi surface and open a partial electronic gap. When this long-range order is suppressed — such as through selenization of 1T-TaS_2 — the system frequently evolves into a superconducting state. In this process, progressive substitution of sulfur with selenium progressively destabilizes the extended CDW and breaks it into nanoscale domains, and this partial loss of coherence enables superconductivity to appear.

Using scanning tunneling microscopy together with tunneling spectroscopy, researchers directly visualize the electronic structure of the resulting CDW "mosaic" phase that coexists with superconductivity. In these experiments, researchers observe pronounced modifications in the low-energy electronic states upon entering the superconducting regime, with coherent pairing emerging despite the persistence of spatially textured CDW regions.

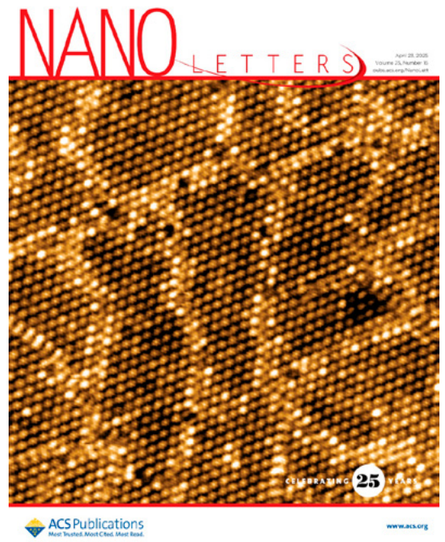
A central result of the study is that superconductivity in 1T-TaSSe is not primarily controlled by in-plane CDW domain walls, as previously suggested. Instead, the dominant factor is the loss of interlayer CDW registry between adjacent layers, which randomizes stacking and enhances interlayer electronic hopping. This process effectively drives a transition toward a more metallic electronic environment in which superconducting pairing can develop.

By combining spatially resolved spectroscopy with ultra-low-temperature measurements, researchers show that the superconducting state possesses a uniform energy gap consistent with BCS theory. Importantly, this gap remains essentially unchanged across regions with and without domain walls, demonstrating that superconductivity is insensitive to in-plane CDW fragmentation and instead reflects a more intrinsic bulk electronic property.

More broadly, these findings reshape the understanding of how competing ordered phases interact in layered quantum materials. They show that reducing static CDW coherence can enhance low-energy excitations that favor Cooper pairing, while highlighting that the essential physics governing superconductivity lies in three-dimensional interlayer electronic structure rather than purely two-dimensional CDW networks.



On the left, STM imaging reveals the mosaic charge density wave phase in 1T-TaSSe, highlighting its characteristic superstructure. On the right, the upper section illustrates the interlayer stacking disorder, while the lower section presents tunnelling and Andreev spectroscopy measurements, which reveal a uniform superconducting gap consistent with BCS theory, confirming superconductivity in the mosaic phase.



Cover image from *Nano Letters* illustrating the mosaic charge density wave phase in 1T-TaSSe, where irregular CDW domains and interconnected domain walls give rise to a disordered stacking landscape that enables superconductivity to emerge.

Interlayer disorder drives pairing in 1T-TaSSe. Randomization of charge density wave stacking enhances metallicity and enables Cooper pairing across layers.

Topological water-wave structures manipulating particles

Wang B, Che Z, Cheng C, Tong C, Shi L, Shen Y, Bliokh KY, and Zi J
Nature 638, 394 (2025)

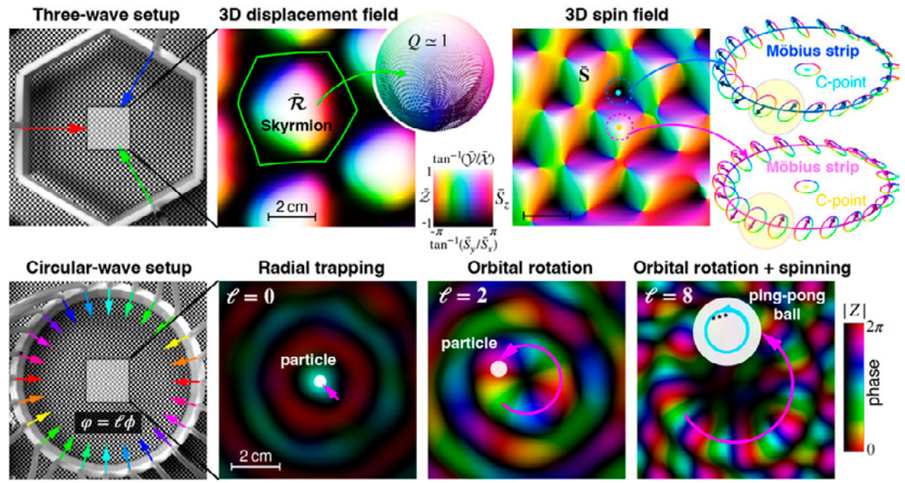
Topological wave structures have revolutionized optical and acoustic techniques for manipulation of small particles, but their realization and practical use in fluid systems have remained largely unexplored. This work establishes water waves as a versatile platform for exploring topological wave physics and its practical applications for trapping and transport of floating particles.

Complex wave patterns can exhibit robust patterns, such as phase vortices, skyrmions, and polarization Möbius strips, which are characterized by topological features. These wave structures have been widely explored in optics and, more recently, in acoustics. By carefully interfering multiple surface waves in a water tank, a team of researchers from DIPC, Fudan University (China), and Nanyang University (Singapore) successfully generated these topological objects in gravity-driven water surface waves.

Crucially, the study goes beyond observation to demonstrate functionality: these structured waves can exert forces and torques on floating objects. The experiments show three key mechanisms. First, particles can be trapped in regions of either high or low wave intensity via gradient forces. Second, they can be driven along controlled circular paths by wave's orbital angular momentum, analogous to that in optical vortices. Third, particles can undergo spinning motion induced by the wave's spin angular momentum, which is associated with the local circular motion of water-surface elements.

These effects were observed across a range of particle sizes: from millimetre-scale spheres to macroscopic objects such as ping-pong balls. This highlights the robustness and scalability of the approach. The results establish a direct analogue between optical/acoustic manipulation techniques, such as optical tweezers, and hydrodynamic systems, extending wave-based control into a new physical regime.

Beyond fundamental interest, the findings open new avenues for applications in microfluidics and soft-matter control. Water waves operate in a complementary size range (millimetres to centimetres), potentially enabling the manipulation and sorting of larger biological or synthetic objects than those achievable with optical or acoustic methods. Moreover, the accessibility of water-wave experiments provides a powerful platform for studying topological wave phenomena.



Three-wave interference (upper row) generates skyrmions (all possible directions) in the 3D displacements of water-surface elements in a finite 2D area, as well as Möbius-strip distributions of elliptical trajectories of these elements along closed contours. Circular wave interference (lower row) generates vortex wave modes, which are characterized by integer topological number *l* (phase winding around the center modulo 2ϖ). These modes can trap floating particles due to radial intensity gradients, perform orbital rotation of the particle due to the azimuthal phase gradient (orbital angular momentum), and induce spinning of the particle due to local circular motions (spin) of water-surface elements.

Topological water waves: First experimental realization of vortices, skyrmions, and Möbius structures in surface waves.
Wave-driven manipulation: Demonstration of trapping, orbital motion, and spinning of floating particles using structured water waves.
From optics to fluids: A new platform extending structured-wave control to fluid mechanics.

Quantum twisting microscopy of phonons in twisted bilayer graphene

Birkbeck J, Xiao J, Inbar A, Taniguchi T, Watanabe K, Berg E, Glazman L, Guinea F, von Oppen F, and Ilani S
Nature 641, 345 (2025)

The Quantum Twisting Microscope (QTM) [1] is a novel research tool that uniquely combines two seemingly incompatible capabilities: it can measure both the spatial localization of electronic wavefunctions and their momentum-dependent behavior. In other words, it achieves simultaneous position and momentum resolution. This is accomplished by merging key features of two established techniques in solid-state physics: angle-resolved photoemission spectroscopy (ARPES), which probes momentum, and scanning tunneling microscopy (STM), which provides precise spatial information.

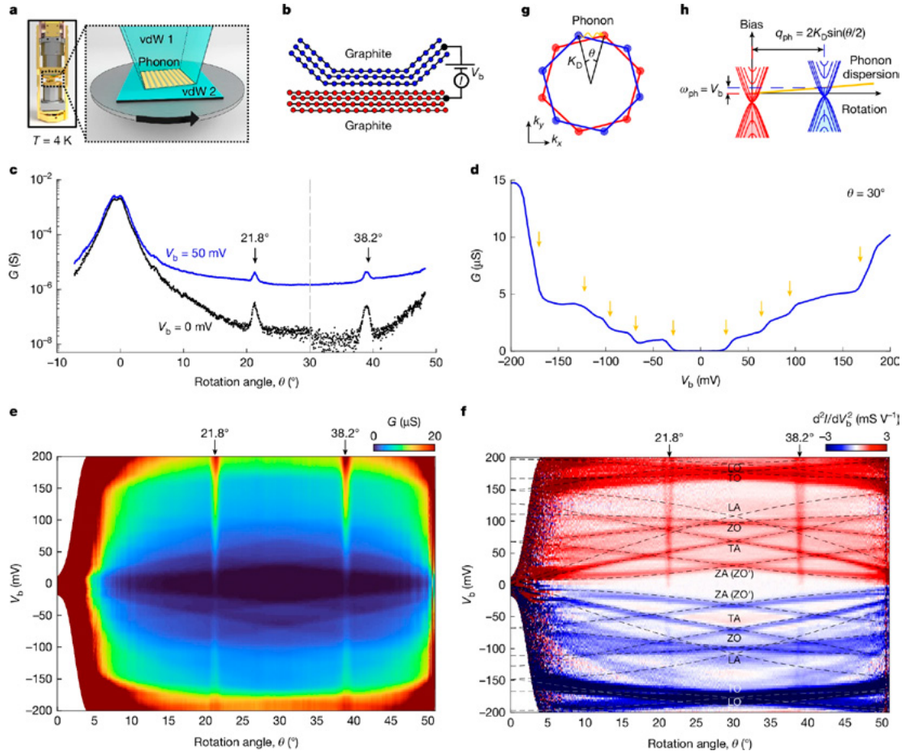
The article presents one of the first applications of this technique: probing the interaction between electrons and atomic vibrations (phonons) in graphene. The experimental results show excellent agreement with theoretical predictions, validating both the method and the underlying models. Understanding electron–phonon interactions is essential, as they govern fundamental properties of materials, including electrical conductivity and superconductivity.

Such measurements are extremely challenging using conventional approaches, which typically require multiple experimental techniques, separate setups, and even different samples. In contrast, the QTM enables a direct and unified measurement. By comparing experimental data with well-established theoretical frameworks, the study extracts key physical parameters that describe graphene's behavior.

Overall, these results demonstrate the power of QTM as a versatile tool and pave the way for more advanced investigations of complex two-dimensional systems, including twisted bilayer graphene, where electron interactions lead to rich and unconventional physical phenomena.

(1) Inbar A, Birkbeck J, Xiao J, Taniguchi T, Watanabe K, Yan B, Oreg Y, Berg E, and S. Ilani S. Nature 614, 682 (2023).

The Quantum Twist Microscope is a novel scientific instrument which combines position and momentum resolution.



a, Schematics of the cryogenic QTM (inset), allowing us to form a continuously twistable interface between two vdW materials at T=4 K (main panel). b, The experiments in this figure are all performed in a twisted junction between two graphite flakes (several tens of nanometres thick), shown schematically. c, Measured G versus twist angle. d, Measured G versus Vb at θ=30. e, Two-dimensional measurement of G versus θ and Vb. f, The second derivative, (formula), obtained numerically from panel e. g, The Fermi surfaces in k-space of the top (blue) and bottom (red) graphite layers. h, The corresponding energy bands.

The measurement and theoretical modelling of the interactions between electrons and phonons in graphene makes it possible to determine important parameters for the description of graphene.

Moiré materials based on M-point twisting

Călugăru D, Jiang Y, Hu H, Pi H, Yu J, Vergniory MG, Shan J, Felser C, Schoop LM, Efetov DK, Fai Mak K, and Bernevig BA
Nature 643, 376 (2025)

When two atom-thin sheets of certain materials are stacked with a relative twist, a delicate interference pattern—called a moiré pattern—appears reshaping the Brillouin zone of the stacked system. Suddenly, electrons find themselves in a new energy landscape defined by the moiré periodicity.

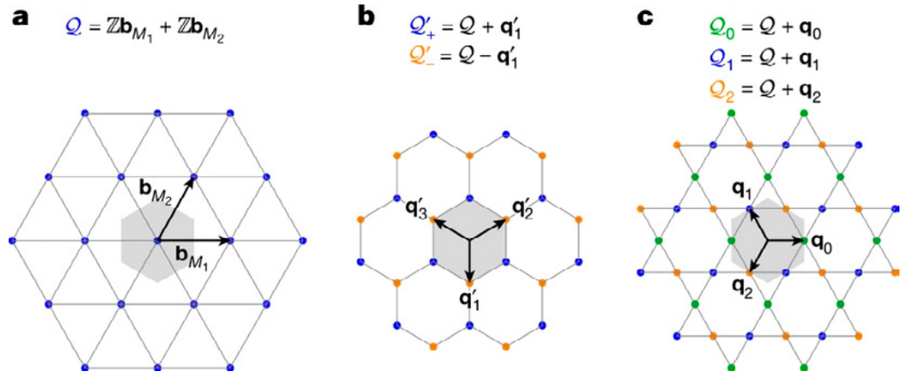
The magic happens when this reshaping produces flat bands. Normally, the energy of an electron changes a lot depending on its momentum—it "disperses." But in a flat band, the energy barely changes as momentum changes. That means the electrons are not zipping around much; their kinetic energy is suppressed. When electrons cannot run freely, their interactions with each other—repulsion, attraction, collective organization—dominate. This is the recipe for fascinating collective behaviors like magnetism, superconductivity, and more exotic correlated phases.

Most moiré systems studied so far—like twisted bilayer graphene—achieve flat bands by focusing on the Γ or K points of their Brillouin zones. What this new study does is shift attention to the M points. At these locations, the electronic states come in threes, like three equivalent "valleys" arranged by symmetry. Twisting two sheets of materials such as $SnSe_2$ or ZrS_2 lines up these valleys in a way that produces extremely flat bands.

The researchers also found that the interference patterns in momentum space resemble a kagome lattice—a web of triangles and hexagons familiar from basket weaving. Even though the atoms themselves are not arranged this way, the effective wave patterns of electrons in momentum space follow this geometry, which is known to host rich quantum phenomena.

An especially intriguing feature is that, depending on the exact stacking of the layers, the electrons may act as if they are confined along one direction—almost like a one-dimensional system—even though the material is two-dimensional. This "quasi-1D" behaviour could lead to entirely new kinds of electronic phases. The practical upshot is that the M-point strategy offers a brand-new playground for twistronics, the field that studies how twisting layers controls electron behaviour. Instead of relying only on Γ- or K-point physics, researchers now have a whole new toolkit—three valleys, flat bands, kagome-like structures, and tuneable dimensionality—to explore and potentially engineer states of matter that do not occur naturally.

In summary, this work shows that by twisting atom-thin crystals in just the right way, we can design quantum materials whose electrons live in a strange new landscape—one where their motion is slowed, their interactions amplified, and their collective behaviours open a window to physics we have only begun to imagine.



The three panels correspond to the cases in which the low-energy degrees of freedom are located at the Γ (a), K (b) and M (c) points of the Brillouin zone, in gray.

The experimental realization of these materials is critical. Once twisted, gated, and measured, these new quantum states may become tangible realities

Every new twist we perform seems to yield surprises. Fundamentally, these materials offer a gateway to quantum states of matter nobody has envisioned. And because they are so controllable experimentally, the possibilities truly are limitless.

High-definition imaging of a filamentary connection between a close quasar pair at z=3

Tornotti D, Fumagalli M, Fossati M, Benitez-Llambay A, Izquierdo-Villalba D, Travascio A, Arrigoni Battaia F, Cantalupo S, Beckett A, Bonoli S, Dayal P, D'Odorico V, Dutta R, Lusso E, Peroux C, Rafelski M, Revalski M, Spinoso D, and Swinbank M

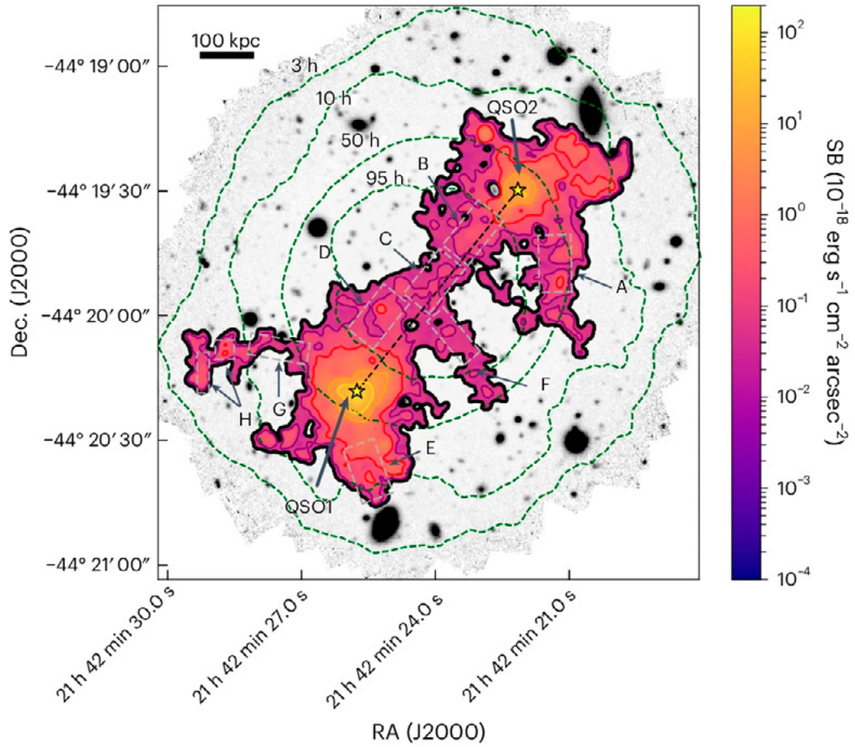
Nature Astronomy 9, 577 (2025)

Galaxies in our Universe are embedded within massive halos of dark matter, which provide the gravitational potential needed for gas to accumulate and eventually form stars. However, dark matter is not confined only to these halos. Vast structures known as dark matter filaments, extending across millions of light years, connect the halos and form a large-scale network called the "cosmic web." The existence of this web is a key prediction of the currently favored cosmological model and numerical simulations of structure formation.

Detecting the cosmic web is extremely challenging because both the density of dark matter and the amount of luminous matter within these filaments are very low. In this Nature paper, the authors report the detection and analysis of gas emission from a filament connecting the halos that host two bright quasars. This discovery was made possible through deep observations of the region between the quasars using the MUSE instrument on the Very Large Telescope in Chile, with a total exposure time of 140 hours.

The quasars are located at a redshift of 3, corresponding to a time when the Universe was only about 2 billion years old, roughly one-sixth of its current age. The filament connecting them is estimated to extend over more than 3 million light years.

The observed properties of the filament are consistent with predictions from state-of-the-art simulations of cosmic structure formation. These observations therefore provide a powerful new method for studying the distribution of dark matter in the Universe and for testing the validity of our cosmological model.



The filament connecting the quasars. The quasars are indicated by the yellow stars. The color map shows the surface brightness of the emission of the gas around the quasars and along the filament. The background gray image is a snapshot of the area observed with MUSE.

This rare observational evidence of the cosmic web provides a powerful new way to trace the distribution of dark matter and to test our current understanding of the formation and evolution of cosmic structures.

Frustrated charge density wave and quasi-long-range bond-orientational order in the magnetic kagome FeGe

Subires D, Kar A, Korshunov A, Fuller CA, Jiang Y, Hu H, Călugăru D, McMonagle C, Yi C, Roychowdhury S, Schnelle W, Shekhar C, Strempfer J, Jana A, Vobornik I, Dai J, Tallarida M, Chernyshov D, Bosak A, Felser C, Bernevig BA, and Blanco-Canosa S

Nature Communications 16, 4091 (2025)

Kagome metals have emerged as a versatile platform to explore intertwined correlated and topological phenomena due to their geometrically frustrated lattice (figure 1A), which promotes competition between charge, spin, and lattice orders. FeGe is a particularly compelling example, exhibiting a charge density wave (CDW) coupled to magnetic order and a complex lattice distortion. However, the microscopic origin of its CDW and the role of Ge dimers have remained unresolved.

Using high-quality single crystals and advanced synchrotron techniques at the ESRF, including temperature-dependent single-crystal X-ray diffraction (Figure 1) and diffuse scattering (DS), this study provides a detailed picture of the CDW transition. Two distinct temperature regimes are identified (Figure 1). Below T_{CDW}≈105 K, FeGe develops a multi-q CDW with a continuous evolution of both lattice distortion and satellite intensity, consistent with second-order-like behavior. Crucially, the fraction of Ge dimers quantitatively tracks the CDW amplitude, establishing it as the primary order parameter (Figure 1). This demonstrates that the transition is not a conventional Peierls instability but an order–disorder process driven by the progressive freezing of local dimer correlations.

Above T_{CDW}, up to approximately 125 K, strong and anisotropic diffuse scattering emerges, revealing short-range correlations within the kagome planes (Figure 2). These correlations evolve from a diffuse ring into sharper features, indicating the persistence of bond-orientational order despite the loss of long-range translational order. This behavior is analogous to a hexatic phase, representing an intermediate state preceding the fully ordered CDW phase.

To interpret these findings, Monte Carlo simulations based on a frustrated triangular-Ising model of Ge dimer occupancy were employed (Figura 2). The model successfully reproduces the experimental diffuse scattering patterns and supports a two-step melting process mediated by topological defects: first disrupting translational order, then orientational order at higher temperatures (Figure 2).

These results establish a unified framework for understanding CDW formation in frustrated systems, highlighting the central role of local dimers and defect dynamics. More broadly, they provide key insights for controlling competing electronic phases in kagome materials through external tuning parameters such as strain, pressure, or doping.

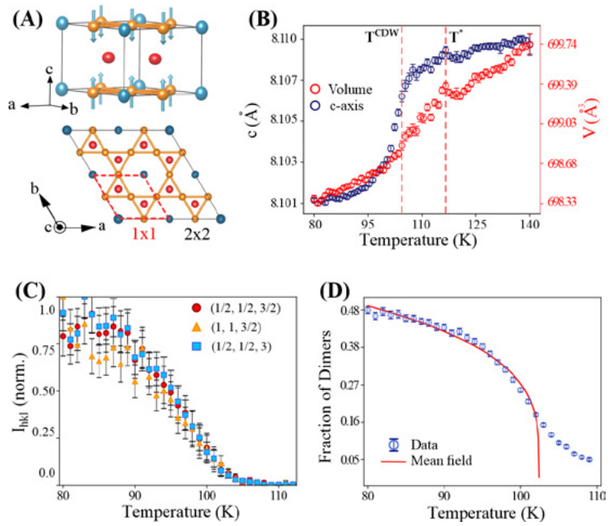


Figure 1: (A-B) Crystal structure of FeGe (non-CDW) in hexagonal P6/mmm space group. Orange symbols are the Fe atoms, the blue and red symbols represent the Ge atoms. Arrows stand for the spin-up and spin-down of Fe atoms in the magnetically ordered state. (B) Top view of the FeGe kagome net, displaying unit cells for the non-CDW 1 × 1 and CDW 2 × 2 ordering. (C) Temperature dependence of the c-axis lattice parameter and volume V. (C) Normalized temperature dependence of CDW reflections. (D) Definition of fraction of dimers as the primary order parameter and its fitting to a mean field power law. The departure from the mean field at $T > T_{CDW}$ is a consequence of the charge density fluctuations.

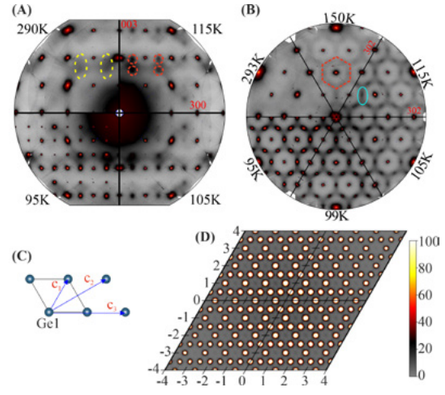


Figure 2: (A) (H0L) DS maps at different temperatures. The yellow ellipse highlights the DS along the M-L direction and demonstrates the uncorrelated charge scattering between kagome layers. (B) (HK2) DS maps as a function of temperature. The red hexagon underlines the 2D hexagonal shape of the DS. At 115 K, the anisotropic charge scattering concentrates at the M points (blue ellipse). (C) Schematics of the model used for the MC simulations. ci's describe the interaction energies taken into account in the Ising Hamiltonian. c4 stands for the out-of-plane nearest-neighbour interaction. (D) (H K 2) DS maps obtained from MC.

X-ray diffraction and high-flux diffuse scattering at the ESRF revealed that the Ge dimer fraction governs the CDW transition in kagome FeGe.

DS maps demonstrate a hexatic-like precursor to the CDW phase.

Monte Carlo simulations reproduce the experimental DS, emphasizing the frustrated nature of CDW ordering.

BiaPy: accessible deep learning on bioimages

Franco-Barranco D, Andrés-San Román JA, Hidalgo-Cenalmor I, Backová L, González-Marfil A, Caporal C, Chessel A, Gómez-Gálvez P, Escudero LM, Wei D, Muñoz-Barrutia A, and Arganda-Carreras I
Nature Methods 22, 1124 (2025)

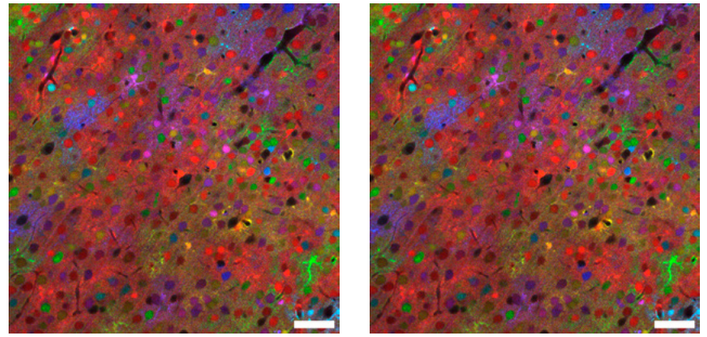
Bioimages, like those from electron or fluorescence microscopes, capture details invisible to the naked eye. The sheer volume of data and the complexity of patterns often require advanced computational tools. Traditionally, analyzing these images meant manually sifting through thousands of pictures or relying on specialized software that demanded advanced programming skills. This created a barrier for many biologists, who are experts in life sciences but not necessarily in computer science. BiaPy is a game-changer in the world of biology, blending deep learning with user-friendly design to unlock new discoveries.

At its core, BiaPy uses deep learning, a type of artificial intelligence inspired by how the human brain processes information. Deep learning models can "learn" to recognize patterns in images, such as identifying cell boundaries or spotting specific structures, by training on example data. BiaPy supports a variety of tasks, from segmenting individual cells in 3D images to denoising blurry microscope captures or even enhancing low-resolution images to reveal finer details. What sets BiaPy apart is its versatility—it handles both 2D and 3D images, supports multiple microscope types, and works with cutting-edge models like Transformers, which are revolutionizing AI by processing complex data more effectively.

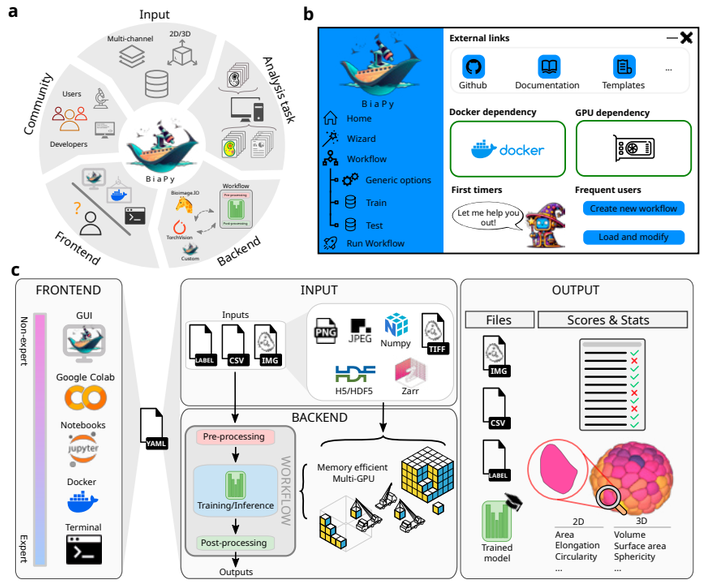
The platform's design is a triumph of accessibility. Instead of requiring users to write complex code, BiaPy offers a graphical interface and "zero-code" notebooks, where researchers can set up analyses with a few clicks. For those working with massive datasets, BiaPy scales up, leveraging multiple graphics processing units (GPUs) to crunch data quickly. It also supports large file formats, ensuring it can handle the hefty images produced by modern microscopes. A single configuration file, editable through a text editor or guided "Wizard" tool, lets users tailor workflows to their needs, making the process intuitive and shareable.

BiaPy's impact is already evident in real-world research. For instance, it's been used to segment mitochondria in large electron microscopy volumes, revealing their complex shapes in unprecedented detail. In another study, it helped model wound healing in fruit fly embryos by analyzing time-lapse videos, offering insights into how tissues repair themselves. It is even streamlined the analysis of epithelial cysts, automating tedious tasks to uncover patterns in cell morphology.

As an open-source tool, BiaPy invites collaboration, encouraging scientists to contribute ideas and improve its features. By democratizing bioimage analysis, it is paving the way for faster, more inclusive scientific breakthroughs, bringing us closer to understanding the building blocks of life.



Two-dimensional slice of a mouse brain region with fluorescent markers (image acquired with ChroMS). Each white dot represents an individual cell automatically detected by BiaPy, demonstrating its ability to analyse large images and detect cells in both densely populated and more sparse regions. Left without applying and right after applying BiaPy.



BiaPy environment and scope.

BiaPy makes deep learning for bioimage analysis accessible, scalable, and ready for real-world research.

Directional strong coupling at the nanoscale between hyperbolic polaritons and organic molecules

Tresguerres-Mata AIF, Matveeva OG, Lanza C, Álvarez-Cuervo J, Voronin KV, Calavalle F, Avedissian G, Díaz-Núñez P, Álvarez-Pérez G, Tarazaga Martín-Luengo A, Taboada-Gutiérrez J, Duan J, Martín-Sánchez J, Bylinkin A, Hillenbrand R, Mishchenko A, Hueso LE, Volkov VS, Nikitin AY, and Alonso-González P
Nature Photonics 19, 1196 (2025)

Controlling light–matter interaction at the nanoscale is a central challenge in modern nanophotonics, with important implications for sensing, spectroscopy, and chemical control. In this work, researchers from the University of Oviedo, the Center for Research on Nanomaterials and Nanotechnology (CINN-CSIC), and the 2D Nanophotonics group at DIPC demonstrate for the first time directional strong coupling between hyperbolic polaritons and molecular vibrations.

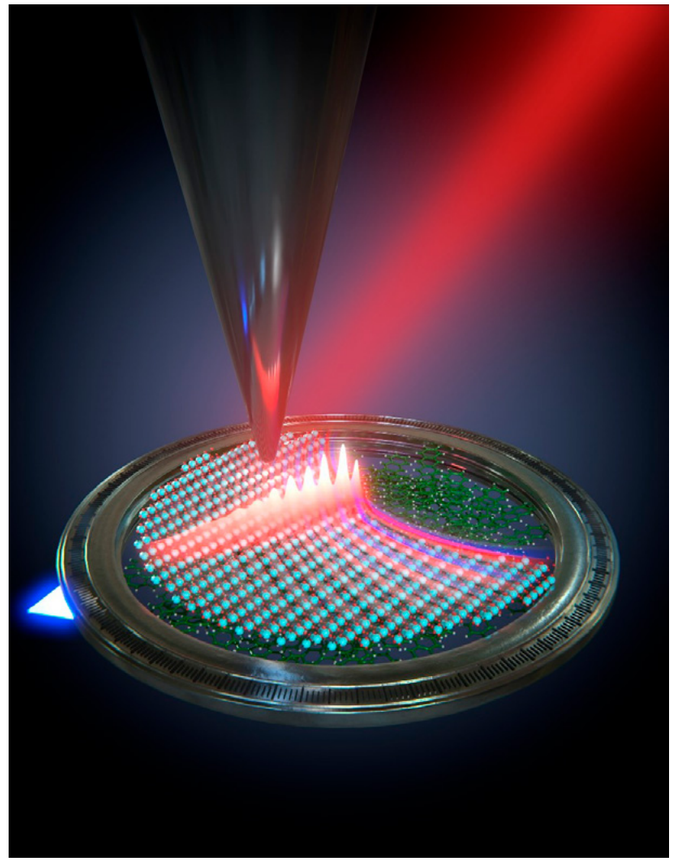
The study exploits the unique optical properties of molybdenum trioxide (MoO_3), a highly anisotropic van der Waals material that supports hyperbolic phonon polaritons—electromagnetic modes confined to deeply subwavelength scales and propagating along specific in-plane directions. These modes enable extreme light confinement and enhanced light–matter interaction.

The authors show experimentally that when organic molecules are placed near MoO_3, their vibrational modes can strongly couple to hyperbolic polaritons. Crucially, this interaction is highly directional, with the coupling strength depending strongly on the propagation direction of the polaritons. This anisotropic coupling mechanism has no counterpart in conventional isotropic systems and represents a new regime of light–matter interaction.

In the strong coupling regime, light and molecular vibrations hybridize into new quasiparticles, enabling efficient energy exchange and modifying the optical response of the system. Here, this hybridization can be selectively enhanced or suppressed depending on direction, providing an additional degree of control at the nanoscale.

These results open new avenues for directional molecular sensing, where vibrational fingerprints can be selectively probed, improving sensitivity and selectivity. More broadly, they establish a platform for anisotropic nano-chemistry, where chemical processes could be influenced through direction-dependent light–matter coupling.

Beyond applications, this work expands the fundamental understanding of strong coupling in low-dimensional systems, positioning hyperbolic materials as a powerful platform for engineering light–matter interactions.



Hyperbolic phonon polaritons in the anisotropic 2D material MoO_3 enable strong and directional coupling to molecular vibrations. The interaction strength depends on the propagation direction, offering a new platform for selective molecular detection and nanoscale light–matter control. Image credits: Scixel.

First demonstration of directional strong coupling between hyperbolic polaritons and molecular vibrations.
Hyperbolic 2D materials enable anisotropic light–matter interaction, adding a new control parameter: direction.
New route for molecular sensing and nano-chemistry, based on direction-dependent coupling at the nanoscale.

Negative transit time in nontunneling electron transmission through graphene multilayers

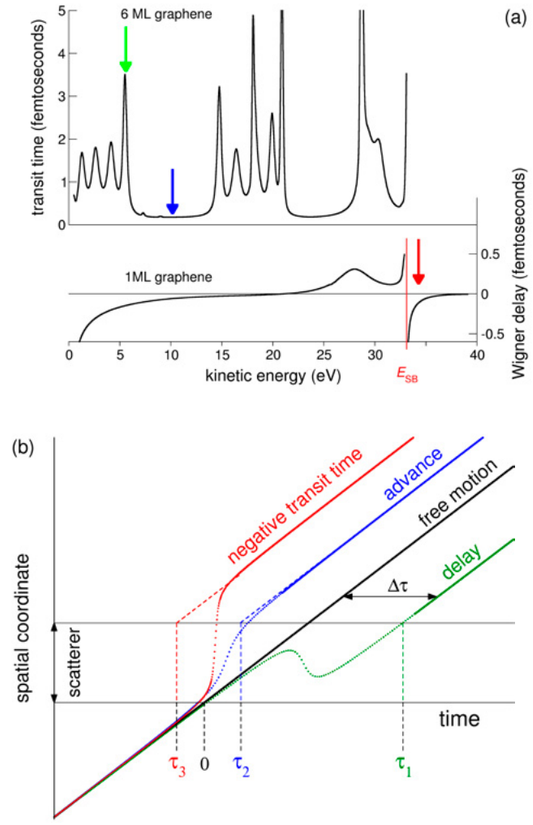
Krasovskii EE and Kuzian RO

Physical Review Letters 134, 126302 (2025)

The question of how long it takes for a quantum particle to traverse a microscopic distance has been puzzling physicists since 1930s. The theoretical discovery by Hartman in 1962 of the superluminal propagation in tunneling had aroused a vast amount of discussion on how to rationalize this observation. However, the theoretical studies have been limited to tunneling in one-dimensional systems.

The researchers at DIPC have applied an ab initio realization of the phase-time formalism of Eisenbud, Wigner, and Smith to electron transmission through realistic crystalline films, namely, to graphene and hexagonal boron nitride. The study goes beyond the tunneling paradigm and focuses on a classically allowed motion in the presence of strong multiple scattering. Apart from confirming the Hartman effect in the energy gaps of the graphene multilayers, the calculations have revealed hitherto unknown phenomena brought about by the lateral scattering, most fascinating being the divergent time delay and "negative transit time" at the scattering resonances due to the emergence of the secondary beams in low energy electron diffraction. In approaching the threshold from below the transit time infinitely grows, and---even more counterintuitive---in approaching it from above the transit time may acquire negative values. The latter does not violate causality but rather points to subtleties in the interpretation of attosecond measurements in terms of trajectories. In particular, the travel path cannot be split into elementary intervals so that the travel time can be obtained by adding the times spent in each of the intervals. At the same time, the arrival time of a wave packet relative to its excitation is well defined, and the present result suggests that it can be strongly affected by in-plane scattering.

On a more practical note, the rapid energy variations of the transmission delay offer a way to manipulate the propagation timing of the wave packet without tunneling, i.e., without sacrificing the transmitted intensity. In particular, the spatial reshaping of the wave packet at the resonances may help to elucidate details of the acceleration of photoelectrons by an inhomogeneous laser field, which is relevant for attosecond streaking spectroscopy of the solid state.



(a) Energy dependence of the Wigner time delay Delta t and transit time for a monolayer and six-layer graphene. The vertical arrows show three energies with different propagation scenarios: finite time delay at a transmission resonance (green), Hartman effect (blue), and negative transit time (red). The corresponding equations of motion are schematically shown by the respective colors in graph (b).

Lateral scattering in atomically thin films may lead to infinitely large positive or negative delays causing a substantial spatial reshaping of the wave packet.

Addressing the correlation of Stokes-shifted photons emitted from two quantum emitters

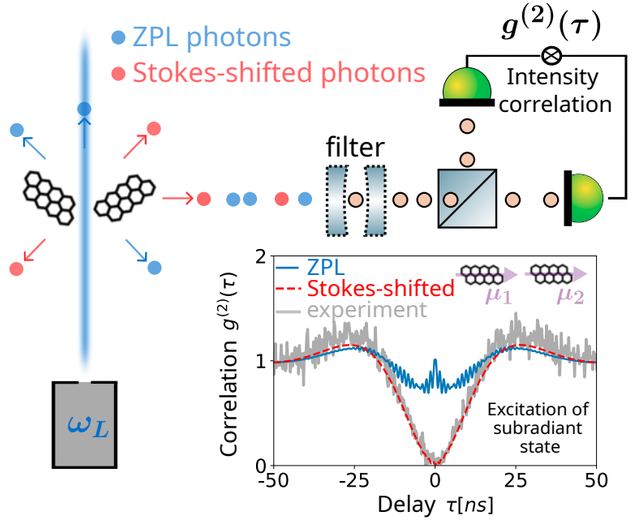
Juan-Delgado A, Trebbia J, Esteban R, Deplano Q, Tamarat P, Avriller R, Lounis B, and Aizpurua J.
Physical Review Letters 135, 163602 (2025)

Photons emitted by organic molecules are useful resources for quantum technologies, as the state of the photons can be used to encode and transmit quantum information. The complete characterization of photonic states requires information about the statistical properties of the emitted signal. This is typically addressed by accessing the intensity correlation $g^{(2)}(\tau)$, which measures the normalized probability of two photons being detected at a fixed time delay τ in two different detectors after going through a beam splitter (top and left panel in the figure).

Researchers at DIPC, Materials Physics Center (CFM), and Bordeaux University combine theoretical and experimental results to show that the correlations of fluorescent photons emitted by interacting organic molecules can be highly sensitive to the spectral filtering applied in the detection scheme, with coherence playing an important role even when short-lived vibrational transitions are involved in the emission. Two different detection schemes are considered. The first detects the photons of energy very close to that of the resonant excitation laser, in the zero-phonon line (ZPL), as often considered in theoretical treatments. However, measuring the ZPL is challenging because the laser beam can dominate the detected signal, and thus the correlation of Stokes-shifted photons at lower energy is also analyses as in a typical experimental configuration.

To analyze the emission in both detection schemes, a general theoretical model including vibrational states of the molecules is developed, and then applied to interpret experimental measurements of the intensity correlation of the Stokes-shifted photons emitted by two interacting organic molecules at nanometer distance. The results in the bottom right panel of the figure illustrate how, for specific frequencies of the excitation laser, the calculated correlations of the Stokes-shifted photons (red line) agree with the experimental results (grey line) much better than the result for the zero-phonon-line photons (blue line). This difference highlights the importance of developing accurate theoretical models to capture the details of specific experimental set-ups.

Additionally, previous theoretical models assume that quantum coherence does not affect the correlation of Stokes-shifted photons, as the emission process involves the excitation of a vibration of picosecond lifetime. In contrast, the decomposition of the intensity correlation calculated with the general model into coherent and incoherent contributions shows that the coherent contribution is important both at very short (picoseconds) and at much longer (nanoseconds) delays, and that including this contribution improves the agreement with experiments. Thus, these results show that coherence can affect the intensity correlations during times much larger than the characteristic vibrational lifetimes.



(Top and left panel) Schematics of the set-up considered. A laser illuminates two interacting organic molecules, and the intensity correlation $g^{(2)}(\tau)$ of the emitted photons is measured in a Hanbury Brown-Twiss interferometer, which consists in a beam splitter that directs the photons into two different detectors. The photons detected (brown dots) have gone through a filter to select either the zero-phonon-line photons (blue dots) or the Stokes-shifted photons (red dots). (Bottom right panel). The experimental correlation (solid grey line) is reproduced by the calculated correlation of the Stokes-shifted photons (dashed red line) but not by the calculated correlation of the zero-phonon line (ZPL, solid blue line). The reason is that the experiment filters out the photons near the laser line. The results are plotted as a function of time delay τ between the photons and the laser frequency is chosen to excite the subradiant state created due to the interaction between the molecules.

Fluorescence from two interacting quantum emitters is revealed to exhibit strikingly different light statistics in two spectrally distinct emission channels: the direct electronic transition and vibrationally assisted Stokes-shifted transitions. Additionally, a combined theoretical and experimental analysis shows that coherence in the Stokes-shifted emission can persist well beyond the vibrational lifetime, challenging common assumptions about fluorescence.

Concomitant formation of protocells and prebiotic compounds under a plausible early Earth atmosphere

Jenewein C, Maíz-Sicilia A, Rull F, and García-Ruiz JM
PNAS 122, 2, e2413816122

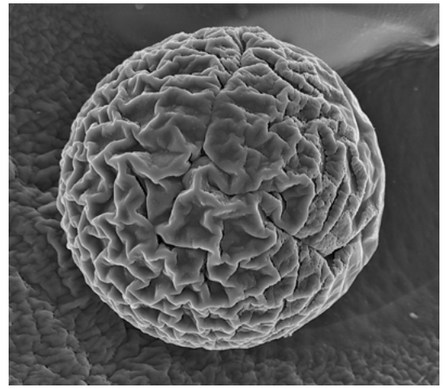
Within the ERC project PROTOS, we aim to understand the role of silica in the dawn of life. The famous pioneering Miller-Urey experiments in the last century demonstrated that the interaction of simple gases such as methane, nitrogen and ammonia produced a diversity of organic molecules, such as amino acids and nucleobases - the building blocks of life - and a solid organic film composed of hydrogen cyanide-derived polymers. We have already demonstrated that the experiment only works in the presence of silica, Earth's most abundant mineral. What we found in the newly reported experiments was remarkable: these organic films spontaneously organized into structures resembling primitive cells, or protocells. These structures ranged from nanometers to micrometers in size and formed at the interface between hydrogen/HCN-rich bubbles and water.

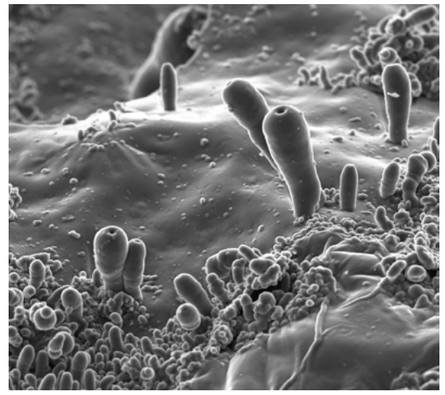
Protocells are considered a critical step in the origin of life because they can provide local environments where chemical reactions involving life's building blocks may occur more efficiently. Our results suggest that two essential components for the emergence of life, protocells and prebiotic organic molecules, could have formed simultaneously and in close proximity. Such a scenario would have favored further chemical evolution and may have contributed to the pathway toward the first living systems.

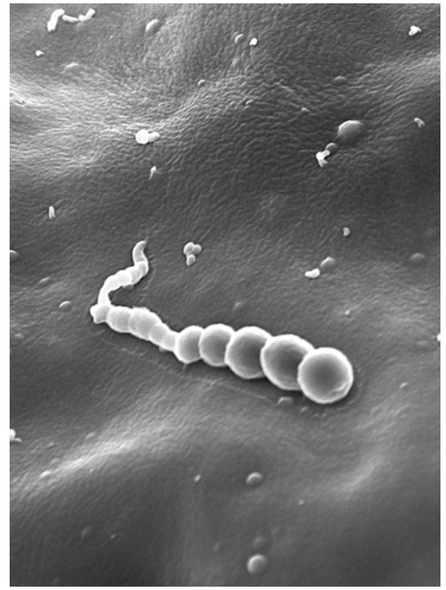
While this study represents a significant step forward, it is only one piece of the puzzle. In future work, we plan to investigate how variations in environmental conditions and mineral surfaces affect protocell formation, stability and chemical complexity. These studies will help us better understand the possible pathways from simple chemistry to increasingly complex prebiotic systems.

The conditions recreated in the laboratory are not necessarily unique to early Earth. Similar environments could exist or may have existed on other planets or moons with volcanic activity, liquid water and energy sources such as lightning or radiation. This makes the study relevant not only for understanding our own origins but also for exploring the possibility of life elsewhere in the universe.

The journey to uncover life's origins is far from over, but studies like ours bring us closer to answering one of humanity's most fundamental questions: Where do we come from?







Electron microscopy views of vesicular nanostructures, also called protocells, that form simultaneously with amino acids and nucleobases in the prebiotic experiments. Their morphological resemblance to living microorganisms made this finding also very relevant in the detection of extraterrestrial life.

This study sheds light on one of science's greatest mysteries: how life began on Earth.
Our results suggest that two critical components for the emergence of life—protocells and prebiotic organic molecules—could have formed simultaneously and in close proximity.
Our results are also key to unequivocally identifying life beyond Earth.

Colloquium: Synthetic quantum matter in non-standard geometries

Grass T, Bercioux D, Bhattacharya U, Lewenstein M, Nguyen HS, and Weitenberg C
Reviews of Modern Physics 97, 011001 (2025)

Do we live in a three-dimensional Euclidean world? In our everyday experience, yes—but modern quantum simulators can explore a far richer landscape of geometries. First developed to mimic familiar quantum materials, today these tunable systems let researchers construct and explore geometries that are otherwise out of reach— from the curved spacetime that shapes the cosmos to the extra dimensions of leading theories of fundamental physics, and the intricate quasicrystalline and fractal patterns found throughout nature. Most of these structures are too vast, too small, or too subtle to probe directly, but, as surveyed in this colloquium by Tobias Grass, Dario Bercioux, and collaborators, quantum simulators turn them into systems we can build, tune, and measure on a tabletop.

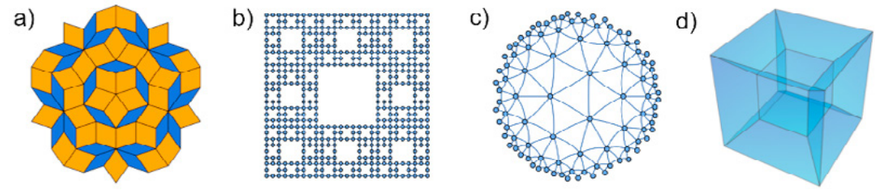
The first part of the review introduces the quantum-engineering techniques that make such exotic geometries possible. It provides a broad overview of contemporary platforms, ranging from cold atoms in optical lattices and tweezer arrays to photonic and waveguide systems, engineered electronic surface states, twisted van der Waals materials, and superconducting circuits. A notable achievement across several platforms is the site-by-site assembly of tailored lattice structures for atoms, photons, and electrons.

The second part explores the novel physics that emerges when geometry becomes an active control parameter rather than a passive backdrop. Topics span condensed-matter phenomena—such as transport and topology—as well as analogues of cosmological effects, including expanding universes and black holes realized in Bose–Einstein condensates or tilted graphene systems. The review discusses geometric localization in aperiodic lattices for both interacting and noninteracting systems, highlighting subtle distinctions from disorder-induced localization, such as multifractal scaling.

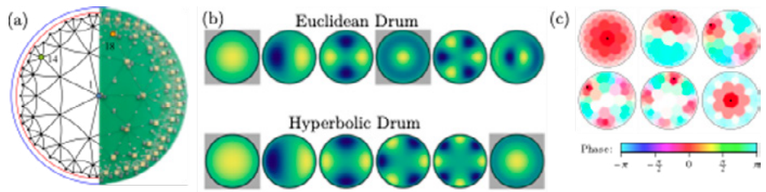
Geometry has particularly striking consequences for topology. For example, one-dimensional quasicrystals can exhibit topological properties analogous to two-dimensional systems, including edge states and Chern numbers, while two-dimensional quasicrystals can emulate features of four-dimensional topological phases. Their noncrystallographic rotational symmetries enable symmetry-protected topological phases that are inaccessible in periodic lattices.

Beyond summarizing recent advances, the article outlines key challenges and future directions: scaling interactions in fractal geometries, introducing controlled disorder in quasicrystals, and developing robust probes for quantum-gravity analogues. Addressing these challenges could elevate synthetic quantum matter into a versatile framework for designing and testing fundamental physical theories.

This colloquium surveys the state of the art in quantum simulation across multiple platforms, with a distinctive focus on systems engineered in exotic geometries and the novel phenomena they enable.



Examples of exotic geometries explored in the colloquium: **(a)** quasicrystals with nonrepeating patterns, **(b)** fractal lattices such as the Sierpiński carpet, **(c)** curved (hyperbolic) lattices, and **(d)** a four-dimensional lattice.



Implementation of hyperbolic lattices with classical LC electric circuits. **(a)** Schematic of {3,7}-hyperbolic tessellation (left half), with the unit circle in blue and the circle with radius r_0=0.94 in red, and photographs of the electric circuit (right half). **(b)** Comparison of the first six eigenmodes of the Euclidean and hyperbolic drum of radius r_0=0.94 according to increasing eigenvalues. **(c)** Measurements of the voltage profiles of the first six eigenmodes (only one mode is shown for each pair of degenerate modes). The saturation encodes the magnitude as a fraction of the voltage (white denotes 0 and full saturation denotes 1) at the input node (black dots), and the color encodes the phase relative to the reference voltage (see the legend). Adapted from Lenggenhager, Patrick M., et al., "Simulating hyperbolic space on a circuit board," *Nat. Commun.* 13, 4373 (2022).

How does quantum behavior change beyond three-dimensional Euclidean space? This colloquium addresses that question while reviewing the quantum-engineering advances that now allow the realization of non-Euclidean and higher-dimensional systems.

Photonic axion insulator

Liu GG, Mandal S, Xi X, Wang Q, Devescovi C, Morales-Pérez A, Wang Z, Yang L, Banerjee R, Long Y, Meng Y, Zhou P, Gao Z, Chong Y, García-Etxarri A, Vergniory MG, and Zhang B
Science 387, 162 (2025)

Dark matter is believed to make up a large portion of the Universe, yet it remains undetectable through conventional methods because it does not interact with light. One leading hypothesis proposes that dark matter consists of particles known as axions, theorized since the 1970s. These particles are extremely difficult to observe due to their weak interaction with their surroundings, although theory predicts they can convert into photons under strong magnetic fields.

In this work, the researchers demonstrated that photons can be engineered to mimic the behavior of axions within a specially designed three-dimensional crystal. This photonic crystal allows light of specific wavelengths to travel exclusively along its edges in a single direction, without loss or backscattering, even when encountering defects or obstacles. This unusual propagation closely resembles the predicted dynamics of axions and represents an important experimental platform for studying them.

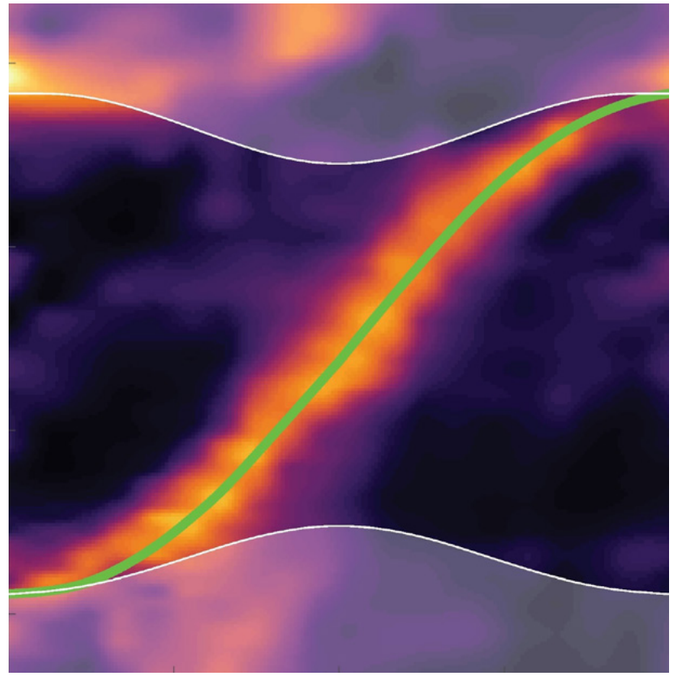
The results provide a new route toward detecting axion-like phenomena and deepen our understanding of topological physics. At the same time, they have practical implications: the robustness of light transport in these materials could improve the reliability of data transmission and contribute to the development of more stable photonic and quantum technologies.

Researchers involved in the theoretical work emphasize that the study not only introduces a new class of photonic materials but also establishes a way to control light in three dimensions with high precision. Beyond communications, the platform may enable experimental exploration of axion electrodynamics and other fundamental physical effects, such as braiding in photonic systems.

Overall, the work highlights how carefully designed materials can emulate exotic particles and phenomena, offering both a window into fundamental physics and a pathway toward next-generation technologies. Led by an international team from DIPC and Nanyang Technological University, and published in Science, this advance contributes a new experimental approach that could help probe one of physics' most elusive targets, dark matter, while marking a milestone in topological materials and opening new possibilities in photonics and communication systems.

The article presents a new photonic crystal that mimics axion-like behavior, offering a novel experimental platform to explore dark matter and advancing the field of topological photonics.

Researchers demonstrate robust, one-way light propagation in a 3D crystal, paving the way for more reliable photonic communications and quantum technologies.



Measured hinge dispersion on the H1 hinge. The green curve and white region represent the simulated hinge states and projected bulk and surface states.

This work introduces a new approach for probing elusive dark matter candidates and opens fresh avenues for controlling light in three dimensions.

Dark matter distinguished by skewed microlensing in the “Dragon Arc”

Broadhurst T, Li SK, Alfred A, Diego JM, Morilla P, Kelly PL, Sun F, Oguri M, Williams H, Windhorst R, Zitrin A, Abe KT, Chen W, Dai L, Fudamoto Y, Kawai H, Lim J, Liu T, Meena AK, Palencia JM, Smoot GF, and Williams LLR.
The Astrophysical Journal Letters, 978, 1 (2025)

Dark matter remains a huge mystery: it outweighs ordinary matter by a factor of five, it neither shines nor absorbs light, but is readily detected through its gravitational effects on galaxy motions and the bending of light. A new study using the James Webb Space Telescope (JWST) has observed stellar flickering in the “Dragon Arc” behind the massive galaxy cluster Abell 370, offering surprising new clues that helps distinguish between different forms of dark matter.

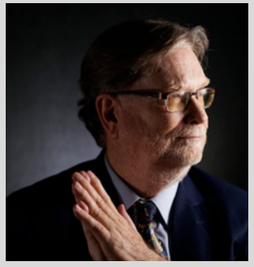
The “Dragon Arc” forms because the massive cluster Abell 370 acts as a gravitational lens, bending and magnifying light from background galaxies. JWST, with its extraordinary sensitivity, has detected dozens of microlensed stars along the “Dragon Arc”. Most of these stars are not blazing blue giants like the famous “Icarus” discovered by Hubble in 2018, but luminous evolved red giants, stars near the end of their lives. Normally these stars are much too faint to be seen individually but lensing can boost their brightness enough for JWST to spot them across billions of light years.

The team found that microlensed stars are not evenly distributed around the “critical curve” (the region of strongest lensing). Instead, they seen to occur in band about 4.5 kiloparsecs wide that is shifted by about 700 parsecs toward the inside of the curve, closer to the cluster center, suggesting small-scale irregularities in the cluster’s dark matter distribution.

Two leading ideas for dark matter make different predictions about small-scale structure. Cold Dark Matter (CDM), the standard model, describes dark matter as a collection of heavy, slow-moving particles. In contrast, Wave Dark Matter (also known as Fuzzy Dark Matter) proposes that dark matter consists of ultralight particles that behave collectively like a quantum wave, as in a Bose-Einstein condensate.

By matching the data, Broadhurst’s team found that a wave dark matter particle with a mass around 2×10^{-22} electronvolts—so light that its quantum wavelength spans about 10 parsecs—fits the observations remarkably well. Strikingly, this is the same particle mass inferred from the internal motions of small dwarf galaxies, suggesting a consistent picture across very different scales.

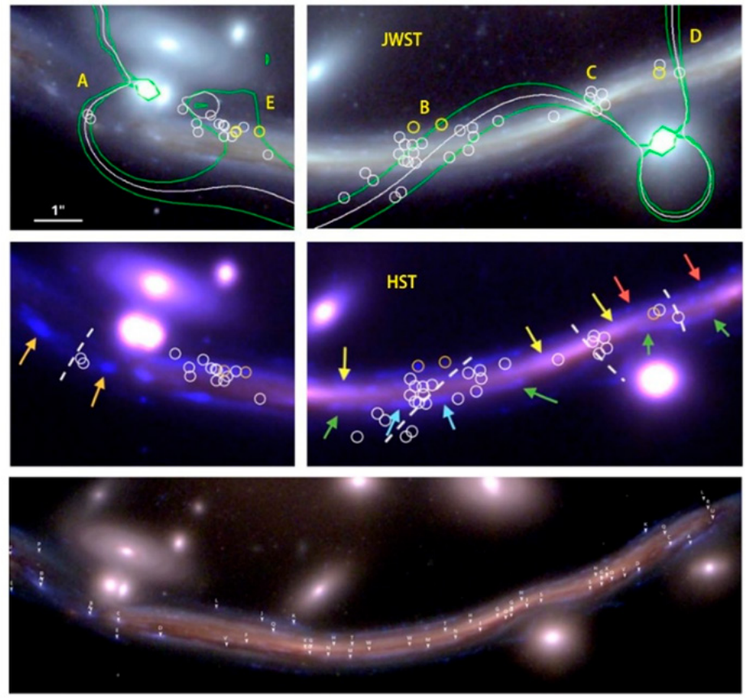
Hence, the distribution of microlensed stars in the “Dragon Arc” provides a new, independent test of dark matter theories. For decades, CDM has dominated simulations of cosmic structure, but it struggles with certain small-scale phenomena, such as why dwarf galaxies have large, smooth cores instead of dense peaks. Wave dark matter naturally explains such features and now appears consistent with the lensing evidence from JWST.



George F. Smoot
20/02/1945-18/09/2025

Professor George F. Smoot, awarded the Nobel Prize in Physics in 2006 for the discovery of the black body form and anisotropy of the cosmic microwave background radiation, was admired worldwide for his groundbreaking contributions to cosmology. For all of us, George was an inspiring friend and treasured mentor who made science an adventure to share. He was deeply respected and beloved by our community and will be remembered for both his scientific legacy and his kindness and warmth.
Agur eta ohore.

The team notes uncertainties though, such as how variations in stellar populations within the Dragon Arc affect the brightness distribution, or how gas in the cluster may smooth lensing signals. More data—deeper, more frequent JWST observations—are needed to pin down these effects. Still, the results hint that dark matter may involve more complex, wave-like behaviour, resembling a vast cosmic Bose–Einstein condensate rippling across galaxies and pervading the Universe.



Microlensing events detected by the JWST and HST aligned along the gravitational lensing critical curve of the highly magnified Dragon Arc, crossing the Einstein ring of a galaxy cluster.

The “Dragon Arc” offers a rare glimpse into the invisible: by catching the brief twinkle of stars halfway across the universe, it may reveal the unknown nature of the universal Dark Matter that surrounds us all.

Publications

1 **Rational design of antimony-based Zintl clusters: Unveiling unconventional bonding and architectures**
Lai Y, Chen WX, Tian WJ, Munoz-Castro A, Frenking G, and Sun ZM.
Accounts Chemical Research 58, 2875 (2025).

2 **Hacking cryptographic protocols with advanced variational quantum attacks**
Aizpurua B, Bermejo P, Martinez JE, and Orus R.
ACM Transactions on Quantum Computing 6, 14 (2025).

3 **Hybrid carbon nitride/cobalt phthalocyanine nanocomposites for efficient photocatalytic hydrogen generation**
Arumugam LS, Durantini JE, Follana-Berna J, Schiller F, Etxebarria A, Forzanini L, Barja S, Sastre-Santos A, and Gimenez S.
ACS Applied Energy Materials 8, 5056 (2025).

4 **Electrostatic self-assembly-driven heterojunction of Cubic CeO_2/g-C_3N_4 nanosheets for efficient photocatalytic hydrogen evolution and photoelectrocatalytic water splitting: A hybrid experimental and theoretical study**
Das A, Gumber S, Maji NC, Mishra SB, Preethi M, Ningthoukhongjam P, Nair RG, Abhijith T, Kazakova EA, Vasenko AS, Madhumitha R, and Prezhdo OV.
ACS Applied Materials & Interfaces 17, 48941 (2025).

5 **Photoluminescence enhancement at telecom wavelengths from PbS/CdS quantum dots coupled to a plasmonic crescent metasurface**
Al-Hamadani A, Gupta V, Montano-Priede JL, Thomas R, Muravitskaya A, Markey L, Roux-Byl C, Pons T, Zapata-Herrera M, Zabala N, et al.
ACS Applied Nano Materials 8, 19474 (2025).

6 **Bond-reversibility effects on self-crowding of unimacromolecular nano-objects**
Ruiz-Bardillo A, Asenjo-Sanz I, Verde-Sesto E, Porcar L, Kohlbrecher J, Pomposo JA, Moreno AJ, Arbe A, and Colmenero J.
ACS Macro Letters 14, 1389 (2025).

7 **Giant Purcell broadening and Lamb shift for DNA-assembled near-infrared quantum emitters**
Verlekar S, Sanz-Paz M, Zapata-Herrera M, Pilo-Pais M, Kolataj K, Esteban R, Aizpurua J, Acuna GP, and Galland C.
ACS Nano 19, 3172 (2025).

8 **Electron–phonon coupling and phonon dynamics in single-layer $NbSe_2$ on graphene: the role of Moiré phonons**
Al Taleb A, Wan W, Benedek G, Ugeda MM and Farías D.
ACS Nano 19, 8895 (2025).

9 **Chemical activation of a single melamine molecule via isomerization followed by metalation with a copper atom**
Rothe K, Alkorta M, Neel N, Frederiksen T, and Kroeger J.
ACS Nano 19, 9207 (2025).

10 **Optomechanical pumping of collective molecular vibrations in plasmonic nanocavities**
Jakob LA, Juan-Delgado A, Mueller NS, Hu S, Arul R, Boto RA, Esteban R, Aizpurua J, and Baumberg JJ.
ACS Nano 19, 10977 (2025).

11 **Local inversion symmetry breaking and thermodynamic evidence for ferrimagnetism in Fe_3GaTe_2**
Lee SE, Li Y, Lee Y, Brown WK, Cai P, Yun J, Lee C, Moon A, Mei L, Kim J, et al.
ACS Nano 19, 28702 (2025).

12 **Ultra-low atomic diffusion barrier on two-dimensional materials: The case of Pt on epitaxial graphene**
Berti A, Bergua RM, Mercero JM, Perco D, Lacovig P, Lizzit S, Jimenez-Izal E, and Baraldi A.
ACS Nano 19, 35921 (2025).

13 **Emergence of moire Dirac fermions at the interface of topological and 2D magnetic insulators**
Klimovskikh II, Hadjadj SE, Thakur A, Saunot A, Rogero C, Tallarida M, Dai J, Trontl VM, Weber AP, Gu GD, Lobo-Checa J, Ilyn M, and Valla T.
ACS Nano 19, 36411 (2025).

14 **Multivalent interactions between chaperone and ribosome-nascent chain complex revealed by high-speed AFM and MD simulations**
Nunez E, Saha P, Ibarluzea MG, Muguruza-Montero A, M-Alicante S, Ramis R, Leonardo A, Bergara A, Villarroel A, and Rico F.
ACS Nano 19, 42275 (2025).

15 **Synthesis of novel amphiphilic fluorinated polymers for the dispersion of hydrophobic gold nanoparticles, quantum dots, or highly fluorinated molecules in water**
Llorente G, Arango JM, Soto N, Kyzyma O, Yanez Crespo AA, Blanchet C, Garcia-Etxarri A, Cardenas M, and Carril M.
ACS Nanoscience Au 5, 482 (2025).

16 **Radical formation by direct single electron transfer between nitrobenzene and anionic organo bases**
Balahoju SA, Bhattacharjee N, Lezama L, Lopez X, Salcedo-Abraira P, Rodriguez-Dieguez A, and Reta D.
ACS Omega 10, 23798 (2025).

17 **Femtosecond optical-field-driven currents in few-nanometer-size gaps with hot electron injection into metallic leads**
Borisov AG, Ma B, Zapata-Herrera M, Babaze A, Kruger M, and Aizpurua J.
ACS Photonics 12, 2137 (2025).

18 **Compendium of natural epsilon-near-zero materials**
Darabian HR, Toudert J, Bliokh KY, and Pawlak DA.
ACS Photonics 12, 3042 (2025).

19 **Theoretical description of infrared near-field spectroscopy of in- and out-of-plane molecular vibrations in thin layers**
Robledo IP, Maciel-Escudero C, Schnell M, Mester L, Aizpurua J, and Hillenbrand R.
ACS Photonics 12, 3782 (2025).

20 **Roadmap for photonics with 2D materials**
Garcia de Abajo FJ, Basov DN, Koppens FHL, Orsini L, Ceccanti M, Castilla S, Cavicchi L, Polini M, Goncalves PAD, Costa AT, et al.
ACS Photonics 12, 3961 (2025).

21 **Tunable hyperbolic Landau-level polaritons in charge-neutral graphene nanoribbon metasurfaces**
Domina K, Slipchenko T, Nguyen DHM, Kuzmenko AB, Martin-Moreno L, Bercioux D, and Nikitin AY.
ACS Photonics 12, 5264 (2025).

22 **Iridium-based time-resolved luminescent sensor for Ba^{2+} detection**
Aranburu AI, Elorza M, Valle PRG, Pazos A, Brodolin A, Herrero-Gomez P, Barcelon JE, Molina-Terriza G, Monrabal F, Rogero C, Cossío FP, Gómez-Cadenas JJ, Tonnelé C, Freixa Z, and NEXT Collaboration.
ACS Sensors 10, 2487 (2025).

23 **Supplementary cementitious materials based on CO_2–capturing periwinkle shell**
Saeed E, Ogundiran MB, Goracci G, Aymonier C, and Dolado JS.
ACS Sustainable Resour. Manage 2, 2195 (2025).

24 **Physically cross-linked cellulose nanofiber (LCNF/CNF) hydrogels: impact of the composition on mechanical and swelling properties**
Baraka F, Morales A, Velazco-Cabral I, Rivilla I, and Labidi J.
Advanced Composites and Hybrid Materials 8, 151 (2025).

25 **Size-dependent penetration depth of colloidal nanoparticles into cell spheroids**
Zhu D, Brueckner D, Sosniok M, Skiba M, Feliu N, Gallego M, Liu Y, Schulz F, Falkenberg G, Parak WJ, and Sanchez-Cano C.
Advanced Drug Delivery Reviews 222, 115593 (2025).

26 **Decoding the structure of benzodithiophene polymers for high-efficiency organic solar cells**
Sanviti M, Marina S, Rodriguez-Martinez X, Asatryan J, Di Lisio V, Hultmark S, Gutierrez J, Solano E, Rech JJ, Solla EL, et al.
Advanced Functional Materials 35, 2503634 (2025).

27 **Superior adhesion of monolayer amorphous carbon to copper**
Zhang H, Grebenko AK, Iakoubovskii KV, Zhang H, Yamaletdinov R, Makarova A, Fedorov A, Rejaul SK, Shivajirao R, Tong ZJ, et al.
Advanced Materials 37, 2419112 (2025).

28 **Anomalous nonlinear magnetoconductivity in Van der Waals magnet CrSBr**
Jo J, M. Suarez-Rodriguez M, Manas-Valero S, Coronado E, Souza I, de Juan F, Casanova F, Gobbi M, and Hueso LE.
Advanced Materials 37, 2419283 (2025).

29 **Mechanical resonant sensing of spin texture dynamics in a 2D antiferromagnet**
Yousuf SMEH, Wang Y, Ramachandran S, Koptur-Palenchar J, Tarantini C, Xiang L, McGill S, Smirnov D, Santos EJG, Feng PXL, and Zhang XX.
Advanced Materials 37, 2420168 (2025).

30 **Ancestral protein-based lighting**
Willeit S, Mauz A, Gutierrez-Armayor D, Arbash J, Banda-Vazquez JA, Marti S, Coto PB, and Costa RD.
Advanced Materials 37, 2420303 (2025).

31 **All-heat control of magnetization dynamics on Van der Waals magnets**
Haldar S, Griepe T, Atxitia U, and Santos EJG.
Advanced Materials 37, 2501043 (2025).

32 **High magnetic sensitivity at the coercive field induced by shear horizontal SAW in polycrystalline FeGa films**
Aguilera JD, Ranchal R, Galvez F, Colino JM, Gracia I, Vallejos S, Hernando A, Marin P, de la Presa P, and Matatagui D.
Advanced Materials Technologies 10, e00746 (2025).

33 **A new class of diarylethene compounds that exhibit turn-on emission: From aggregation-induced emission to anti-Kasha emission**
Xu Z, Owona J, Liu QT, Putwa S, Jiang L, Tong KM, Hean D, Patrick BO, Chou KC, Tonnele C, et al.
Advanced Optical Materials 13, 00422 (2025).

34 **Coupled optical response of armchair graphene nanoribbons and single wall carbon nanotube hybrid structures**
van der Gon DD, Laranjeira J, Milotti V, Perner LW, Benalcazar J, Melle-Franco M, Pichler T, Heckl OH, and Ayala P.
Advanced Optical Materials 13, 2500892 (2025).

35 **Size effect on photothermal heating ability of gold bipyramids**
Naik AM, Sanchez-Iglesias A, Montano-Priede JL, D'souza NM, Sancho-Parramon J, Mezzasalma SA, Rao A, and Grzelczak M.
Advanced Optical Materials 13, e01006 (2025).

36 **Quantitative analytical spheroid model for scattering-type scanning near-field optical spectroscopy**
Voronin KV, Leon IH, Hillenbrand R, and Nikitin AY.
Advanced Optical Materials 13, e01539 (2025).

37 **Operation of single-spin qubits: recent advances and prospects**
Zhang Z, Ran J, Gao F, Jia C, and Guo X.
Advanced Physics Research 4, 2400146 (2025).

38 **Versatile quadrature antenna for precise control of large electron spin ensembles in diamond**
Pellicer-Guridi R, Custers K, Solozabal-Aldalur J, Brodolin A, Francis JT, Varga M, Mongelos A, Casanova J, Paulides MM, and Molina-Terriza G.
Advanced Quantum Technologies 8, 2400142 (2025).

39 **Field-induced antiferromagnetic correlations in a nanopatterned Van der Waals ferromagnet: A potential artificial spin ice**
Noah A, Fridman N, Zur Y, Markman M, King YK, Klang M, Rama-Eiroa R, Solanki H, Ashby MLR, Levin T, et al.
Advanced Science 12, 2409240 (2025).

40 **A modern roman-inspired concrete with daytime radiative cooling capacity**
Dolado JS, Goracci G, Moutaoukil G, Agbaoye RO, Beruete M, Torres-Garcia AE, Carlosena L, Prabhu A, Ibanez JA, Adams N, van Lipzig N, and Allacker K.
Advanced Science 12, e11691 (2025).

41 **Barium ion sensing with IPG K^+ molecular probes**
Miller RL, Byrnes N, Cameron CG, Carlson AJ, Dey E, Madigan R, Medina J, Melancon S, Navarro KE, Foss FW, et al.
Analyst 150, 5558 (2025).

42 **Tailoring ϖ-d magnetic interactions in metallated porphyrin nanotapes**
Robles R, Edalatmanesh S, Sun Q, Ruffieux P, Fasel R, Mateo LM, Bottari G, Torres T, and Lorente N.
Angewandte Chemie International Edition 64, e15342 (2025).

43 **N-Heterocyclic carbene vs. thiophene - Chiral adsorption and unidirectional rotation on Au(111)**
Khera N, Sun N, Park S, Das P, Au-Yeung KH, Sarkar S, Plate F, Robles R, Lorente N, Lissel FSC, and Moresco F.
Angewandte Chemie International Edition 64, e202424715 (2025).

44 **Synthesis of porous carbon-based network containing ultranarrow nonplanar nanopores on surfaces**
Qin T, Gao F, Wu Y, Liang B, Hu L, Yang W, Ding H, Hu J, Xu Q, Garcia-Lekue A, et al.
Angewandte Chemie International Edition 64, e202504734 (2025).

45 **Solution of the modified Anderson chain**
Karnaukhov IN, and Krasovskii EE.
Annals of Physics 479, 170037 (2025).

46 **A conformal anomaly from the Fermi velocity renormalization in graphene and Dirac semi-metals**
Baggioli M, Chernodub MN, Landsteiner K, Principi A, and Vozmediano MAH.
Annals of Physics 483, 170267 (2025).

47 **Influence of carrier density and disorder on the quantum Hall plateau widths in epitaxial graphene**
Figueruelo-Campanero I, Baba Y, Jimeno-Pozo A, Garcia-Perez J, Gonzalez EM, Miranda R, Guinea F, Canovas E, Granados D, Pantaleon PA, Burset P, and Menghini M.
APL Materials 13, 071119 (2025).

48 **Optical forces, helicity, angular momentum and how they are all intertwined**
Gomez-Viloria I, Garcia EA, Olmos-Trigo J, Stefano QP, Lasa-Alonso J, Molezuelas-Ferreras M, and Molina-Terriza G.
APL Photonics 10, 051101 (2025).

49 **Mie scattering based measurements of the optical size of single spherical dielectric microparticles**
Tribaldo I, Molezuelas-Ferreras M, Cifuentes A, Lopez C, Fenollosa R, and Molina-Terriza G.
APL Photonics 10, 076103 (2025).

50 **Manipulation of the anomalous Hall effect in magnetic topological insulator heterostructure $MnBi_2Te_4/Bi_2Te_3$ by Si substrate surface engineering**
Ishihara K, Ichinokura S, Eremeev SV, Sasaki TT, Takada R, Nishimichi H, Akiyama R, Chulkov EV, and Hirahara T.
Applied Physics Letters 127, 211601 (2025).

51 **Persistent incommensurate charge density wave in chalcogen-disordered 1*T*-TaSeTe**
Sharma J, Choudhury S, Huang MJ, Buck J, Blanco-Canosa S, Rossnagel K, and Mahatha SK.
Applied Physics Letters 127, 243101 (2025).

52 **Mastering the growth of antimonene on Bi_2Se_3: Strategies and insights**
Flammini R, Hogan C, Colonna S, Ronci F, Satta M, Papagno M, Aliev ZS, Eremeev SV, Chulkov EV, Benher ZR, et al.
Applied Physics Reviews 12, 011336 (2025).

53 **Perovskite nanocrystals as emerging single-photon emitters: Progress, challenges, and opportunities**
Ryu J, Krivenkov V, Olejniczak A, Nikitin AY, and Rakovich Y.
Applied Physics Reviews 12, 041323 (2025).

54 **Adsorption and self-assembling of a norbornadiene derivative on Au(111)**
Sarkar S, Khera N, Ferreira P, Au-Yeung KH, Das P, Robles R, Lorente N, Moth-Poulsen K, and Moresco F.
Applied Surface Science 709, 163744 (2025).

55 **Towards cooling concrete: Evaluation of cement and cement composites under realistic climatic conditions**
Torres-Garcia AE, Agbaoye RO, Carlosena L, Goracci G, Lezaun C, Dolado JS, and Beruete M.
Applied Thermal Engineering 265, 125531 (2025).

56 **DFT study on the role of Lewis acids in benzoxasilole synthesis via intramolecular Hosomi-Sakurai reaction**
Rodriguez-Arias C, and de Cozar A.
Asian Journal of Organic Chemistry 14, e00571 (2025).

57 **Gaussian Lagrangian galaxy bias**
Stucker J, Pellejero-Ibanez M, Voivodic R, and Angulo RE.
Astronomy & Astrophysics 694, A29 (2025).

58 **KiDS-Legacy: Angular galaxy clustering from deep surveys with complex selection effects**
Yan Z, Wright AH, Chisari NE, Georgiou C, Joudaki S, Loureiro A, Reischke R, Asgari M, Bilicki M, Dvornik A, et al.
Astronomy & Astrophysics 694, A259 (2025).

59 **Exploring the physical origins of halo assembly bias from early times**
Montero-Dorta AD, Contreras S, Celeste Artale M, Rodriguez F, and Favole G
Astronomy & Astrophysics 695, A159 (2025).

60 **The J-PAS survey: The effect of photometric redshift errors on cosmic voids**
Mansour JA, Liivamagi LJ, Tamm A, Laur J, Abramo R, Tempel E, Kipper R, Hernan-Caballero A, Marra V, Alcaniz J, et al.
Astronomy & Astrophysics 695, A174 (2025).

61 **J-PLUS: Spectroscopic validation of Hα emission line maps in spatially resolved galaxies**
Rahna PT, Akhlaghi M, Lopez-Sanjuan C, Logrono-Garcia R, Muniesa DJ, Dominguez-Sanchez H, Fernandez-Ontiveros JA, Sobral D, Lumbreras-Calle A, Chies-Santos AL, et al.
Astronomy & Astrophysics 695, A200 (2025).

62 **Euclid I. Overview of the Euclid mission**
Mellier Y, Abdurro'uf, Barroso JAA, Achucarro A, Adamek J, Adam R, Addison GE, Aghanim N, Aguena M, Ajani V, et al.
Astronomy & Astrophysics 697, A1 (2025).

63 **The impact of baryons on the sparsity of simulated galaxy clusters from The Three Hundred Project Astrophysical and cosmological implications**
Corasaniti PS, Richardson TRG, Ettori S, De Petris M, Rasia E, Cui W, Yepes G, Gianfagna G, Le Brun AMC, and Rasera Y.
Astronomy & Astrophysics 697, A33 (2025).

64 **FLAMINGO: Galaxy formation and feedback effects on the gas density and velocity fields**
Ondaro-Mallea L, Angulo RE, Arico G, Schaye J, McCarthy IG, and Schaller M.
Astronomy & Astrophysics 697, A63 (2025).

65 **Non-halo structures and their effects on gravitationally lensed galaxies**
Jego B, Despali G, Richardson T, and Stuecker J.
Astronomy & Astrophysics 697, A191 (2025).

66 **Investigating the galaxy-halo connection of DESI emission-line galaxies with SHAMe-SF**
Ortega-Martinez S, Contreras S, Angulo RE, and Chaves-Montero J.
Astronomy & Astrophysics 697, A226 (2025).

67 **Galaxy formation physics behind bar formation: A view from cosmological hydrodynamical simulations**
Rosas-Guevara Y, Bonoli S, Puchwein E, Dotti M, and Contreras S.
Astronomy & Astrophysics 698, A20 (2025).

68 **Stellar rotation in the intermediate-age massive cluster NGC 1783: Clues about the nature of UV-dim stars**
Leanza S, Dalessandro E, Cadelano M, Fanelli C, Ettorre G, Kamann S, Bastian N, Martocchia S, Salaris M, Lardo C, Mucciarelli A, and Saracino S.
Astronomy & Astrophysics 698, A27 (2025).

69 **Spatially resolved stellar populations and emission line properties in nearby galaxies with J-PLUS I. Method and first results for the M101 group**
Thaina-Batista J, Cid Fernandes R, Gonzalez Delgado RM, Rodriguez-Martin JE, Garcia-Benito R, Martinez-Solaeche G, Diaz-Garcia LA, Sasse VH, Lumbreras-Calle A, Conrado AM, et al.
Astronomy & Astrophysics 699, A45 (2025).

70 **KiDS-Legacy: Covariance validation and the unified OneCovariance framework for projected large-scale structure observables**
Reischke R, Unruh S, Asgari M, Dvornik A, Hildebrandt H, Joachimi B, Porth L, von Wietersheim-Kramsta M, van den Busch JL, Stoelzner B, et al.
Astronomy & Astrophysics 699, A124 (2025).

71 **6 x 2 pt: Forecasting gains from joint weak lensing and galaxy clustering analyses with spectroscopic-photometric galaxy cross-correlations**
Johnston H, Elisa Chisari N, Joudaki S, Reischke R, Stoelzner B, Loureiro A, Mahony C, Unruh S, Wright AH, et al.
Astronomy & Astrophysics 699, A127 (2025).

72 **Probabilistic Lagrangian bias estimators and the cumulant bias expansion**
Stucker J, Pellejero-Ibanez M, Angulo RE, Maion F, and Voivodic R.
Astronomy & Astrophysics 699, A197 (2025).

73 **Probabilistic estimators of Lagrangian shape biases: Universal relations and physical insights**
Maion F, Stucker J, and Angulo RE.
Astronomy & Astrophysics 699, A271 (2025).

74 **Microlensing at cosmological distances: Event rate predictions in the Warhol arc of MACS 0416**
Palencia JM, Diego JM, Dai L, Pascale M, Windhorst R, Koekemoer AM, Li SK, Kavanagh BJ, Sun F, Alfred A, et al.
Astronomy & Astrophysics 699, A295 (2025).

75 **Flashlights: Prospects for constraining the initial mass function around cosmic noon with caustic-crossing events**
Meena AK, Li SK, Zitrin A, Kelly PL, Broadhurst T, Chen W, Diego JM, Filippenko AV, Furtak LJ, and Williams LLR.
Astronomy & Astrophysics 699, A299 (2025).

76 **Galaxy formation with wave/fuzzy dark matter: The core-halo structure and the solitonic imprint**
Pozo A, Emami R, Mocz P, Broadhurst T, Hernquist L, Vogelsberger M, Smith R, Tremblay G, Narayan R, Steiner J, Grindlay J, and Smoot G.
Astronomy & Astrophysics 699, A308 (2025).

77 **Testing the role of merging binaries in the formation of the split main sequence in young clusters**
Bastian N, Kamann S, Niederhofer F, and Saracino S.
Astronomy & Astrophysics 700, A241 (2025).

78 **Signatures of fuzzy dark matter inside radial critical curves**
Palencia JM, Morilla P, Li SK, Diego JM, Alfred A, Broadhurst TJ, Kavanagh BJ, and Lim J.
Astronomy & Astrophysics 701, A24 (2025).

79 **Hidden figures in the sky. Evolution of low-surface-brightness galaxies from a hydrodynamical perspective**
Stoppacher D, Tissera P, Rosas-Guevara Y, Galaz G, and Onorbe J.
Astronomy & Astrophysics 701, A272 (2025).

80 **J-PLUS: Understanding outlier white dwarfs in the third data release via dimensionality reduction**
Lopez-Sanjuan C, Tremblay PE, del Pino A, Dominguez Sanchez H, Vazquez Ramio H, Ederoclite A, Cenarro AJ, Marin-Franch A, Anguiano B, Civera T, et al.
Astronomy & Astrophysics 701, A273 (2025).

81 **KiDS-Legacy: Consistency of cosmic shear measurements and joint cosmological constraints with external probes**
Stolzner B, Wright AH, Asgari M, C. Heymans C, Hildebrandt H, Hoekstra H, Joachimi B, Kuijken K, Li SS, Mahony C, et al.
Astronomy & Astrophysics 702, A169 (2025).

82 **KiDS-Legacy: Redshift distributions and their calibration**
Wright AH, Hildebrandt H, Van Den Busch JL, Bilicki M, Heymans C, Joachimi B, Mahony C, Reischke R, Stolzner B, Wittje A, et al.
Astronomy & Astrophysics 703, A144 (2025).

83 **KiDS-Legacy: Cosmological constraints from cosmic shear with the complete Kilo-Degree Survey**
A. H. Wright AH, B. Stolzner B, M. Asgari M, M. Bilicki M, B. Giblin, C. Heymans, H. Hildebrandt, H. Hoekstra, B. Joachimi, K. Kuijken, et al.
Astronomy & Astrophysics 703, A158 (2025).

84 **Off-centre black hole seed formation: Implications for high- and low-redshift massive black holes**
Izquierdo-Villalba D, Spinoso D, Volonteri M, Colpi M, Sesana A, and Bonoli S.
Astronomy & Astrophysics 703, A165 (2025).

85 **JWST lens model for A370: A very low dark matter fraction for a brightest cluster galaxy and lensing properties for the Dragon arc**
Diego JM, Sun F, Palencia JM, Lin X, Limousin M, Gledhill R, Niemiec A, Chen W, Windhorst RA, Struble MF, and Broadhurst T.
Astronomy & Astrophysics 703, A207 (2025).

86 **J-PAS: Discovery of RaJav, a bright extended Lyα Nebula at z=2.25**
Rahna PT, Akhlaghi M, Fernandez-Ontiveros JA, Zheng ZY, Hernan-Caballero A, Amorin R, Lopez-Sanjuan C, Diego JM, Diaz-Garcia LA, Vilchez JM, et al.
Astronomy & Astrophysics 703, L20 (2025).

87 **Infalling ultra-faint dwarfs as emissaries of the Axiverse**
Pozo A, Broadhurst T, Luu HN, Smoot G, Umetsu K, Chiueh T, Schive HY, Emami R, Hernquist L, Mocz P, and Vogelsberger M.
Astronomy & Astrophysics 704, A34 (2025).

88 **The miniJPAS survey**
Rodriguez-Martin JE, Diaz-Garcia LA, Gonzalez Delgado RM, Martinez-Solaeche G, Garcia-Benito R, De Amorim A, Thaina-Batista J, Cid Fernandes R, Marquez I, Fernandez-Soto A, et al.
Astronomy & Astrophysics 704, A52 (2025).

89 **Cluster Ages to Reconstruct the Milky Way Assembly (CARMA)**
Niederhofer F, Massari D, Aguado-Agelet F, Cassisi S, Bellini A, Kozhurina-Platais V, Libralato M, Kacharov N, Mucciarelli A, Monelli M, et al.
Astronomy & Astrophysics 704, A257 (2025).

90 **MaNGA AGN dwarf galaxies (MAD) IV. Revealing hidden AGN in dwarf galaxies with radio observations**
Flores I, Mezcua M, and Rodriguez Morales V.
Astronomy & Astrophysics 704, A267 (2025).

91 **Transient star blue-to-red ratio and star formation history in $z \gtrsim 1$ lensed galaxies**
Li SK, Palencia JM, Diego JM, Lim J, Kelly PL, Meena AK, Nianias J, Williams H, Williams LLR, Zitrin A, and Broadhurst TJ.
Astronomy & Astrophysics 704, A309 (2025).

92 **COCOA: A compact Compton camera for astrophysical observation of MeV-scale gamma rays**
Soleti SR, Gomez-Cadenas JJ, Apilluelo J, Asquith L, Bannister EF, Barradas NP, Baylis CL, Beney JL, Berberan e Santos M, de la Bernardie X, et al.
Astroparticle Physics 172, 103135 (2025).

93 **Ultrathin water layers on mannosylated gold nanoparticles**
Alonso MAI, Melillo JH, Cerveny S, Tong Y, and Bittner AM.
Beilstein Journal of Nanotechnology 16, 2183 (2025).

94 **On the aromaticity and photophysics of 1-arylbenzo[a]imidazo[5,1,2-cd]indolizines as bicolor fluorescent molecules for barium tagging in the study of double-beta decay of ^{136}Xe**
Velazco-Cabral EI, Auria-Luna F, Molina-Canteras J, Vazquez MA, Rivilla I, and Cossio FP.
Beilstein Journal of Organic Chemistry 21, 1627 (2025).

95 **Exploring biological properties of sulfa-based copper(II) complexes: in vitro genotoxicity, cytotoxicity (2D and 3D) and mechanistic insights**
Coelho MPM, de M. Pereira G, Corbi PP, Nakahata DH, Gandin V, Donati C, Vecina JF, and Ruiz ALTG
Biometals 38, 1551 (2025).

96 **Energy-resolved imaging and tomography with compact neutronsystems - application to novel construction materials for thermal-energystorage**
Macia-Castello C, Blanco-Lopez D, Gaboardi M, Koenders E, Dolado JS, Wakabayashi Y, Fukuchi T, Ikeda Y, Otake Y, and Fernandez-Alonso F.
Canadian Journal of Physics 103, 1232 (2025).

97 **Structural characterization of low methoxyl pectin-based adsorbents: The role of water on pectin structure**
Coin F, Larranaga A, and Cerveny S.
Carbohydrate Polymer Technologies and Applications 11, 100885 (2025).

98 **Observation of increasing bending rigidity of graphene with temperature**
Tømterud M, Hellner SK, Eder SD, Forti S, Convertino D, Manson JR, Coletti C, Frederiksen T, and Holst B.
Carbon 238, 120150 (2025).

99 **How does intercalation affect the structure and dynamics of bilayer graphene?**
Hourigan NJ, Seiler P, Wetherington M, Dong C, Robinson JA, Benedek G, and Tamtögl A.
Carbon 238, 120156 (2025).

100 **Overcoming flavin-driven inactivation of alcohol dehydrogenases through enzyme immobilization**
Castillo Pacheco SF, Swiderek K, Moran MJ, Oliden-Sanchez A, Moliner V, Salassa L, and Lopez-Gallego F.
Catalysis Science & Technology 15, 6486 (2025).

101 **The Sabatier principle governs the performance of self-sufficient heterogeneous biocatalysts for redox biotransformations**
Diamanti E, Oliden-Sanchez A, Grajales-Hernandez D, Andres-Sanz D, Fernandez-Marin R, Padro D, Ruiz-Cabello J, Zangi R, and Lopez-Gallego F.
Cell Reports Physical Science 6, 102694 (2025).

102 **Ceramide and the membrane-fusion activity of LC3/GABARAP autophagy proteins**
Varela YR, Aguirre CC, Iriondo MN, Ballesteros U, Collado MI, Etxaniz A, Montes LR, Goni FM, and Alonso A.
Cellular and Molecular Life Sciences 82, 283 (2025).

103 **Thermal properties of tricalcium aluminate: Molecular dynamics simulation and experimental approach**
Sarkar PK, Goracci G, and Dolado JS.
Cement and Concrete Research 189, 107780 (2025).

104 **Red-light photocatalytic activation of Pt(IV) anticancer prodrugs using methylene blue**
Carrasco AC, Bajetto G, Scoditti S, Pieslinger GE, Gambino F, De Andrea M, Sicilia E, Martinez-Martinez V, Dell'Oste V, and Salassa L.
ChemCatChem 17, e202401424 (2025).

105 **The paradigm of safe and sustainable-by-design synthetic catalysts for catalytic therapies**
Zingales E, de Alejo CMP, Sanchez M, Fernandez-Mendez L, Ruiz-Cabello J, Sanchez-Cano C, and Carregal-Romero S.
ChemCatChem 17, e202402043 (2025).

106 **Choline-geranate (CAGE) ionic liquids potentiate the anticancer activityof platinum-based drugs**
Verdugo MC, Sierri G, Hernandez-Fernandez L, Formoso E, Miranda JI, Sica FS, Orrego AH, Gonzalez A, Rezabal E, Re F, and Salassa L.
Chemical Communications 61, 12167 (2025).

107 **A snapshot of flavin-conjugated Pt anticancer agents: Pt(iv)-to-Pt(ii) reduction revealed by X-ray fluorescence imaging and XANES**
Zingales E, Sanchez-Camacho J, Walker J, Salassa L, and Sanchez-Cano C.
Chemical Communications 61, 18112 (2025).

108 **Green procedure for grafting polypeptide onto cellulose nanofibers**
F. Baraka, J. Santos, M. M. Langari, Rivilla I, and J. Labidi
Chemical Engineering Journal 506, 160349 (2025).

109 **Folded-twisted mechanisms control dynamic redox properties, photophysics and electron transfer of anthanthrene-quinodimethanes**
Valdivia AC, Lirette F, Marin-Beloqui JM, Carreras A, Casanova D, Boismenu-Lavoie J, Morin JF, and Casado J.
Chemical Science 16, 1925 (2025).

110 **Double-core nanothread formation from α-furil via a pressure-induced planarization pathway**
Dunning SG, Hari A, Zhu L, Chen B, Cody GD, Rom S, Zhang D, and Strobel TA.
Chemical Science 16, 4144 (2025).

111 **Isolable monoatomic monovalent bismuth complexes with a redox non-innocent bis-silylenyl carborane ligand**
Xu J, Yao S, Postils V, Matito E, Lorent C, and Driess M.
Chemical Science 16, 10826 (2025).

112 **Surface-enhanced Raman spectroscopy: a half-century historical perspective**
Yi J, You EM, Hu R, Wu DY, Liu GK, Yang ZL, Zhang H, Gu Y, Wang YH, Wang X, et al.
Chemical Society Reviews 54, 1453 (2025).

113 **The puzzle of sphingolipids and cholesterol under the atomic force microscope: bilayer thicknesses and breakthrough forces**
Garcia-Arribas AB, Alonso A, and Goni FM.
Chemistry and Physics of Lipids 271, 105527 (2025).

114 **Atomistic mechanism of perovskite grain boundary healing by halide doping: Machine Learning and Ab Initio analyses**
Wu Y, Wang B, Casanova D, and Prezhdo OV.
Chemistry of Materials 37, 5387 (2025).

115 **Synthesis and characterization of a non-planar cyclophenylene on Au(111)**
Salaverria S, Irizar M, Janeiro J, Angulo-Portugal P, Wang T, Calupitan JP, Rodriguez-Fernandez J, Garcia-Lekue A, Corso M, Artacho E, et al.
Chemistry – A European Journal 31, e202404256 (2025).

116 **Coordination compounds as antivirals against neglected tropical diseases**
Rezende WS, Neto AM, Corbi JJ, Corbi PP, de Paiva REF, and Bergamini FRG.
ChemMedChem 20, e202400799 (2025).

117 **Enhanced tetracycline removal through "in situ" europium incorporation in poly (vinyl alcohol) (PVA) electrospun mats: Advantages of this strategy in adsorption and reuse over doping**
Rodríguez-Ramírez CA, Coin F, Vergara-Rubio A, Picón D, Cerveny S, and Goyanes S.
Chemosphere 372, 144102 (2025).

118 **The aromaticity of osmapentalenes derivatives - an analysis based on electron-delocalization indices**
Grande-Aztazi R, Matito E, Ugalde JM, and Mercero JM.
ChemPhysChem 26, e202400713 (2025).

119 **Molecular hydrogen as a proton donor in H-H•••F hydrogen bonds-BF_4-•••$(H_2)_n$ clusters**
Grabowski SJ.
ChemPhysChem 26, e202500243 (2025).

120 **Continuous-flow synthesis of $BiVO_4$ nanoparticles: from laboratory scale to practical systems**
Robles C, Montanes L, Mesa CA, Iglesias D, Rabelo H, Spadaro MC, Arbiol J, Redondo J, Schiller F, Barja S, et al.
ChemSusChem 18, e202402583 (2025).

121 **Electrochemical transformation of copper sulfide electrodes for selective CO_2-to-formate conversion**
Fernandez-Climent R, Giusi D, Miceli M, Mesa CA, Gutierrez-Blanco A, Li J, Redondo J, Schiller F, Barja S, Celorrio V, Kornienko N, Ampelli C, and Gimenez S.
ChemSusChem 18, e2501180 (2025).

122 **Recent progress on surface chemistry II: property and characterization**
Li X, Xu Z, Bu D, Cai J, Chen H, Chen Q, Chen T, Cheng F, Chi L, Dong W, et al.
Chinese Chemical Letters 36, 110100 (2025).

123 **Strain-induced one-dimensional magnetic stripe in metallic monolayer H-$NbSe_2$**
Jia L, Zhang C, Gao F, Chen Y, Zhou L, Zhou F, Han X, Zhang T, Sanchez-Portal D, Gao S, Zhang Y, and Wang Y.
Chinese Physics Letters 42, 080712 (2025).

124 **Synergistic effects of FeNPs@GO on arsenic adsorption: Insights from experimental and theoretical studies**
Moreno-Barcenas A, Sepulveda-Ortiz P, Aguilera-del-Toro RH, Aguilera-Granja F, and Garcia-Garcia A.
Colloids and Surface A – Physicochemical and Engineering Aspects 727, 138310 (2025).

125 **Thermally-induced nickelocene fragmentation and one-dimensional chain assembly on Au(111)**
Jyoti D, Fetida A, Limot L, Robles R, Lorente N, and Choi DJ.
Communications Chemistry 8, 117 (2025).

126 **Synthesis, characterization and reactivity of a series of alkaline earth and rare earth iminophosphoranomethanide complexes**
Stevens MP, Liu Y, Alexopoulos E, Daudo SSAX, Hawker RR, Khan A, Lezama L, Reta D, and Ortu F.
Communications Chemistry 8, 175 (2025).

127 **Characterization of quasi-periodic dynamics of a magnetic nanoparticle**
Velez JA, Perez LM, Pizarro AE, Pedraja-Rejas L, Suarez OJ, Hernandez-Garcia R, Barrientos RJ, Bragard J, Laroze D, and Otxoa RM.
Communications in Nonlinear Science and Numerical Simulation 149, 108942 (2025).

128 **Intrinsic magnetic topological insulators of the $MnBi_2Te_4$ family**
Vyazovskaya AY, Bosnar M, Chulkov EV, and Otrokov MM.
Communications Materials 6, 88 (2025).

129 **High harmonic spectroscopy reveals anisotropy of the charge-density-wave phase transition in $TiSe_2$**
Tyulnev I, Zhang L, Vamos L, Poborska J, Bhattacharya U, Chhajlany RW, Grass T, Manas-Valero S, Coronado E, Lewenstein M, and Biegert J.
Communications Materials 6, 152 (2025).

130 **Direct to indirect band gap transition induced by approximately dark states**
Yang J, Date M, Ramirez IS, Hasse V, Biswas D, Parkin SSP, Vergniory MG, de Juan F, Felser C, Watson MD, and Schroter NBM.
Communications Materials 6, 277 (2025).

131 **Dissipative solitons signature in achiral Néel magnetic domain walls driven by spin-orbit torque**
Fattouhi M, Thiaville A, Garcia-Sanchez F, Otxoa RM, Estevez MPG, Martinez E, and Lopez-Diaz L.
Communications Physics 8, 234 (2025).

132 **Topological Weyl altermagnetism in CrSb**
Li C, Hu M, Li Z, Wang Y, Chen W, Thiagarajan B, Leandersson M, Polley C, Kim T, Liu H, et al.
Communications Physics 8, 311 (2025).

133 **Structural study of B-N Co-doped carbon dots: Comparison of spectroscopic analysis using DFT**
Navarro-Ibarra DC, Ibarra-Prieto HD, Garcia-Garcia A, and Aguilera-Granja F.
Computational Materials Science 258, 114048 (2025).

134 **Ambient pressure high temperature superconductivity in $RbPH_3$ facilitated by ionic anharmonicity**
Dangić D, Fang YW, Cerqueira TFT, Sanna A, Novoa T, Gao H, Marques MAL, and Errea I.
Computational Materials Today 8, 100043 (2025).

135 **Numerical renormalization group calculations for magnetic impurity systems with spin-orbit coupling and crystal-field effects**
Calvo-Fernandez A, Blanco-Rey M, and Eiguren A.
Computer Physics Communications 312, 109613 (2025).

136 **GRANAD-Simulating GRAphene nanoflakes with ADatoms**
Dams D, Kosik M, Mueller M, Ghosh A, Babaze A, Szczuczko J, Bryant GW, Ayuela A, Rockstuhl C, Pelc M, and Slowik K.
Computer Physics Communications 317, 109818 (2025).

137 **Momentum, spin, and orbital angular momentum of electromagnetic, acoustic, and water waves**
Bliokh KY.
Contemporary Physics 65, 219 (2025).

138 **Triel bonds-interactions without borders, similarly as hydrogen bonds**
Grabowski SJ.
Crystal Growth and Design 25, 4539 (2025).

139 **Effect of Al and Ta impurities on Si adsorption on (001) and (111) surfaces of B1-TiN**
Koroteev YM, Svyatkin LA, Ognev SO, and Silkin VM.
Crystals 15, 37 (2025).

140 **Exploring N_2 activation using novel Lewis acid/base pairs: computational insight into frustrated Lewis pair reactivity**
Gastearena X, Matxain JM, and Ruiperez F.
Dalton Transactions 54, 4338 (2025).

141 **Photoinduced electron transfer cascade between Mo- and W-based polyoxometalates**
Sanchez M, Gonzalez A, Guerrero-Ortega E, Bansal V, and Dominguez-Vera JM.
Dalton Transactions 54, 8834 (2025).

142 **Redefining platinum(IV) chemotherapy: α-tocopherol succinate functionalization and nanoparticle encapsulation to improve cisplatin- and oxaliplatin-based therapies**
Marotta C, Cirri D, Maimone MC, Giacomelli C, Trincavelli ML, Salassa L, Gabbiani C, and Pratesi A.
Dalton Transactions 54, 13200 (2025).

143 **Characterization of a radiation detector based on opaque water-based liquid scintillator**
Apilluelo J, Asquith L, Bannister EF, Beney JL, de la Bernardie X, Bezerra TJC, Bongrand M, Bourgeois C, Boutalha H, Breton D, et al.
Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 1071, 170075 (2025).

144 √ **Crilin: A novel calorimeter proposal for the s=10 TeV Muon Collider - Simulations and prototype tests results**
Cantone C, Casarsa M, Cemmi A, Ceravolo S, Ciccarella V, Colao E, Di Meco E, Di Sarcina I, Diociaiuti E, Gargiulo R, et al.
Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 1079, 170617 (2025).

145 **Recognizing past shapes: Sex differentiation through deep learning on European Upper Palaeolithic hand stencils**
Fernandez-Navarro V, Gonzalez-Marfil A, Arganda-Carreras I, and Garate D.
Digital Applications in Archaeology and Cultural Heritage 38, e00453 (2025).

146 **Pursuit of singlet fission fulvene candidates using inverse design**
Casademont-Reig I, Monreal-Corona R, Desmedt E, De Vleeschouwer F, and Alonso M.
Digital Discovery 4, 2156 (2025).

147 **Near-infrared emissive optical waveguides and photophysical insights based on 5H-[1,2,5] thiadiazolo[3,4-f]benzotriazole (BTD-BTZ)**
Sanchez-Oliva A, Herreros JH, de Cozar A, Martin C, Gomez MV, Prieto P, and Torres-Moya I.
Dyes and Pigments 242, 112949 (2025).

148 **Generalized SSH model with staggered field**
Karnaukhov IN, and Krasovskii EE.
Electronic Structure 7, 045002 (2025).

149 **Crossover in aromatic amino acid interaction strength between tyrosine and phenylalanine in biomolecular condensates**
De Sancho D, and Lopez X.
eLife 14, RP104950 (2025).

150 **PRODAN and C120 fluorescent probes to investigate the structure of branched cyclic polyglycerol**
Pagnacco CA, Barroso-Bujans F, Calderon M, and Orellano MS.
European Polymer Journal 228, 113831 (2025).

151 **Shape, temperature and density interplay in depletion forces**
Azizi I.
Europhysics Letters 149, 27001 (2025).

152 **Concluding (closing?) remarks**
Goni FM.
Faraday Discussions 259, 634 (2025).

153 **Wikipedia as a cultural lens: A quantitative approach for exploring cultural networks**
Miccio LA, Agapitos P, Gamez-Perez C, Gonzalez F, Suarez JL, and Schwartz GA.
Humanities and Social Sciences Communications 12, 462 (2025).

154 **Growth and characterization of Ag layers on Mo(110) using LEED, XPS and ARPES**
Das S, Kar A, Pau S, and Menon KSR.
Indian Journal of Physics 99, 3755 (2025).

155 **Chemical bonding of low-valent radical magnesium species and computational design of low-valent radical calcium complexes**
Guo W, Zhu M, Hu Y, Zhang Z, Yan R, Frenking G, and Zhao L.
Inorganic Chemistry 64, 18103 (2025).

156 **How can polyoxometalates have phosphodiesterase activity? Unravelling the catalytic effect of heptamolybdate in the hydrolysis of phosphodiester models**
Lanuza J, Sanchez-Gonzalez A, Lopez X, and Gil A.
Inorganic Chemistry Communications 174, 113908 (2025).

157 **Structures and stabilities Ru-doped Ag_n (n=1-13) clusters: $Ag_{10}Ru$ a 18-ve cluster superatom**
Rodriguez-Kessler PL, Rodriguez-Carrera S, Guevara-Vela JM, Rocha-Rinza T, Orozco-Ic M, Olalde-Lopez D, and Munoz-Castro A.
Inorganica Chimica Acta 574, 122349 (2025).

158 **Synthesis and structure of triosmium clusters bearing an organosilicon ligand**
Reza MS, Rajbangshi S, Nesterov VN, Pieslinger GE, Kabir SE, and Ghosh S.
Inorganica Chimica Acta 586, 122765 (2025).

159 **Er^{3+}-Yb^{3+}-codoped LaF_3 glass-ceramic optical fiber**
Sedano M, Kochanowicz M, Dorosz D, Duran A, Fernandez J, Balda R, and Pascual MJ.
International Journal of Applied Glass Science 17, e70001 (2025).

160 **Multifunctional cassava starch bilayers with basil extract and eco-friendly synthesized silver** nanoparticles for scalable and sustainable food packaging
Iacovone C, Fernandez L, Guz L, and Fama L.
International Journal of Biological Macromolecules 309, 142925 (2025).

161 **The role of artificial intelligence in implant dentistry: a systematic review**
Vazquez-Sebrango G, Anitua E, Macia I, and Arganda-Carreras I.
International Journal of Oral and Maxillofacial Surgery 54, 1098 (2025).

162 **Cardiac fibrosis inhibitor CTPR390 prevents structural and morphological changes in human engineered cardiac connective tissue**
Maestro D, Palanca A, Soto H, Llarena I, DeGrave AN, Guedes G, de Oliveira GH, Conceicao ALC, Mieites V, Icardo JM, et al.
iScience 28, 113013 (2025).

163 **Role of lithium atoms in modulating dynamic deformation and phase transition of iron-based single crystals under cylindrically shock**
Tan J, Jiang X, Xiao S, Tang Z, Wang K, Hu W, Moghaddam AO, Stolyarov VS, and Vasenko AS.
Journal of Alloys and Compounds 1039, 183129 (2025).

164 **False alarm rate-based statistical detection limit for astronomical photon detectors**
Lau AWK, Fung LWH, and Smoot GF.
Journal of Astronomical Telescopes, Instruments, and Systems 11, 028007 (2025).

165 **Chronic treatment with adenosine A1 receptor antagonist promotes neurogenesis and improves outcome after cerebral ischemia**
Ardaya M, Benito-Munoz M, Rubio-Lopez E, Garbizu M, Aguado L, Mocha-Munoz N, Iglesias L, Aldutzin U, Matute C, Soria FN, et al.
Journal of Cerebral Blood Flow & Metabolism 45, 2016 (2025).

166 **Longitudinal imaging evaluation of the inflammatory role of purinergic A2A receptors during subacute and chronic ischemic stroke**
Garbizu M, Mocha-Munoz N, Rubio-Lopez E, Palacios L, Aguado L, Ardaya M, Joya A, Alduntzin U, Plaza-Garcia S, Padro D, et al.
Journal of Cerebral Blood Flow & Metabolism 46, 456 (2025).

167 **Modeling and elucidating the behavior of a thermoresponsive LCST ionic liquid**
Mohammed HO, de Cozar A, and Zangi R.
Journal of Chemical Information and Modeling 65, 785 (2025).

168 **Resolving molecular interactions in protein folding trajectories with NCIPLOT**
A. Urriolabeitia, Contreras-Garcia J, De Sancho D, and Lopez X.
Journal of Chemical Information and Modeling 65, 10613 (2025).

169 **Machine learning approach for predicting drug-like molecules targeting calmodulin pathway proteins**
Baltasar-Marchueta M, Lopez N, Alicante S, Barbolla I, Garcia Ibarluzea M, Ramis R, Salomon AM, Muguruza-Montero A, Nunez Viadero E, Leonardo A, et al.
Journal of Chemical Information and Modeling 65, 11892 (2025).

170 **Computational analysis of a next-generation platinum-based chemotherapies that Induce DNA double-strand breaks**
Guimaraes AR, Ballesteros OR, Rivilla I, Olaizola I, Odriozola-Gimeno M, de Cozar A, de Sancho D, Lopez X, Banales JM, and Cossio FP.
Journal of Chemical Information and Modeling 66, 668 (2025).

171 **Dynamic training enhances machine learning potentials for long-lasting molecular dynamics**
Zugec I, Veljkovic TH, Alducin M, and Juaristi JI.
Journal of Chemical Information and Modeling 95, 8033 (2025).

172 **Magnetic properties, spin-vibration couplings, and temperature effects in phenalenyl and triangulene**
Omist A, Cebreiro-Gallardo A, Hugget M, Boto RA, and Casanova D
Journal of Chemical Theory and Computation 21, 1153 (2025).

173 **Efficient energy measurement of chemical systems via one-particle reduced density matrix: a NOF-VQE approach for optimized sampling**
Lew-Yee JFH, and Piris M.
Journal of Chemical Theory and Computation 21, 2402 (2025).

174 **State-interaction approach for *g*-matrix calculations in TDDFT: Ground-excited state couplings and beyond first-order spin-orbit effects**
Cebreiro-Gallardo A, and Casanova D
Journal of Chemical Theory and Computation 21, 6528 (2025).

175 **Pruned-ADAPT-VQE: Compacting molecular ansatze by removing irrelevant operators**
Vaquero-Sabater N, Carreras A, and Casanova D.
Journal of Chemical Theory and Computation 21, 8720 (2025).

176 **Correlation-driven spin-component-scaled second-order Møller-Plesset perturbation theory (CD-SCS-MP2)**
Paulau A, Soriano-Agueda L, and Matito E
Journal of Chemical Theory and Computation 21, 9601 (2025).

177 **Clarification of some bonding concepts: Virial theorem, electron pair repulsion, and rotational barriers**
Schwarz WHE, Frenking G, and Pan S
Journal of Computational Chemistry 46, e70085 (2025).

178 **Energy and real space characteristics of non-covalent interactions across the periodic table**
Desmedt E, Zator K, Woller T, Boto RA, Alonso M, and Contreras-Garcia J
Journal of Computational Chemistry 46, e70268 (2025).

179 **The lifespan of our universe**
Luu HN, Qiu YC, and Tye SHH.
Journal of Cosmology and Astroparticle Physics 09, 055 (2025).

180 **J-PAS: Forecasting constraints on neutrino masses**
Rodrigues G, Cuesta AJ, Alcaniz J, Resco MA, Maroto AL, Masip M, Rodrigues G, dos Santos FBM, Perez JC, Garcia-Farieta JE, et al.
Journal of Cosmology and Astroparticle Physics 12, 047 (2025).

181 **Attosecond dynamics of electron scattering by an absorbing layer**
Kuzian RO, and Krasovskii EE.
Journal of Electron Spectroscopy and Related Phenomena 280, 147535 (2025).

182 **New platinum derivatives selectively cause double-strand DNA breaks and death in naïve and cisplatin-resistant cholangiocarcinomas**
Olaizola I, Odriozola-Gimeno M, Olaizola P, Caballero-Camino FJ, Pastor-Toyos N, Tena-Garitaonaindia M, Lapitz A, Val B, Guimaraes AR, Asensio M, et al.
Journal of Hepatology 83, 1077 (2025).

183 **Probing the general axion-nucleon interaction in water Cherenkov experiments**
Cavan-Piton M, Guadagnoli D, Iohner A, Fernandez-Menendez P, and Vittorio L.
Journal of High Energy Physics 2025, 70 (2025).

184 **Reconstructing neutrinoless double beta decay event kinematics in axenon gas detector with vertex tagging**
Martinez-Vara M, Mistry K, Pompa F, Jones BJP, Martin-Albo J, Sorel M, Adams C, Almazan H, Ivarez V, Aparicio B, et al.
Journal of High Energy Physics 2025, 170 (2025).

185 **Designing mimosine-containing peptides as efficient metal chelators: Insights from molecular dynamics and quantum calculations**
Silva-Brea D, Aduriz-Arrizabalaga J, de Sancho D, and Lopez X
Journal of Inorganic Biochemistry 264, 112807 (2025).

186 **Cryogenic cesium iodide as a potential PET material**
Soleti SR, Castillo A, Del Barrio-Torregrosa M, Echeverria C, Seemann M, Zerzion D, Cadenas JJG, and Collar JI.
Journal of Instrumentation 20, P06038 (2025).

187 **Analysis of microstructural, electronic and magnetic properties of nanocrystalline compound Sm_2ZrCo_{16}: Effects of annealing temperature and role of intergranular exchange coupling**
Fersi R, Reinhold A, Pereira A, and Dalia AP.
Journal of Magnetism and Magnetic Materials 626, 173085 (2025).

188 **A carnitine-based BODIPY photosensitizer**
Maierhofer L, Prieto-Montero R, Cubiella T, Diaz-Andres A, Morales-Benitez N, Casanova D, Martinez-Martinez V, Chiara MD, Mann E, and Chiara JL.
Journal of Materials Chemistry B 13, 4330 (2025).

189 **Optical and excitonic properties of calcite $CaCO_3$**
Janovec J, Dolado JS, and Ayuela A.
Journal of Materials Chemistry C 13, 6267 (2025).

190 **Experimental and theoretical insights into light confinement within 2D waveguides of alkylphenyl benzothiadiazole crystals**
Torres-Moya I, Uddin MA, Gamez-Valenzuela S, Alvarez-Conde J, Cabanillas-Gonzalez J, Montero-Alejo AL, Rodriguez AM, Montero-Cabrera LA, Ruiz Delgado MC, Gomez-Lor B, and Prieto P.
Journal of Materials Chemistry C 13, 17056 (2025).

191 **A comprehensive study on A_2PdH_2: from ambient to high pressure**
Alizadeh Z, Fang YW, Errea I, and Mohammadizadeh MR.
Journal of Materials Chemistry C 13, 23221 (2025).

192 **Exploring the structural relaxation in 2-ethyl-1-hexanol by neutron spin echo: from intermolecular and supramolecular correlations to long-range density fluctuations**
S. Arrese-Igor, J. Colmenero, J. Allgaier, M.D. Ruiz-Martín, B. Farago and, A. Arbe.
Journal of Molecular Liquids 438, 128600 (2025).

193 **Thermodynamic model for the structure of Nd doped phosphate laser glasses and the neodymium chemistry influence on their emission properties**
Lopez-Grande A, Azkargorta J, Iparraguirre I, Tricot G, Garcia-Revilla S, Fernandez J, Balda R, and Munoz F.
Journal of Non-Crystalline Solids 668, 123779 (2025).

194 **Ru-Sn and Ru-Os mixed-metal clusters bearing heterocyclic thiolate ligand(s): Synthesis, crystal and electronic structures**
Hossain MM, Nesterov VN, Hogarth G, Pieslinger GE, Kabir SE, and Ghosh S.
Journal of Organometalic Chemistry 1031, 123593 (2025).

195 **Polarizability, plasmons and damping in pseudospin-1 gapped materials with a flat band**
Zhemchuzhna L, Iurov A, Gumbs G, and Huang D.
Journal of Physics: Condensed Matter 37, 085701 (2025).

196 **Future of condensed matter physics for the next 10 years**
Bird J, Cheng J, Duan CG, Frederiksen T, Kahl G, Pacchioni G, Park JG, Rahman TS, Schofield SR, Sengupta K, Xu X, Zhao J, and Dowben PA.
Journal of Physics: Condensed Matter 37, 421502 (2025).

197 **Artificial intelligence for advanced functional materials: Exploring current and future directions**
Malica C, Novoselov KS, Barnard AS, Kalinin V, Spurgeon SR, Reuter K, Alducin M, Deringer VL, Csanyi G, Marzari N, et al.
Journal of Physics: Materials 8, 021001 (2025).

198 **Origins of the anomalous Hall conductivity in the symmetry enforced Fe_3GeTe_2 nodal-line ferromagnet**
Garcia-Diez M, Beidenkopf H, Robredo I, and Vergniory MG.
Journal of Physics: Materials 8, 035012 (2025).

199 **3DCryoHolder: A new open access 3D printable system to store and transport silicon nitride membranes under cryogenic conditions for spectromicroscopy at low temperature**
Dominguez-Alfaro A, and Sanchez-Cano C.
Journal of Synchrotron Radiation 32, 225 (2025).

200 **Evidence of ferroelectric distortions in topological crystalline insulators via transverse thermoelectric measurements**
Negi P, He B, Ukolov D, Horta S, Maji K, Mao N, Peshcherenko N, Yanda P, Yao M, Dutta M, et al.
Journal of the American Chemical Society 147, 18704 (2025).

201 **On-surface synthesis of a ferromagnetic molecular spin trimer**
Vegliante A, Vilas-Varela M, Ortiz R, Romero Lara F, Kumar M, Gomez-Rodrigo L, Trivini S, Schulz F, Soler-Polo D, Ahmoum H, et al.
Journal of the American Chemical Society 147, 19530 (2025).

202 **Piercing molecular graphenes: Precision synthesis and photophysics of NBN-edged porous molecular carbons**
Yu Y, Izu A, Marin Beloqui JM, Rana S, Mali KS, De Feyter S, Casanova D, Casado J, and Liu J.
Journal of the American Chemical Society 147, 20098 (2025).

203 **WikiTextGraph: A python tool for parsing multilingual wikipedia text and graph extraction**
Agapitos P, Suárez JL, and Schwartz GA
Journal Open Research Software 13, 17 (2025).

204 **In-operando control of sum-frequency generation in tip-enhanced nanocavities**
Roelli P, Pascual Robledo I, Niehues I, Aizpurua J, and Hillenbrand R.
Light: Science & Applications 14, 203 (2025).

205 **Germanium disulfide as an alternative high refractive index and transparent material for UV-visible nanophotonics**
Slavich AS, Ermolaev GA, Zavidovskiy IA, Grudinin DV, Kravtsov KV, Tatmyshevskiy MK, Mironov MS, Toksumakov AN, Tselikov GI, Fradkin IM, et al.
Light: Science & Applications 14, 213 (2025).

206 **Varying the core topology in all-glycidol hyperbranched polyglycerols: synthesis and physical characterization**
Pagnacco CA, Alvarez-Fernandez A, Maestro A, de San Roman EG, Lund R, and Barroso-Bujans F.
Macromolecular Rapid Communications 46, 2400791 (2025).

207 **Clustering and nanoscale vitrimeric behavior in telechelic polybutadiene model vitrimers**
Alegria A, Arbe A, Colmenero J, Patelis N, Bhaumik S, Zhou M, and Hadjichristidis N.
Macromolecules 58, 3407 (2025).

208 **Vitrimeric behavior revealed by fast scanning calorimetry in branched polyglycerol networks cross-linked by reversible enamine bonds**
Stavropoulou VM, Aldecoa-Ortueta M, Verde-Sesto E, Di Lisio V, Lam A, Pomposo JA, Alegria A, Cangialosi D, and Barroso-Bujans F.
Macromolecules 58, 9993 (2025).

209 **Multistep relaxation pathway from glass to crystal development in poly(l-lactide)**
Rocchi LA, Sturabotti E, Martinelli A, Cangialosi D, and Di Lisio V.
Macromolecules 58, 12966 (2025).

210 **Landau levels and electronic states for pseudospin-1 lattices with a bandgap: application to a Lieb lattice**
Zhemchuzhna L, Joseph L, Iurov A, Gumbs G, and Huang D.
Magnetism 5, 22 (2025).

211 **Reactive molecular dynamics based multiaxial failure analysis of jennite**
Sarkar PK, Mitra N, and Dolado JS.
Materialia 39, 102368 (2025).

212 **Modeling the dielectric spectra of silicon dioxide for passive radiative cooling applications**
A. Patt, and Dolado JS
Materialia 44, 102536 (2025).

213 **A century of general Lichtenecker equation: Between stringency and empiricism, accuracy and approximability**
Goncharenko AV, and Silkin VM.
Materials 18, 5562 (2025).

214 **Design of improved thermoelectric and thermal energy storage properties of katoite, the stable hydration product of calcium aluminate cement**
Agbaoye RO, Ayuela A, and Dolado JS.
Materials & Design 258, 114678 (2025).

215 **Optical properties of CaO, SiO_2, Al_2O_3 and Fe_2O_3 cementitious oxides**
Janovec J, Agbaoye RO, Dolado JS, and Ayuela A.
Materials & Design 260, 114803 (2025).

216 **From rheological concepts to additive manufacturing assessment of hydrogel-based materials for advanced bioprinting applications**
Calafel MI, Criado-Gonzalez M, Aguirresarobe R, Fernandez M, and Mijangos C.
Materials Advances 6, 4566 (2025).

217 **Reviewing numerical studies on sensible thermal energy storage in cementitious composites: report of the RILEM TC 299-TES**
Rahjoo M, Caggiano A, Berardi U, Prabhu A, and Dolado JS.
Materials and Structures 58, 40 (2025).

218 **Growth of bulk crystals of magnetic topological insulators under peritectic conditions**
Sergeev AI, Frolov AS, Vladimirova NV, Naumov AA, Kirsanova MA, Naumov MA, Stolyarov VS, Golyashov VA, Tereshchenko OE, Klimovskikh II, Tamm ME, and Yashina V.
Materials Chemistry and Physics 344, 131160 (2025).

219 **A sustainable approach to energy storage in buildings: the first rechargeable geopolymer-based battery**
Kovrugin VM, Guerlou-Demourgues L, Croguennec L, Dolado JS, and Aymonier C.
Materials Horizons 12, 3712 (2025).

220 **A chessboard-like photothermoelectric cement cell: a new design for scalable and high efficiency solar energy conversion**
Barzegar M, Goracci G, Martauz P, and Dolado JS.
Materials Horizons 12, 10760 (2025).

221 **Choline acetate/water mixtures: Physicochemical properties and structural organization**
Mangiacapre E, Barhoumi Z, Brehm M, Castiglione F, Di Lisio V, Triolo A, and Russina O.
Molecules 30, 3403 (2025).

222 **Large-scale dual AGN in large-scale cosmological hydrodynamical simulations**
Puerto-Sanchez C, Habouzit M, Volonteri M, Ni Y, Foord A, Angles-Alcazar D, Chen N, Guetzoyan P, Dave R, Di Matteo T, et al.
Monthly Notices of the Royal Astronomical Society 536, 3016 (2025).

223 **Pure gravitational wave estimation of Hubble's constant using neutron star-black hole mergers**
Fung LWH, Broadhurst T, and Smoot GF.
Monthly Notices of the Royal Astronomical Society 538, 711 (2025).

224 **Study of barred galaxies in IllustrisTNG100: the case of low surface brightness galaxies**
Chim-Ramirez K, Cervantes-Sodi B, Rosas-Guevara Y, Perez-Montano LE, and Bonoli S.
Monthly Notices of the Royal Astronomical Society 539, 2262 (2025).

225 **FLAMINGO: combining kinetic SZ effect and galaxy-galaxy lensing measurements to gauge the impact of feedback on large-scale structure**
McCarthy IG, Amon A, Schaye J, Schaan E, Angulo RE, Salcido J, Schaller M, Bigwood L, Elbers W, Kugel R, et al.
Monthly Notices of the Royal Astronomical Society 540, 143 (2025).

226 **Galaxy mergers in the epoch of reionization - I. A JWST study of pair fractions, merger rates, and stellar mass accretion rates at z=4.5-11.5**
Duan Q, Conselice CJ, Li Q, Austin D, Harvey T, Adams NJ, Duncan KJ, Trussler J, Ferreira L, Westcott L, et al.
Monthly Notices of the Royal Astronomical Society 540, 774 (2025).

227 **Excursion sets with a "perfect" collapse model**
Wislocka AM, Stuecker J, Hahn O, and Angulo RE.
Monthly Notices of the Royal Astronomical Society 541, 880 (2025).

228 **The formation and disruption of globular cluster populations in simulations of present-day L* galaxies with controlled assembly histories**
Newton O, Davies JJ, Pfeffer J, Crain RA, Kruijssen JMD, Pontzen A, and Bastian N.
Monthly Notices of the Royal Astronomical Society 542, 591 (2025).

229 **Tracing stellar rotation in young massive LMC clusters**
Kamann S, Bastian N, Niederhofer F, Bellini A, Cabrera-Ziri I, Dreizler S, Gottgens F, Kozhurina-Platais V, Libralato M, Martens S, and Saracino S.
Monthly Notices of the Royal Astronomical Society 542, 2768 (2025).

230 **JWSTs PEARLS: NIRCam imaging and NIRISS spectroscopy of a z=3.6 star-forming galaxy lensed into a near-Einstein ring by a z=1.258 massive elliptical galaxy**
Adams NJ, Ferram G, Westcott L, Harvey T, Estrada-Carpenter V, Conselice CJ, Austin D, Wyithe JSB, Goolsby CM, Li Q, et al.
Monthly Notices of the Royal Astronomical Society 543, 3535 (2025).

231 **A 1-per cent-accurate method to include baryonic effects in galaxy-galaxy lensing models**
Zennaro M, Arico G, Garcia-Garcia C, Angulo RE, Ondaro-Mallea L, Contreras S, Nicola A, Schaller M, and Schaye J.
Monthly Notices of the Royal Astronomical Society 544, 3512 (2025).

232 **Lensed stars in galaxy-galaxy strong lensing - a JWST prediction for the Cosmic Horseshoe**
Li SK, Weisenbach L, Collett TE, Diego JM, Lim J, Broadhurst TJ, Chow A, Enzi WJR, Kelly PL, Melo-Carneiro CR, et al.
Monthly Notices of the Royal Astronomical Society 544, 4469 (2025).

233 **Roadmap on atomically-engineered quantum platforms**
Phark SH, Weber B, Yoshida Y, Forrester PR, Elbertse RJG, Stroscio JA, Wang H, Yang K, Gross L, Mishra S, et al.
Nano Futures 9, 032001 (2025).

234 **Twisting nanoporous graphene on graphene: electronic decoupling and chiral currents**
de Cerio XD, Lorentzen AB, Brandbyge M, and Garcia-Lekue A.
Nano Letters 25, 1281 (2025).

235 **Real-space visualization of canalized ray polaritons in a single Van der Waals thin slab**
Teran-Garcia E, Lanza C, Voronin K, Martin-Sanchez J, Nikitin AY, Martin-Luengo AT, and Alonso-Gonzalez P.
Nano Letters 25, 2203 (2025).

236 **Relating radical delocalization, charge transfer, and magnetic ground state in acene-derived oxyradicals**
Wang T, Salaverria S, Aguilar-Galindo F, Besteiro-Saez J, Mateo LM, Angulo-Portugal P, Rodriguez-Fernandez J, Perez D, Corso M, Pena D, and De Oteyza DG.
Nano Letters 25, 6516 (2025).

237 **Atomic-scale mapping of superconductivity in thel incoherent CDW mosaic phase of a transition metal dichalcogenide**
Sajan S, Guo H, Agarwal T, Sanchez-Ramirez I, Patra C, Vergniory MG, De Juan F, Singh RP, and Ugeda MM.
Nano Letters 25, 6654 (2025).

238 **Misalignment between the directions of propagation and decay of nanoscale-confined polaritons**
Voronin KV, Alvarez-Perez G, Tarazaga Martin-Luengo A, Alonso-Gonzalez P, and Nikitin AY.
Nano Letters 25, 13811 (2025).

239 **From local to collective superconductivity in proximitized graphene**
Trivini S, Kokkeler T, Ortuzar J, Cortes-del Rio E, Vina-Bausa B, Mallet P, Veuillen JY, Cuevas JC, Brihuega I, Bergeret FS, and Pascual JI.
Nano Letters 25, 16323 (2025).

240 **Nickel doping unlocks ambient-condition photostability in individual cesium lead bromide perovskite quantum dots**
Ryu J, Krivenkov V, Olejniczak A, Arruabarrena M, Janovec J J, Hadjadj SE, Ilyn M, Leonardo A, Martinez-Martinez V, Ayuela A, Nikitin AY, and Rakovich Y.
Nano Letters 25, 16630 (2025).

241 **Magnetic excitations of isolated and interconnected complexes on a superconductor**
Meng X, Moller J, Irizar M, Sanchez-Portal D, Garcia-Lekue A, Weismann A, Herges R, and Berndt R.
Nano Letters 25, 16772 (2025).

242 **Description of ultrastrong light-matter interaction through coupled harmonic oscillator models and their connection with cavity-QED Hamiltonians**
Muniain U, Aizpurua J, Hillenbrand R, Martin-Moreno L, and Esteban R.
Nanophotonics 14, 2031 (2025).

243 **Point defects at grain boundaries can create structural instabilities and persistent deep traps in metal halide perovskites**
Wu Y, Liu D, Chu W, Wang B, Vasenko AS, and Prezhdo OV.
Nanoscale 17, 2224 (2025).

244 **Polarisation-dependent Raman enhancement in hexagonal boron nitride membranes**
Rogoza J, Binder J, Voronin KV, Niehues I, Ludwiczak K, Dabrowska AK, Tokarczyk M, Bozek R, Nikitin AY, Hillenbrand R, Stepniewski R, and Wysmolek A.
Nanoscale 17, 3053 (2025).

245 **Thermodynamics and kinetics in Van der Waals epitaxial growth of Te**
Li T, Gao W, Wang Y, Li T, Zhi G, Zhou M, and Niu T.
Nanoscale 17, 9308 (2025).

246 **An organic array of quantum corrals modulated by the gold herringbone electronic superlattice**
Li J, Piquero-Zulaica I, Gottardi S, Ashoush MA, Abd El-Fattah ZM, Solianyk L, Ortega JE, Barth JV, Moreno-Lopez JC, Lobo-Checa J, and Stohr M.
Nanoscale 17, 10314 (2025).

247 **Evidence of Au(111) topological states in a kagome analogue lattice and their robustness beyond ultra-low temperatures and defect-free conditions**
Austin D, Barragan A, Switzer ED, Lois S, Sarasola A, Le D, Rahman TS, and Vitali L.
Nanoscale 17, 12087 (2025).

248 **Emergent Dirac fermions in graphene and underlying Au monolayer with two-dimensional ferrimagnetism**
Rybkin AG, Tarasov AV, Rybkina AA, Voroshnin VY, Estyunin DA, Usachov DY, Petukhov AE, Pudikov DA, Eryzhenkov AV, Klimovskikh II, et al.
Nanoscale 17, 21706 (2025).

249 **Europium intercalation as a route to modulate electronic and magnetic properties of h-BN/Ni(111)**
Voloshina E, Schiller F, Ali K, Bakhit AMI, Castrillo-Bodero R, Paulus B, and Dedkov Y.
Nanoscale 17, 25071 (2025).

250 **Electron spin resonance with scanning tunneling microscopy: A tool foran on-surface quantum platform of identical qubits**
Choi DJ, Phark SH, Heinrich AJ, and Lorente N.
Nanoscale Advances 7, 4551 (2025).

251 **Unraveling spin entanglement using quantum gates with scanning tunneling microscopy-driven electron spin resonance**
Switzer ED, Reina-Galvez J, Giedke G, Rahman TS, Wolf C, Choi DJ, and Lorente N.
Nanoscale Advances 7, 8048 (2025).

252 **Magnetic exchange interaction between unpaired ϖ- and d-electrons in nanographene-metal coordination complexes**
Li DY, Zheng Y, R. Ortiz R, Wang BX, Jiang Y, Yuan B, Zhang XY, Li C, Liu L, Liu X, et al.
National Science Review 12, nwaf033 (2025).

253 **Topological water-wave structures manipulating particles**
Wang B, Che Z, Cheng C, Tong C, Shi L, Shen Y, Bliokh KY, and Zi J.
Nature 638, 394 (2025).

254 **Quantum twisting microscopy of phonons in twisted bilayer graphene**
Birkbeck J, Xiao J, Inbar A, Taniguchi T, Watanabe K, Berg E, Glazman L, Guinea F, von Oppen F, and Ilani S.
Nature 641, 345 (2025).

255 **Moiré materials based on M-point twisting**
Călugăru D, Jiang Y, Hu H, Pi H, Yu J, Vergniory MG, Shan J, Felser C, Schoop LM, Efetov DK, Mak KF, and Bernevig BA.
Nature 643, 376 (2025).

256 **Many-body interference in kagome crystals**
Guo C, Wang K, Zhang L, Putzke C, Chen D, Van Delft MR, Wiedmann S, Balakirev FF, McDonald RD, Gutierrez-Amigo M, et al.
Nature 647, 68 (2025).

257 **George Smoot obituary: Charismatic cosmologist who revealed ripples in the Big Bang's afterglow**
Scott D, Silk J, and Broadhurst T.
Nature 647, 854 (2025).

258 **Identification of more than 40 gravitationally magnified stars in a galaxy at redshift 0.725**
Fudamoto Y, Sun F, Diego JM, Dai L, Oguri M, Zitrin A, Zackrisson E, Jauzac M, Lagattuta DJ, Egami E, et al.
Nature Astronomy 9, 428 (2025).

259 **High-definition imaging of a filamentary connection between a close quasar pair at z=3**
Tornotti D, Fumagalli M, Fossati M, Benitez-Llambay A, Izquierdo-Villalba D, Travascio A, Arrigoni Battaia F, Cantalupo S, Beckett A, Bonoli S, et al.
Nature Astronomy 9, 577 (2025).

260 **Synthesis of triple-decker sandwich compounds featuring a M-M bond through cyclo-Bi_5 and cyclo-Sb_5 rings**
Xu YH, Yang X, Yang YN, Zhao L, Frenking G, and Sun ZM.
Nature Chemistry 17, 968 (2025).

261 **Tip carbon encapsulation customizes cationic enrichment and valence stabilization for low K^+ acidic CO_2 electroreduction**
Wang Z, Liu D, Xia C, Shi X, Zhou Y, Liu Q, Huang J, Wu H, Zhu D, Zhang S, et al.
Nature Communications 16, 1754 (2025).

262 **Tunable superconductivity coexisting with the anomalous Hall effect in a transition metal dichalcogenide**
Hossain MS, Zhang Q, Graf D, Iraola M, Mueller T, Mardanya S, Tu YH, Lai Z, Soldini MO, Li S, et al.
Nature Communications 16, 2399 (2025).

263 **Polaritonic Fourier crystal**
Menabde SG, Lim Y, Voronin K, Heiden JT, Nikitin AY, Lee S, and Jang MS.
Nature Communications 16, 2530 (2025).

264 **Ultrafast thermo-optical control of spins in a 2D Van der Waals semiconductor**
Dabrowski M, Haldar S, Khan S, Keatley PS, Sagkovits D, Xue Z, Freeman C, Verzhbitskiy I, Griepe T, Atxitia U, et al.
Nature Communications 16, 2797 (2025).

265 **Alchemically-glazed plasmonic nanocavities using atomic layer metals: Controllably synergizing catalysis and plasmonics**
Hu S, Goerlitzer ESA, Lin Q, de Nijs B, Silkin VM, and Baumberg JJ.
Nature Communications 16, 3370 (2025).

266 **Decoupled few-femtosecond phase transitions in vanadium dioxide**
Brahms C, Zhang L, Shen X, Bhattacharya U, Recasens M, Osmond J, Grass T, Chhajlany RW, Hallman KA, Haglund RF, et al.
Nature Communications 16, 3714 (2025).

267 **Frustrated charge density wave and quasi-long-range bond-orientational order in the magnetic kagome FeGe**
Subires D, Kar A, Korshunov A, Fuller CA, Jiang Y, Hu H, Calugaru D, Mcmonagle C, Yi C, Roychowdhury S, et al.
Nature Communications 16, 4091 (2025).

268 **Liquid-like versus stress-driven dynamics in a metallic glass former observed by temperature scanning X-ray photon correlation spectroscopy**
Frey M, Neuber N, Riegler SS, Cornet A, Chushkin Y, Zontone F, Ruschel LM, Adam B, Nabahat M, Yang F, et al.
Nature Communications 16, 4429 (2025).

269 **Long-lived zone-boundary magnons in an antiferromagnet**
Choe J, Lujan D, Ye G, Nnokwe C, Ma B, He J, Gao FY, Nunley TN, Leonardo A, Arruabarrena M, et al.
Nature Communications 16, 5486 (2025).

270 **Systematic modulation of charge and spin in graphene nanoribbons on MgO**
Dominguez-Celorrio A, Edens L, Sanz S, Vilas-Varela M, Martinez-Castro J, Pena D, Langlais V, Frederiksen T, Pascual JI, and Serrate D.
Nature Communications 16, 5632 (2025).

271 **Realisation of de Gennes' absolute superconducting switch with a heavy metal interface**
Matsuki H, Hijano A, Mazur GP, Ilic S, Wang B, Alekhina I, Ohnishi K, Komori S, Li Y, Stelmashenko N, et al.
Nature Communications 16, 5674 (2025).

272 **Does provable absence of barren plateaus imply classical simulability?**
Cerezo M, Larocca M, Garcia-Martin D, Diaz NL, Braccia P, Fontana E, Rudolph MS, Bermejo P, Ijaz A, Thanasilp S, Anschuetz ER, and Holmes Z.
Nature Communications 16, 7907 (2025).

273 **Friedel oscillations and chiral superconductivity in monolayer $NbSe_2$**
Siegl J, Bleibaum A, Wan W, Kurpas M, Schliemann J, Ugeda MM, Marganska M, and Grifoni M.
Nature Communications 16, 8228 (2025).

274 **An electrically controlled single-molecule spin switch**
Huang W, Au-Yeung KH, Greule P, Stark M, Surgers C, Wernsdorfer W, Robles R, Lorente N, and Willke P.
Nature Communications 16, 8242 (2025).

275 **The maximum T_c of conventional superconductors at ambient pressure**
Gao K, Cerqueira TFT, Sanna A, Fang YW, Dangic D, Errea I, Wang HC, Botti S, and Marques MAL.
Nature Communications 16, 8253 (2025).

276 **Spin Hall and Edelstein effects in chiral non-collinear altermagnets**
Hu M, Janson O, Felser C, Mcclarty P, van den Brink J, and Vergniory MG.
Nature Communications 16, 8529 (2025).

277 **Challenging the Bredt's rule in an acid catalyzed cationic cyclization to get bicyclo[3.3.1]nonane derivatives**
Garcia-Pedrero O, Pardo P, Alberro N, Cossio FP, and Rodriguez F.
Nature Communications 16, 10556 (2025).

278 **Universal efficiency boost in prethermal quantum heat engines at negative temperature**
Brollo A, Del Campo A, and Bastianello A.
Nature Communications 16, 10593 (2025).

279 **Li-F polarity-driven stabilization of -VII oxidation state of gold at high pressure**
Zhang X, Wang S, Bergara A, Du X, and Yang G.
Nature Communications 16, 11566 (2025).

280 **Ultrafast dynamics of vibronically dressed core excitons in graphite: a femtosecond RIXS perspective**
Malvestuto M, Volpato B, Babici E, Bhardwaj R, Caretta A, Laterza S, Parmigiani F, Manfredda M, Simoncig A, Zangrando M, et al.
Nature Communications 17, 1158 (2025).

281 **A seamless graphene spin valve based on proximity to Van der Waals magnet $Cr_2Ge_2Te_6$**
Yang H, Gobbi M, Herling F, Pham VT, Calavalle F, Martin-Garcia B, Fert A, Hueso LE, and Casanova F.
Nature Electronics 8, 15 (2025).

282 **Nonlinear transport in non-centrosymmetric systems**
Suarez-Rodriguez M, De Juan F, Souza I, Gobbi M, Casanova F, and Hueso LE.
Nature Materials 24, 1005 (2025).

283 **Terahertz photocurrent probe of quantum geometry and interactions in magic-angle twisted bilayer graphene**
Kumar RK, Li G, Bertini R, Chaudhary S, Nowakowski K, Park JM, Castilla S, Zhan Z, Pantaleon PA, Agarwal H, Batlle-Porro S, et al.
Nature Materials 24, 1034 (2025).

284 **Configurable antiferromagnetic domains and lateral exchange bias in atomically thin $CrPS_4$**
Wang YX, Graham THM, Rama-Eiroa R, Islam MA, Badarneh MH, Gontijo RN, Tiwari GP, Adhikari T, Zhang XY, Watanabe K, et al.
Nature Materials 24, 1414 (2025).

285 **BiaPy: accessible deep learning on bioimages**
Franco-Barranco D, Andrés-San Román JA, Hidalgo-Cenalmor I, Backová L, González-Marfil A, Caporal C, Chessel A, Gómez-Gálvez P, Escudero LM, Wei D, Muñoz-Barrutia A, and Arganda-Carreras I.
Nature Methods 22, 1124 (2025).

286 **Optical pumping of electronic quantum Hall states with vortex light**
Session D, Mehrabad MJ, Paithankar N, Grass T, Eckhardt CJ, Cao B, Suárez Forero DG, Li K, Alam MS, Watanabe K, et al.
Nature Photonics 19, 156 (2025).

287 **Directional strong coupling at the nanoscale between hyperbolic polaritons and organic molecules**
Tresguerres-Mata AIF, Matveeva OG, Lanza C, Alvarez-Cuervo J, Voronin KV, Calavalle F, Avedissian G, Diaz-Nunez P, Alvarez-Perez G, Tarazaga Martin-Luengo A, et al.
Nature Photonics 19, 1196 (2025).

288 **Ferromagnetism and topology of the higher flat band in a fractional Chern insulator**
Park H, Cai J, Anderson E, Zhang XW, Liu X, Holtzmann W, Li W, Wang C, Hu C, Zhao Y, Taniguchi T, et al.
Nature Physics 21, 549 (2025)

289 **Fractional charges under the microscope**
Guo H, and Ugeda MM.
Nature Physics 21, 685 (2025).

290 **Interplay between light and heavy electron bands in magic-angle twisted bilayer graphene**
Merino RL, Calugaru D, Hu H, Diez-Merida J, Diez-Carlon A, Taniguchi T, Watanabe K, Seifert P, Bernevig BA, and Efetov DK.
Nature Physics 21, 1078 (2025).

291 **Fractional quantization in insulators from Hall to Chern**
Bernevig BA, Fu L, Ju L, MacDonald AH, Mak KF, and Shan J.
Nature Physics 21, 1702 (2025).

292 **Photovoltage microscopy of symmetrically twisted trilayer graphene**
Batlle Porro S, Calugaru D, Hu H, Krishna Kumar R, Hesp NCH, Watanabe K, Taniguchi T, Bernevig BA, Stepanov P, and Koppens FHL.
Nature Physics 21, 1934 (2025).

293 **Capturing aromatic Cr_5 pentagons in large main-group molecular cages**
Chen WX, Tian WJ, Li ZS, Wang JJ, Munoz-Castro A, Frenking G, and Sun ZM.
Nature Synthesis 4, 471 (2025).

294 **Isolated carbon(I) species featuring a carbone cation radical**
Chan YC, Xiao HX, Qin L, Shen JS, Yang CR, Yap GPA, Ching WM, Chen WC, Chiang YW, Frenking G, Zhao L, and Ong TG.
Nature Synthesis 4, 1278 (2025)

295 **Tensor networks for explainable machine learning in cybersecurity**
Aizpurua B, Palmer S, and Orus R.
Neurocomputing 639, 130211 (2025).

296 **A Monte Carlo Tree Search approach to QAOA: Finding a needle in the haystack**
Agirre A, Van Nieuwenburg E, and Wauters MM.
New Journal of Physics 27, 043014 (2025).

297 **Wave vortices 50 years on**
Dennis MR and Bliokh KY.
Newton 1, 100005 (2025).

298 **High-intensity wave vortices around subwavelength holes: from ocean tides to nanooptics**
Domina K, Alonso-González P, Bylinkin A, Barra-Burillo M, Tresguerres-Mata AIF, Alfaro-Mozaz FJ, Vélez S, Casanova F, Hueso LE, Hillenbrand R, Bliokh KY, and Nikitin AY.
Newton 1, 100060 (2025).

299 **The impact of ionic anharmonicity on superconductivity in metal-stuffed B-C clathrates**
Zhao W, Sun Y, Li J, Yuan P, Iitaka T, Zhong X, Li H, Fang YW, Liu H, Errea I, and Xie Y.
npj Computational Materials 11, 347 (2025).

300 **Electronic spin susceptibility in metallic strontium titanate**
Najev A, Somun N, Spaic M, Khayr I, Greven M, Klein A, Gastiasoro MN, and Pelc D.
npj Quantum Materials 10, 4 (2025).

301 **Tensor network study of the light-induced phase transitions in vanadium dioxide**
Zhang L, Bhattacharya U, Recasens M, Grass T, Chhajlany RW, Lewenstein M, and Johnson AS.
npj Quantum Materials 10, 32 (2025).

302 **Unusual 5*f* magnetism in new kagome material UV_6Sn_6**
Thomas SM, Kengle CS, Simeth W, Lim CY, Riedel ZW, Allen K, Schmidt A, Ruf M, Gim S, Thompson JD, et al.
npj Quantum Materials 10, 66 (2025).

303 **Strong coupling theory of superconductivity and ferroelectric quantum criticality in metallic $SrTiO_3$**
Saha SK, Gastiasoro MN, Ruhman J, and Klein A.
npj Quantum Materials 10, 82 (2025).

304 **Quantum geometry in quantum materials**
Yu J, Bernevig BA, Queiroz R, Rossi E, Torma P, and Yang BJ.
npj Quantum Materials 10, 101 (2025).

305 **Efficient motion of 90° domain walls in Mn_2Au via pure optical torques**
Gavriloaea PI, Ross JL, Freimuth F, Mokrousov Y, Evans RFL, Chantrell R, Chubykalo-Fesenko O, and Otxoa RM.
npj Spintronics 3, 11 (2025).

306 **Chaotic proliferation of relativistic domain walls for reservoir computing**
Vélez JA, Lee MK, Tatara G, Gavriloaea PI, Ross J, Laroze D, Atxitia U, Evans RFL, Chantrell RW, Mochizuki M, and Otxoa RM.
npj Spintronics 3, 14 (2025).

307 **Dynamic signatures of spin-lattice coupling in the layered ferrimagnet $Mn_3Si_2Te_6$**
Martinez LM, Liu Y, Petrovic C, Haldar S, Griepe T, Atxitia U, Campbell M, Pettes MT, Prasankumar RP, Santos EJG, Singamaneni SR, and Padmanabhan P.
npj Spintronics 3, 35 (2025).

308 **A trackable trinuclear platinum complex for breast cancer treatment**
O'Carroll S, Slator C, de Paiva REF, Newsome C, Searle B, Sriram KK, Whittle S, Catley TE, Scoditti S, Mnich K, et al.
Nucleic Acids Research 53, gkaf628 (2025).

309 **Nonlocality in photonic materials and metamaterials: roadmap**
Monticone F, Mortensen NA, Fernandez-Dominguez AI, Luo Y, Zheng X, Tserkezis C, Khurgin JB, Shahbazyan V, Chaves AJ, Peres NMR, et al.
Optical Materials Express 15, 1544 (2025).

310 **Surface lattice resonances for high-performance sensing: a study on gold nanoparticle arrays**
Roggero UFS, Rojas-Bejarano CJ, Herreno-Fierro CA, Seifert A, Garcia-Etxarri A, Hernandez-Figueroa HE, and Zapata-Herrera M.
Optics Express 33, 30328 (2025).

311 **Bulk-to-surface coupling of spatiotemporal vortices**
Rodríguez-Fortuño FJ, Picardi MF, and Bliokh KY.
Optics Letters 50, 5534 (2025).

312 **Catalytic glutathione oxidation and platinum(IV) prodrug activation via a ruthenium-flavin catalyst**
Sanchez-Camacho J, Carrasco AC, Pieslinger GE, Martinez A, Lobinski R, Ronga L, and Salassa L.
Organometallics 44, 944 (2025).

313 **Confinement of lauric acid into the lumen of halloysite nanotubes**
Obele CM, and Barroso-Bujans F.
Particle & Particle Systems Characterization 42, 2400058 (2025).

314 **Electronic band structure, magnetic and thermoelectric properties of sodium and lanthanum cobaltites: Ab initio PAW approach**
Zhukov VP, and Chulkov EV.
Philosophical Magazine 105, 1114 (2025).

315 **Modelling the prebiotic origins of regulation and agency in evolving protocell ecologies**
Shirt-Ediss B, Ferrero-Fernandez A, De Martino D, Bich L, Moreno A, and Ruiz-Mirazo K.
Philosophical Transactions of the Royal Society B: Biological Sciences 380, 20240287 (2025).

316 **Singular value decomposition-assisted holographic generation of high-quality cylindrical vector beams through few-mode fibers**
Cifuentes A, Varga M, and Molina-Terriza G.
Photonics 12, 716 (2025).

317 **Electronic structure of a *p*-type topological insulator $SnSbBiTe_4$**
Eremeev SV, Ferrari L, Sheverdyaeva PM, De Luca O, Caruso T, Casciaro M, Mehtiyevah KZ, Alievh ZS, Chulkov EV, Vasenko AS, et al.
Physica B: Condensed Matter 719, 417913 (2025).

318 **Doping dependence of low-energy charge collective excitations in high-T_c cuprates**
Silkin VM, Efremov V, and Kagan MY.
Physica Scripta 100, 045943 (2025).

319 **Hacking cryptographic protocols with tensor network attacks**
Aizpurua B, Patra S, Martinez JE, and Orus R.
Physica Scripta 100, 085102 (2025).

320 **Using an aromatic linker to optimize charge-resonance states, photodimerization and reversibility in covalent anthracene dimers**
Lam K, Dillon RJ, Carreras A, Nishiuchi T, Kubo T, Al-Kaysi RO, Casanova D, and Bardeen CJ.
Physical Chemistry Chemical Physics 27, 5305 (2025).

321 **Efficient state-interaction approach for the *g*-matrix analysis in high-spin molecules**
Cebreiro-Gallardo A, and Casanova D.
Physical Chemistry Chemical Physics 27, 7093 (2025).

322 **Aromaticity and antiaromaticity in the cyclic 6ϖ and 4ϖ molecules of carbon and silicon E_6H_6 and E_4H_4 (E = C, Si)**
Zhao L, Ma Q, Fernandez I, and Frenking G.
Physical Chemistry Chemical Physics 27, 18555 (2025).

323 **Implementation of quasiclassical mapping approaches for nonadiabatic molecular dynamics in the PySurf package**
Picconi D, Menger MFSJ, Palacino-Gonzalez E, Salazar EX, and Faraji S.
Physical Chemistry Chemical Physics 27, 19105 (2025).

324 **Low-energy modes and localized excitations in metal halide perovskites: Insights from heat capacity**
Arauzo A, Marin-Villa P, Druzbicki K, Sanchez MC, and Fernandez-Alonso F.
Physical Chemistry Chemical Physics 27, 20709 (2025).

325 **Review of the tight-binding method applicable to the properties of moiré superlattices**
Kuang X, Escudero F, Pantaleon PA, Guinea F, and Zhan Z.
Physical Chemistry Chemical Physics 27, 25232 (2025).

326 **Structural and chemical properties of Pt-rich Pt_xZr_y nanoalloys**
Molina LM, and Alonso JA.
Physical Chemistry Chemical Physics 28, 304 (2025).

327 **Nonadiabatic quantum optimization for crossing quantum phase transitions**
Grabarits A, Balducci F, Sanders BC, and Del Campo A
Physical Review A 111, 012215 (2025).

328 **Driving a quantum phase transition at an arbitrary rate: Exact solution of the transverse-field Ising model**
Grabarits A, Balducci F, and Del Campo A.
Physical Review A 111, 042207 (2025).

329 **Time-dependent Jastrow ansatz: Exact quantum dynamics, shortcuts to adiabaticity, and quantum quenches in strongly correlated many-body systems**
Yang J, and Del Campo A
Physical Review A 111, 053315 (2025).

330 **Generation of polarization-entangled photon pairs from two interacting quantum emitters**
Juan-Delgado A, Giedke G, Aizpurua J, and Esteban R.
Physical Review A 112, 052434 (2025).

331 **Exact spectral gaps of random one-dimensional quantum circuits**
Deneris AE, Bermejo P, Braccia P, Cincio L, and Cerezo M.
Physical Review A 112, 062619 (2025).

332 **Helical magnetic order in chiral $PbMnTeO_6$**
Kurbakov AI, Korshunov AN, and Nishimoto S.
Physical Review B 111, 014418 (2025).

333 **Symmetry origin and microscopic mechanism of electrical magnetochiral anisotropy in tellurium**
Suarez-Rodriguez M, Martin-Garcia B, Calavalle F, Tsirkin SS, Souza I, de Juan F, Fert A, Gobbi M, Hueso LE, and Casanova F.
Physical Review B 111, 024405 (2025).

334 **Competition of exchange and correlation energies in two-dimensional N-component electron gas ferromagnetism**
Huang CH, Huang C, and Cazalilla MA.
Physical Review B 111, 045129 (2025).

335 **Slow approach to adiabaticity in many-body non-Hermitian systems: The Hatano-Nelson model**
Dupays L, Del Campo A, and Dora B.
Physical Review B 111, 045130 (2025).

336 **Dynamical polarization function, anisotropic plasmon modes, and dephasing rates for interacting electrons in semi-Dirac bands**
Ross-Harvey G, Iurov A, Zhemchuzhna L, Gumbs G, Huang D, and Fekete P.
Physical Review B 111, 045413 (2025).

337 **Flat phonon soft modes and unconventional charge density wave formation in ScV_6Sn_6: Microscopic and effective theory**
Hu H, Jiang Y, Calugaru D, Feng X, Subires D, Vergniory MG, Felser C, Blanco-Canosa S, and Bernevig BA.
Physical Review B 111, 054113 (2025).

338 **Stationary scattering of one-dimensional magnons by an anisotropic and antisymmetric bond defect**
Fonseca R, Verissimo LM, Pereira MSS, and Lyra ML.
Physical Review B 111, 054401 (2025).

339 **Domain wall dynamics driven by a transient laser-induced magnetization**
Gavriloaea PI, Saugar E, Otxoa R, and Chubykalo-Fesenko O.
Physical Review B 111, 054411 (2025).

340 **Transport signatures of Fermi arcs at twin boundaries in Weyl materials**
Kaushik S, Robredo I, Mathur N, Schoop LM, Jin S, Vergniory MG, and Cano J.
Physical Review B 111, 085133 (2025).

341 **Interpreting tunneling spectroscopic maps of a dinuclear Co(II) complex on gold**
Robles R, Li C, Realista S, Martinho PN, Gruber M, Weismann A, Lorente N, and Berndt R.
Physical Review B 111, 085409 (2025).

342 **Lattice thermal conductivity in the anharmonic over damped regime**
Dangic D, Caldarelli G, Bianco R, Savic I, and Errea I.
Physical Review B 111, 104314 (2025).

343 **Analytic approach to thermoelectric transport in double quantum dots**
Sobrino N, Jacob D, and Kurth S.
Physical Review B 111, 115108 (2025).

344 **Dynamics for unstable self-induced plasma field of electrons driven by a transient electric field in a quantum wire**
Lu X, Huang D, Gumbs G, Clark TT, and Sharma A.
Physical Review B 111, 115302 (2025).

345 **Ab initio study of angle-resolved electron reflection spectroscopy of few-layer graphene**
Patak A, Zouhar M, Konvalina I, Mikmekova EM, Prucha L, Mullerova I, Campbell AC, Valtr M, Horak M, Krapek V, and Krasovskii E.
Physical Review B 111, 125113 (2025).

346 **FeGe as a building block for the kagome 1:1, 1:6:6, and 1:3:5 families: Hidden *d*-orbital decoupling of flat band sectors, effective models, and interaction Hamiltonians**
Jiang Y, Hu H, Calugaru D, Felser C, Blanco-Canosa S, Weng H, Xu Y, and Bernevig BA.
Physical Review B 111, 125163 (2025).

347 **Prediction of *o*-N_{16}: a layered polymeric nitrogen phase**
Li X, Yang Q, Jin D, Ding S, Bergara A, Yao Y, Zhu L, Zhao J, and Yang G.
Physical Review B 111, 134111 (2025).

348 **Constructions and applications of irreducible representations of spin-space groups**
Song Z, AYang AZ, Jiang Y, Fang Z, Yang J, Fang C, Weng H, and Liu ZX.
Physical Review B 111, 134407 (2025).

349 **Effect of quantum anharmonicity on the superconductivity of $I\bar{4}3m$ CH_4-H_3S at high pressures: A first-principles study**
Hou P, Belli F, Bi T, Zurek E, and Errea I.
Physical Review B 111, 144509 (2025).

350 **Cascade of pressure-induced competing charge density waves in the kagome metal FeGe**
Korshunov A, Kar A, Lim CY, Subires D, Deng J, Jiang Y, Hu H, Calugaru D, Yi C, Roychowdhury S, et al.
Physical Review B 111, 155101 (2025).

351 **Magnetic frustration and weak Mn magnetic ordering in $EuMn_2P_2$**
Krebber S, Sichelschmidt J, Chailloleau P, El Mard A, Kopp M, Baenitz M, Kummer K, Vyalikh DV, Mueller J, Krellner C, and Kliemt K.
Physical Review B 111, 174406 (2025).

352 **Direct *ab initio* calculation of magnons in altermagnets: Method, spin-space symmetry aspects, and application to MnTe**
Sandratskii LM, Carva K, and Silkin VM.
Physical Review B 111, 184436 (2025).

353 **Electron-phonon coupling in $EuAl_4$ under hydrostatic pressure**
Sukhanov AS, Gebel S, Korshunov AN, Andriushin ND, Pavlovskii MS, Gao Y, Moya JM, Allen K, Morosan E, and Rahn MC.
Physical Review B 111, 195150 (2025).

354 **Nonadiabatic quantum geometry and optical conductivity**
Resta R.
Physical Review B 111, 205107 (2025).

355 **Optical absorption and emission from Wannier-Stark spectra of moiré superlattices**
Phong VT, Guinea F, and Lewandowski C.
Physical Review B 111, 205132 (2025).

356 **Helium atom scattering investigation of the boson peak presence in amorphous and crystalline two-dimensional materials**
Tømterud M, Eder SD, Freund HJ, Hellner SK, Büchner C, Heyde M, Forti S, Convertino D, Coletti C, Manson JR, and Holst B.
Physical Review B 111, 205423 (2025).

357 **High-pressure sulfur frameworks in Mg-S compounds: Tuning superconductivity through covalent connectivity**
Wu Q, Bergara A, Zhang X, and Yang G.
Physical Review B 111, 214501 (2025).

358 **Violation of the Pauli limit at $KTaO_3$ (110) interfaces**
Poage SJ, Gao X, Baksi M, Salmani-Rezaie S, Muller DA, Kumah DP, Lau CN, Lorenzana J, Gastiasoro MN, and Ahadi K.
Physical Review B 111, 214506 (2025).

359 **Transversality-enforced tight-binding models for three-dimensional photonic crystals aided by topological quantum chemistry**
Morales-Perez A, Devescovi C, Hwang Y, Garcia-Diez M, Manes JL, Bradlyn B, Vergniory MG, and Garcia-Etxarri A.
Physical Review B 111, 235206 (2025).

360 **Nodal nematic superconductivity in multiple flat-band systems**
Liu CX, and Bernevig BA.
Physical Review B 111, L020502 (2025).

361 **Transitionless quantum driving of the Tomonaga-Luttinger liquid**
Dupays L, and Del Campo A.
Physical Review B 111, L100303 (2025).

362 **Full counting statistics for unconventional superconductor junctions**
Kokkeler T, Golubov A, Bergeret S, and Tanaka Y.
Physical Review B 112, 024507 (2025).

363 **σ-electron-driven superconductivity in two-dimensional B_6S_4 stabilized by structural resonance**
Zhang W, Bergara A, Wang S, Li F, Zhang X, and Yang G.
Physical Review B 112, 024511 (2025).

364 **Interfacial spin-orbit coupling in superconducting hybrid systems**
Mazanik AA, Kokkeler T, Tokatly IV, and Bergeret FS.
Physical Review B 112, 024514 (2025).

365 **Surface effects in x-ray absorption spectra of lanthanides: Focus on strongly correlated cerium materials**
Usachov DY, Bokai KA, Poelchen G, Stolyarov VS, Fedorov V, Kliemt K, Khim S, Caroca-Canales N, Krellner C, and Vyalikh DV.
Physical Review B 112, 035137 (2025).

366 **Resonant 4*f* photoemission from lanthanides at the 4*d* edge: Analysis for individual $|M_J\rangle$ states**
Usachov DY, Kliemt K, Krellner C, Stolyarov VS, Poelchen G, and Vyalikh DV.
Physical Review B 112, 035140 (2025).

367 **Non-Hermitian effects in the Su-Schrieffer-Heeger model: Exploring substrate coupling and decoupling dynamics**
Edalatmanesh S, and Frederiksen T.
Physical Review B 112, 035420 (2025).

368 **Evolution of the atomic and electronic structure of the $Sn_x Ag_{1-x}$/Ag(001) bimetallic surface alloy: A LEED, ARPES, and DFT study**
Kar A, Das A, Chakraborty S, Banerjee R, Narasimhan S, and Menon KSR.
Physical Review B 112, 045150 (2025).

369 **Moiré fractional Chern insulators. III. Hartree-Fock phase diagram, magic angle regime for Chern insulator states, role of moiré potential, and Goldstone gaps in rhombohedral graphene superlattices**
Kwan YH, J, Herzog-Arbeitman J, Efetov DK, Regnault N, and Bernevig BA.
Physical Review B 112, 075109 (2025).

370 **Moiré fractional Chern insulators. IV. Fluctuation-driven collapse in multiband exact diagonalization calculations on rhombohedral graphene**
Yu J, Herzog-Arbeitman J, Kwan YH, Regnault N, and Bernevig BA.
Physical Review B 112, 075110 (2025).

371 **Multiband exact diagonalization and an iteration approach to search for fractional Chern insulators in rhombohedral multilayer graphene**
Li H, Bernevig BA, and Regnault N.
Physical Review B 112, 075130 (2025).

372 **Revealing the anisotropic charge-density-wave order of $TiSe_2$ through high harmonic generation**
Zhang L, Tyulnev I, Vamos L, Poborska J, Bhattacharya U, Chhajlany RW, Grass T, Biegert J, and Lewenstein M.
Physical Review B 112, 085147 (2025).

373 **Theory of infrared magneto-optical effects from chiral phonons in solids**
Fiorazzo C, Park CH, Souza I, and Calandra M.
Physical Review B 112, 094307 (2025).

374 **From superconductivity to nonsuperconductivity in LiPdH: A first principles approach**
Alizadeh Z, Fang YW, Errea I, and Mohammadizadeh MR.
Physical Review B 112, 104308 (2025).

375 **Frustrated Bose ladder with extended range density-density interaction**
Biswas S, Rico E, and Grass T.
Physical Review B 112, 115122 (2025).

376 **Topological heavy fermion model as an efficient representation of atomistic strain and relaxation in twisted bilayer graphene**
Herzog-Arbeitman J, Yu J, Calugaru D, Hu H, Regnault N, Vafek O, Kang J, and Bernevig BA.
Physical Review B 112, 125128 (2025).

377 **Kekulé spiral order from strained topological heavy fermions**
Herzog-Arbeitman J, Calugaru D, Hu H, Yu J, Regnault N, Kang J, Bernevig A, and Vafek O.
Physical Review B 112, 125129 (2025).

378 **Superconductivity in barium hydrides via incorporation of light elements**
Fang YW, and Errea I.
Physical Review B 112, 125204 (2025).

379 **Unoccupied bands in the molybdenum dichalcogenides MoS_2, $MoSe_2$, and $MoTe_2$**
Jobst J, Krasovskii EE, Ribeiro R, de Jong TA, Dean CR, Tromp RM, and van der Molen SJ.
Physical Review B 112, 125422 (2025).

380 **Native three-body interactions in a superconducting lattice gauge quantum simulator**
Busnaina JH, Shi Z, Alcaine-Cuervo JM, Yang CX, Nsanzineza I, Rico E, and Wilson CM.
Physical Review B 112, 134514 (2025).

381 **Theory of plasmon spectroscopy with the quantum twisting microscope**
Wei N, Guinea F, von Oppen F, and Glazman LI.
Physical Review B 112, 155157 (2025).

382 **Doping-induced nematic and stripe orders within the charge density wave state of $TiSe_2$**
Munoz-Segovia D, Venderbos JWF, Grushin AG, and De Juan F.
Physical Review B 112, 165119 (2025).

383 **Flat band driven itinerant magnetism in the Co-pnictides $CaCo_2As_2$ and $LaCo_2P_2$**
Subires D, Garcia-Diez M, Kar A, Lim CY, Li VM, Yannello V, Carbone D, Gargiani P, Yilmaz T, Dai J, Tallarida M, Vescovo E, Shatruk M, Vergniory MG, and Blanco-Canosa S.
Physical Review B 112, 165141 (2025).

384 **Quantum Hall effect and Chern phases in the 1/5-depleted square lattice**
Aghtouman S, Gumbs G, and Hosseini MV.
Physical Review B 112, 165303 (2025).

385 **Disentangling structural order and disorder in kagome $Yb_{0.5}Co_3Ge_3$**
Korshunov A, Fuller CA, Lim CY, Kar A, Roychowdhury S, Chernyshov D, Shekhar C, Bosak A, Felser C, and Blanco-Canosa S.
Physical Review B 112, 174103 (2025).

386 **Skyrmion Hall effect and shape deformation of current-driven bilayer skyrmions in synthetic antiferromagnets**
Lee MK, Velez JA, Otxoa RM, and Mochizuki M.
Physical Review B 112, 184402 (2025).

387 **$CeCo_2P_2$: An antiferromagnetic topological heavy-fermion system with a PT-protected Kondo effect and nodal-line excitations**
Hu H, Jiang Y, Liu D, Chen Y, Tsvelik AM, Xu Y, Haule K, and Bernevig BA.
Physical Review B 112, 195107 (2025).

388 **Parallel spin transport and holonomy in non-Euclidean curved circuits on a spherical two-dimensional electron gas**
Rodriguez EJ, Reynoso AA, Baltanas JP, Bercioux D, and Frustaglia D.
Physical Review B 112, 195305 (2025).

389 **Tuning excitons and superfluidity of dipolar excitons in double layers of kagome lattice by applying circularly polarized irradiation**
Kandel S, Gumbs G, Lee T, and Berman OL.
Physical Review B 112, 195424 (2025).

390 **Ab initio description of the family of Cr selenides: Structure, magnetism, and electronic structure from bulk to the single-layer limit**
Phillips J, Fumega AO, Blanco-Canosa S, and Pardo V.
Physical Review B 112, 224105 (2025).

391 **Phonon spectra, quantum geometry, and the Goldstone theorem**
Pellitteri G, Dai Z, Hu H, Jiang Y, Menichetti G, Tomadin A, Bernevig BA, and Polini M.
Physical Review B 112, 245128 (2025).

392 **Contrasting exchange-field and spin-transfer torque driving mechanisms in all-electric electron spin resonance**
Reina-Galvez J, Nachtigall M, Lorente N, Martinek J, and Wolf C.
Physical Review B 112, 245408 (2025).

393 **Microscopic scattering approach to in-gap states: Cr adatoms on superconducting β-Bi_2Pd**
Sink J, Paudyal H, Jyoti D, Heinrich AJ, Choi DJ, Lorente N, and Flatte ME.
Physical Review B 112, 245429 (2025).

394 **Competing phases in the kagome magnet FeGe from functional renormalization**
Bonetti PM, Jiang Y, Hu H, Calugaru D, Scherer MM, Bernevig BA, and Classen L.
Physical Review B 112, L220405 (2025).

395 **Excitons and optical response in the excitonic insulator candidate $TiSe_2$**
Novko D.
Physical Review B 112, L241114 (2025).

396 **Evidence for asymmetric reionization histories from a joint analysis of the cosmic microwave background and astrophysical data**
Paoletti D, Hazra DK, Finelli F, and Smoot GF.
Physical Review D 111, 043532 (2025).

397 **Diverse dark matter haloes in two-field fuzzy dark matter**
Luu HN, Mocz P, Vogelsberger M, Pozo A, Broadhurst T, Tye SHH, Liu T, Fung LWH, Smoot GF, Emami R, and Hernquist L.
Physical Review D 111, L121302 (2025).

398 **Dynamical dark energy from an ultralight axion**
Luu HN, Qiu YC, and Tye SHH.
Physical Review D 112, 023524 (2025).

399 **Input-dependence in quantum reservoir computing**
Martinez-Pena R, and Ortega JP.
Physical Review E 111, 065306 (2025).

400 **Krylov subspace methods for quantum dynamics with time-dependent generators**
Takahashi K, and Del Campo A.
Physical Review Letters 134, 030401 (2025).

401 **Anomalies in the electronic stopping of slow antiprotons in LiF**
Massillon-JL G, Correa AA, Andrade X, and Artacho E.
Physical Review Letters 134, 076401 (2025).

402 **Universal phenomenology of charge-spin interconversion and dynamics in diffusive dystems with spin-orbit coupling**
Kokkeler T, Bergeret FS, and Tokatly V.
Physical Review Letters 134, 096001 (2025).

403 **Mesoscopic dynamics in molecular liquids: Universality of nondispersive structural mode and its reflection in self-atomic motions**
Arbe A, Arrese-Igor S, Ruiz-Martin MD, Farago B, Alvarez F, Nilsen GJ, and Colmenero J.
Physical Review Letters 134, 098001 (2025).

404 **Negative transit time in nontunneling electron transmission through graphene multilayers**
Krasovskii EE and Kuzian RO.
Physical Review Letters 134, 126302 (2025).

405 **Electronic structure dimensionality of the quantum-critical ferromagnet $YbNi_4P_2$**
Dai J, Antezak A, Broad W, Thees M, Zatko V, Bouwmeester RL, Fortuna F, Le Fevre P, Rault JE, Horiba K, et al.
Physical Review Letters 134, 126401 (2025).

406 **Substrate polarization alters the Jahn-Teller effect in a single molecule**
Frankerl M, Patera LL, Giselbrecht F, Frederiksen T, Repp J, and Donarini A.
Physical Review Letters 134, 176203 (2025).

407 **Optical signatures of spin symmetries in unconventional magnets**
Sivianes J, dos Santos FJ, and Ibanez-Azpiroz J.
Physical Review Letters 134, 196907 (2025).

408 **Advancing natural orbital functional calculations through deep learning-inspired techniques for large-scale strongly correlated electron systems**
Huan Lew-Yee JF, del Campo JM, and Piris M.
Physical Review Letters 134, 206401 (2025).

409 **Band-selective spin-charge separation across the charge density wave transition in quasi-1D $NbSe_3$**
Hyun J, Lee Y, Lim CY, Lee G, Cha J, Ahn Y, Jho M, Gim S, Park M, Hashimoto M, Lu D, Kim Y, and Kim S.
Physical Review Letters 134, 206402 (2025).

410 **Universal exchange-correlation surface asymptotics: Metal slabs versus semi-infinite metal surfaces**
Horowitz CM, Proetto CR, and Pitarke JM.
Physical Review Letters 134, 256401 (2025).

411 **Quantum dynamics with stochastic non-Hermitian Hamiltonians**
Martinez-Azcona P, Kundu A, Saxena A, Del Campo A, and Chenu A.
Physical Review Letters 135, 010402 (2025).

412 **Polarons and exciton polarons in two-dimensional polar materials**
Shahnazaryan V, Kullis A, and Tokatly V.
Physical Review Letters 135, 066202 (2025).

413 **Universal Wilson loop bound of quantum geometry**
Yu J, Herzog-Arbeitman J, and Bernevig BA.
Physical Review Letters 135, 086401 (2025).

414 **Strong magnon-phonon coupling in the kagome antiferromagnets**
Sukhanov AS, Utesov OI, Korshunov AN, Andriushin ND, Pavlovskii MS, Nikitin SE, Kulbakov AA, Manna K, Felser C, and Rahn MC.
Physical Review Letters 135, 086703 (2025).

415 **Multiorbital interactions and spin polarization in single rare-earth adatoms**
Kelai M, Reale S, Robles R, Lee J, Jyoti D, Ohresser P, Otero E, Choueikani F, Scheurer F, Lorente N, Choi DJ, Singha A, and Donati F.
Physical Review Letters 135, 106203 (2025).

416 **Interlayer charge transfer induced by electronic instabilities in the natural Van der Waals heterostructure 4H_b-TaS_2**
Roy RM, Feng X, Wenzel M, Hasse V, Shekhar C, Vergniory MG, Felser C, Pronin V, and Dressel M.
Physical Review Letters 135, 116503 (2025).

417 **In-plane anisotropy of charge density wave fluctuations in 1*T*-$TiSe_2$**
Guo X, Kogar A, Henke J, Flicker F, De Juan F, Sun SXL, Khayr I, Peng Y, Lee S, Krogstad MJ, et al.
Physical Review Letters 135, 136102 (2025).

418 **Revealing band-hybrid cooper pairs on the surface of a superconductor with spin-orbit coupling**
Zaldivar J, Ortuzar J, Alvarado M, Trivini S, Baumard J, Rubio-Verdu C, Herrera E, Suderow H, Yeyati AL, Bergeret FS, and Pascual JI.
Physical Review Letters 135, 136201 (2025).

419 **Band renormalization, quarter metals, and chiral superconductivity in rhombohedral tetralayer graphene**
Parra-Martinez G, Jimeno-Pozo A, Phon VT, Sainz-Cruz H, Kaplan D, Emanuel P, Oreg Y, Pantaleon PA, Silva-Guillen JA, and Guinea F.
Physical Review Letters 135, 136503 (2025).

420 **Strongly entangled Kondo and kagome lattices and the emergent magnetic ground state in heavy-fermion kagome metal YbV_6Sn_6**
Lou R, Mende M, Vocaturo R, Zhang H, Dong Q, Li M, Ding P, Cheng E, Liao Z, Zhang Y, et al.
Physical Review Letters 135, 146902 (2025).

421 **Addressing the correlation of Stokes-shifted photons emitted from two quantum emitters**
Juan-Delgado A, Trebbia JB, Esteban R, Deplano Q, Tamarat P, Avriller R, Lounis B, and Aizpurua J.
Physical Review Letters 135, 163602 (2025).

422 **Giant nonreciprocal band structure effect in a multiferroic material**
Stavric S, Cuono G, Yang B, Puente-Uriona AR, Ibanez-Azpiroz J, Barone P, Droghetti A, and Picozzi S.
Physical Review Letters 135, 206401 (2025).

423 **Local control of parity and charge in nanoscale superconducting lead islands**
Trivini S, Ortuzar J, Vaxevani K, Vina-Bausa B, Bergeret FS, and Pascual JI.
Physical Review Letters 135, 226001 (2025).

424 **Family of aperiodic tilings with tunable quantum geometric tensor**
Carrasco HR, Schirmann J, Mordret A, and Grushin AG.
Physical Review Letters 135, 236603 (2025).

425 **Surface-state engineering for generation of nonlinear charge and spin photocurrents**
Sivianes J, Garcia-Goiricelaya P, Hernangomez-Perez D, and Ibanez-Azpiroz J.
Physical Review Letters 135, 256201 (2025).

426 **Family of dual topological materials XSb_4Te_4 (X = Ge, Sn, Pb)**
Bosnar M, Vyazovskaya AY, Sklyadneva IY, Eremeev SV, Koroteev YM, Petrov EK, Heid R, Geilhufe RM, Ernst A, Chulkov EV, and Otrokov MM.
Physical Review Materials 9, 014201 (2025).

427 **Observation of chiral surface state in superconducting $NbGe_2$**
Yao M, Gutierrez-Amigo M, Roychowdhury S, Errea I, Fedorov A, Strocov VN, Vergniory MG, and Felser C.
Physical Review Materials 9, 034803 (2025).

428 **Ultrafast demagnetization dynamics of 4*f* antiferromagnets**
Pankratova M, Borisov V, Thonig D, Pathak R, Windsor YW, Rettig L, Eriksson O, Ernst A, and Bergman A.
Physical Review Materials 9, 094408 (2025).

429 **Controlling the magnetotransport properties of magnetic topological insulator $Cr_x(Bi_ySb_{1-y})_{2-x}Te_3$ thin films via molecular beam epitaxy**
J. Karthein, J. Buchhorn, K. Underwood, A. R. Jalil, M. Vassen-Carl, P. Schuffelgen, D. Grutzmacher, and T. Schapers
Physical Review Materials 9, 124202 (2025).

430 **Large Seebeck coefficient driven by "pudding mold" flat band in hole-doped $CuRhO_2$**
Thakur AJ, Thees M, Fortuna F, Frantzeskakis E, Shiga D, Kuriyama H, Nohara M, Takagi H, Kumigashira H, and Santander-Syro AF.
Physical Review Materials 9, L032401 (2025).

431 **Wannier center spectroscopy to identify boundary-obstructed topological insulators**
Ligthart RAM, Herrera MAJ, Visser ACH, Vlasblom A, Bercioux D, and Swart I.
Physical Review Research 7, 012076 (2025).

432 **Image classification with rotation-invariant variational quantum circuits**
Sein PSS, Canizo M, and Orus R.
Physical Review Research 7, 013082 (2025).

433 **Universal critical holography and domain wall formation**
Ma TC, Shi HQ, Zhang HQ, and Del Campo A.
Physical Review Research 7, 013096 (2025).

434 **Annealing dynamics of regular rotor networks: Universality and its breakdown**
Grabarits A, Sammartino G, and Del Campo A.
Physical Review Research 7, 013123 (2025).

435 **Quantum chaos in random Ising networks**
Grabarits A, Swain KR, Heydari MS, Chandarana P, Gomez-Ruiz FJ, and Del Campo A.
Physical Review Research 7, 013146 (2025).

436 **Fano physics behind the N-resonance in graphene**
Kuzian RO, Efremov DV, and Krasovskii EE.
Physical Review Research 7, 013180 (2025).

437 **Proposal for many-body quantum chaos detection**
Das AK, Cianci C, Cabral DGA, Zarate-Herrada DA, Pinney P, Pilatowsky-Cameo S, Matsoukas-Roubeas AS, Batista VS, Del Campo A, Torres-Herrera EJ, and Santos LF.
Physical Review Research 7, 013181 (2025).

438 **Electrodynamics of vortices in quasi-two-dimensional scalar Bose-Einstein condensates**
Shinn SH, and Del Campo A.
Physical Review Research 7, 013217 (2025).

439 **Spatial form factor for point patterns: Poisson point process, Coulomb gas, and vortex statistics**
Massaro M, and Del Campo A.
Physical Review Research 7, 023107 (2025).

440 **Electronic structure of $(Mn_{1-x}Pb_x)Bi_2Te_4$: Experimental evidence of topological phase transition**
Estyunin DA, Estyunina TP, Klimovskikh II, Bokai KA, Golyashov VA, Kokh KA, Tereshchenko OE, Ideta S, Miyai Y, Kumar Y, et al.
Physical Review Research 7, 023168 (2025).

441 **Layer thickness and substrate effects on superconductivity in epitaxial FeSe films on BLG/SiC(0001)**
Wang Y, Guo H, Etxebarria A, Sajan S, Barja S, and Ugeda MM.
Physical Review Research 7, 023288 (2025).

442 **Anisotropic electron damping and energy gap in $Bi_2Sr_2CaCu_2O_{8+\delta}$**
Li J, Gu Y, Yamada T, Wu Z, Gu G, Valla T, Drozdov I, Dean MPM, Tohyama T, Pelliciari J, and Bisogni V.
Physical Review Research 7, 023319 (2025).

443 **Evaluation of coincidence time resolution in a liquid xenon detector with silicon photomultipliers**
Salor-Iguiniz N, Benlloch-Rodriguez JM, Esteve R, Alvarez V, Ballester F, Gadea R, Rodriguez J, Toledo JF, Torres-Curado R, Herrero V, et al.
Physical Review Research 7, 033089 (2025).

444 **Excess energy and countercurrents after a quantum kick**
Santervas-Arranz N, Stengel M, and Artacho E.
Physical Review Research 7, 033292 (2025).

445 **Redefining the dielectric response of nanoconfined liquids: Insights from water**
Zubeltzu J, Bresme F, Dawber M, Fernandez-Serra M, and Artacho E.
Physical Review Research 7, 043101 (2025).

446 **Projected entangled pair states with flexible geometry**
Patra S, Singh S, and Orus R.
Physical Review Research 7, L012002 (2025).

447 **Efficient driving of a spin qubit using single-atom magnets**
Reina-Galvez J, Le HA, Bui HT, Phark SH, Lorente N, and Wolf C.
Physical Review Research 7, L042055 (2025).

448 **Light-induced reorientation transition in an antiferromagnetic semiconductor**
Fichera BT, Lv B, Morey K, Shen Z, Lee C, Donoway E, Liebman-Pelaez A, Kogar A, Kurumaji T, Rodriguez-Vega M, et al.
Physical Review X15, 011044 (2025).

449 **On the Ehrenfest theorem and centroids of relativistic particles**
Bliokh KY.
Physics Letters A 542, 130425 (2025).

450 **A pathway to unveiling neutrinoless ββ decay nuclear matrix elements via γγ decay**
Romeo B, Stramaccioni D, Menendez J, and Valiente-Dobon JJ.
Physics Letters B 860, 139186 (2025).

451 **Quantum dynamics in Krylov space: Methods and applications**
Nandy P, Matsoukas-Roubeas AS, Martinez-Azcona P, Dymarsky A, and Del Campo A.
Physics Reports - Review Section of Physics Letters 1125, 1 (2025).

452 **Design and characterization of all 2D fragile topological bands**
Bird S, Devescovi C, Engeler P, Valenti A, Gokmen DE, Worreby R, Peri V, and Huber SD.
PNAS Nexus 4, pgaf285 (2025).

453 **M-Ru-Sn (M = Re, Mn) heterometallic and Ru-Sn bimetallic carbonyl complexes bearing heterocyclic thiolato ligands**
Begum SA, Hossain MM, Chowdhury MAH, Saha JK, Nesterov VN, Pieslinger GE, Abedin TSM, and Kabir SE.
Polyhedron 279, 117653 (2025).

454 **Cyclic grafted polymers: Synthesis, properties and biomedical applications**
Pagnacco CA, and Barroso-Bujans F.
Polymer Chemistry 16, 4189 (2025).

455 **Cl^-, Na^+ and Mg^{2+} Adsorption and electronic properties on 2-octyl acrylate and isobornyl acrylate monomers: A comprehensive DFT study**
Bolen E, Dolado JS, and Ayuela A.
Polymers 17, 799 (2025).

456 **Direct control of electron spin at an intrinsically chiral surface for highly efficient oxygen reduction reaction**
Wang X, Peralta M, Li X, Moellers V, Zhou D, Merz P, Burkhardt U, Borrmann H, Shekhar C, Zacharias H, Feng X, and Felser C.
Proceedings of the National Academy of Sciences of the United States of America 122, e2413609122 (2025).

457 **Concomitant formation of protocells and prebiotic compounds under a plausible early Earth atmosphere**
Jenewein C, Maíz-Sicilia A, Rull F, and García-Ruiz JM.
Proceedings of the National Academy of Sciences of the United States of America 122, e2413816122 (2025).

458 **Structural pores not required: Antimicrobial peptides induce ion permeabilization of lipid membranes through transient water channels**
Koynarev VR, Nader ML, Almåsvold KK, Cezar HM, Narayanan T, Porcar L, Cascella M, and Lund R.
Proceedings of the National Academy of Sciences of the United States of America 122, e2517944122 (2025).

459 **Extended detailed balance modeling toward solar cells with cement-based radiative coolers**
Cagnoni M, Testa P, Dolado JS, and Cappelluti F.
Progress in Photovoltaics 33, 54 (2025).

460 **Symmetry-protected topological Haldane phase on a qudit quantum processor**
Edmunds CL, Rico E, Arrazola T, Brennen GK, Meth M, Blatt R, and Ringbauer M.
PRX Quantum 6, 020349 (2025).

461 **Tensor network enhanced dynamic multiproduct formulas**
Robertson NF, Pokharel B, Fuller B, Switzer E, Shtanko O, Amico M, Byrne A, D'Urbano A, Hayes-Shuptar S, Akhriev A, Keenan N, Bravyi S, and Zhuk S.
PRX Quantum 6, 020360 (2025).

462 **Serendipitous discovery of a faint planetary nebula in the massive young LMC cluster NGC 1866**
Bond HE, Bastian N, Bellini A, Kamann S, Libralato M, Niederhofer F, Roth MM, and Soemitro AA.
Publications of the Astronomical Society of the Pacific 137, 114202 (2025).

463 **Ring-exchange physics in a chain of three-level ions**
Biswas S, Rico E, and Grass T.
Quantum 9, 1683 (2025).

464 **Alternatives of entanglement depth and metrological entanglement criteria**
Szalay S, and Toth G.
Quantum 9, 1718 (2025).

465 **A geometrical description of non-Hermitian dynamics: speed limits in finite rank density operators**
Hornedal N, Prosniak OA, Del Campo A, and Chenu A.
Quantum 9, 1729 (2025).

466 **su(d)-squeezing and many-body entanglement geometry in finite-dimensional systems**
Vitagliano G, Guehne O, and Toth G.
Quantum 9, 1844 (2025).

467 **Dynamic and geometric shifts in wave scattering**
Bliokh KY, Kuang Z, and Rotter S.
Reports on Progress in Physics 88, 107901 (2025).

468 **Colloquium: Synthetic quantum matter in nonstandard geometries**
Grass T, Bercioux D, Bhattacharya U, Lewenstein M, Nguyen HS, and Weitenberg C.
Reviews of Modern Physics 97, 011001 (2025).

469 **Metal-insulator transition described by NOFT / Transición metal-aislante descrita por la TFON**
Lew-Yee JFH, and Piris M.
Revista Cubana de Física 42, 30 (2025).

470 **Supramolecular chemistry in solution and solid-gas interfaces: Synthesis and photophysical properties of monocolor and bicolor fluorescent sensors for barium tagging in neutrinoless double beta decay**
Auria-Luna F, Foss FW, Molina-Canteras J, Velazco-Cabral I, Marauri A, Larumbe A, Aparicio B, Vazquez JL, Alberro N, Arrastia I, et al.
RSC Applied Interfaces 2, 185 (2025).

471 **Photonic axion insulator**
Liu GG, Mandal S, Xi X, Wang Q, Devescovi C, Morales-Pérez A, Wang Z, Yang L, Banerjee R, Long Y, et al.
Science 387, 162 (2025)

472 **Canalization-based super-resolution imaging using an individual Van der Waals thin layer**
Duan J, Martin-Luengo AT, Lanza C, Partel S, Voronin K, Tresguerres-Mata AIF, Alvarez-Perez G, Nikitin AY, Martin-Sanchez J, and Alonso-Gonzalez P.
Science Advances 11, eads0569 (2025).

473 **Molecular spin-probe sensing of H-mediated changes in Co nanomagnets**
Fetida A, Bengone O, Goyhenex C, Scheurer F, Robles R, Lorente N, and Limot L.
Science Advances 11, eads1456 (2025).

474 **New magnetic topological materials from high-throughput search**
Robredo I, Xu Y, Jiang Y, Felser C, Bernevig BA, Elcoro L, Regnault N, and Vergniory MG.
Science Advances 11, eadv8780 (2025).

475 **Accelerated design of gold nanoparticles with enhanced plasmonic performance**
Montano-Priede JL, Rao A, Sanchez-Iglesias A, and Grzelczak M.
Science Advances 11, eadx2299 (2025).

476 **Linking the pressure dependence of the structure and thermal stability to δ- and δ-relaxations in metallic glasses**
Shen J, Cornet A, Ronca A, Pineda E, Yang F, Garden JL, Moiroux G, Vaughan G, di Michiel M, Garbarino G, et al.
Science Advances 11, eadz7406 (2025).

477 **Phase transitions, Dirac and Weyl semimetal states in $Mn_{1-x}Ge_xBi_2Te_4$**
Shikin AM, Zaitsev NL, Estyunina TP, Estyunin DA, Rybkin AG, Glazkova DA, Klimovskikh II, Eryzhenkov AV, Kokh KA, Golyashov VA, et al.
Scientific Reports 15, 1741 (2025).

478 **Optimizing Hubbard U parameters for enhanced description of electronic and magnetic properties in CrI_3 monolayers and bilayers**
Lauer D, Gonzalez JW, Suarez Morell E, and Ayuela A.
Scientific Reports 15, 18126 (2025).

479 **Momentum-locked spin between topological and defect states in 1D patterns on bilayer graphene**
Guerrero-Aviles R, Ayuela A, Chico L, Jaskolski W, and Pelc M.
Scientific Reports 15, 28058 (2025).

480 **A nile red fluorescence assay for LC3 autophagy protein binding to lipid bilayers**
Sot J, Varelar YR, Montes LR, Goni FM, and Alonso A.
Scientific Reports 15, 34571 (2025).

481 **Topological states in chain of interacting electrons**
Karnaukhov IN, and Krasovskii EE
Scientific Reports 16, 3750 (2025).

482 **A large-N approach to magnetic impurities in superconductors**
Huang CH, Lobos AM, and Cazalilla MA.
SciPost Physics 18, 087 (2025).

483 **Quantum transport theory for unconventional magnets: Interplay of altermagnetism and p-wave magnetism with superconductivity**
Kokkeler T, Tokatly I, and Bergeret FS.
SciPost Physics 18, 178 (2025).

484 **Probing the biological identity of inorganic nanoparticles with anomalous small angle X-ray scattering**
Skiba M, Klemeyer L, Guedes G, Sun X, Haas S, Cortajarena AL, Koziej D, Parak WJ, and Sanchez-Cano C.
Small 21, 2504135 (2025).

485 **Complementary molecular passivation of multiple surface defects for efficient and stable inverted perovskite solar cells**
Zheng Y, Zheng T, Luo S, Tauqeer HA, Zhuo Y, Cao S, Bi Z, Gutsev LG, Liu D, Ramachandran BR, et al.
Small 21, e05659 (2025).

486 **Understanding the spin of metal complexes from a single-molecule perspective**
Guo J, Gao Q, Gao F, Jia C, and Guo X.
Small Methods 9, 2401302 (2025)

487 **Chain dynamics in polyisoprene stars with arms linked by dynamiccovalent bonds to the central core**
Robles-Hernandez B, Patelis N, Arbe A, Ntetsikas K, Bhaumik S, Hadjichristidis N, Alegria A, and Colmenero J.
Soft Matter 21, 3347 (2025).

488 **Investigating solar wind outflows from open-closed magnetic field structures using coordinated Solar Orbiter and Hinode observations**
Ngampoopun N, Susino R, Brooks DH, Lionello R, Abbo L, Spadaro D, Baker D, Green LM, Long DM, Yardley SL, et al.
Solar Physics 300, 45 (2025).

489 **Pressure-driven charge transfer and tunable superconductivity in intermetallic Li-Mg electrides**
Han S, Bergara A, Zhang X, Ding S, Li F, and Yang G.
Superconductivity 15, 100187 (2025).

490 **Extended hydrogen frameworks in nonmetallic superhydrides enabling 190 K superconductivity**
Li Q, Han S, Zhang X, Ding S, Bergara A, and Yang G.
Superconductivity 15, 100196 (2025).

491 **Selection of cross-coupling reaction products from Pd-cyclometalled complexes deposited on Ag(110) by tuning preparation conditions.**
Stojkovska M, Barcelon JE, Perilli D, Bracco G, Carraro G, Smerieri M, Rocca M, Vattuone L, Vaghi L, Papagni A, Di Valentin C, and Savio L.
Surface Science 756, 122724 (2025).

492 **Funnel mechanism for the filtration of gases through nanopores in layered membranes of carbon materials**
Mahnaee S, López MJ, and Alonso JA.
Surfaces and Interfaces 72, 107127 (2025).

493 **Cellulose pulp functionalization with acetaldehyde and cinnamaldehyde for efficient oil removal from wastewater**
Kandil H, Rivilla I, and Labidi J.
Surfaces and Interfaces 73, 107601 (2025).

494 **EPOCHS. XI. The structure and morphology of galaxies in the Epoch of Reionization to z ~ 12.5**
Westcott L, Conselice CJ, Harvey T, Austin D, Adams N, Ferrari F, Ferreira L, Trussler J, Li Q, Rusakov V, et al.
The Astrophysical Journal 983, 121 (2025).

495 **Constraining the z ~ 1 initial mass function with HST and JWST lensed stars in MACS J0416.1-2403**
Li SK, Diego JM, Meena AK, Lim J, Fung LWH, Levitskiy S, Nianias J, Palencia JM, Williams H, Zhang J, et al.
The Astrophysical Journal 988, 178 (2025).

496 **Explaining JWST counts with galaxy formation models**
Manzoni G, Broadhurst T, Lim J, Liu T, Smoot G, Baugh CM, Tompkins S, Windhorst R, Driver S, Carleton T, et al.
The Astrophysical Journal 988, 264 (2025).

497 **Magnification bias reveals severe contamination in Hubble Frontier Field photo-z catalogs**
Zhang J, Lim J, Broadhurst T, Li SK, Li MC, Manzoni G, and Windhorst R.
The Astrophysical Journal 988, 279 (2025).

498 **A new measure of assembly bias using the environment dependence of the luminosity function**
Y. Wang, I. Zehavi, S. Contreras, S. Cole, and P. Norberg
The Astrophysical Journal 988, 280 (2025).

499 **Connecting Solar Orbiter and L1 measurements of mesoscale solar wind structures to their coronal source using the ADAPT-WSA model**
Samantha Wallace S, Natalia Zambrana Prado N, Irena Gershkovich I, Viall NM, Young P, Kucera TA, Lepri ST, Yardley SL, Raines JM, Livi SA, and Dewey RM.
The Astrophysical Journal 990, 97 (2025).

500 **A parameter-masked mock data challenge for beyond-two-point galaxy clustering statistics**
Krause E, Kobayashi Y, Salcedo AN, Ivanov MM, Abel T, Akitsu K, Angulo RE, Cabass G, Contarini S, Cuesta-Lazaro C et al.
The Astrophysical Journal 990, 99 (2025).

501 **Dark matter distinguished by skewed microlensing in the "Dragon Arc"**
Broadhurst T, Li SK, Alfred A, Diego JM, Morilla P, Kelly PL, Sun F, Oguri M, Williams H, Windhorst R, et al.
The Astrophysical Journal Letters 978, L5 (2025).

502 **Ion transport on phased radiofrequency carpets in xenon gas**
Dey E, Jones BJP, Mei Y, Brodeur M, Chirayath VA, Coward N, Foss FW, Navarro KE, Parmaksiz I, Adams C, et al.
The European Physical Journal C 85, 688 (2025).

503 **Performance of an optical TPC Geant4 simulation with opticks GPU-accelerated photon propagation**
Parmaksiz I, Mistry K, Church E, Adams C, Asaadi J, Baeza-Rubio J, Bailey K, Byrnes N, Jones BJP, Moya IA, et al.
The European Physical Journal C 85, 910 (2025).

504 **Bayesian network 3D event reconstruction in the Cygno optical TPC for dark matter direct detection**
Amaro FD, Antonietti R, Baracchini E, Benussi L, Bianco S, Borra F, Capoccia C, Caponero M, Cavoto G, Costa IA, et al.
The European Physical Journal C 85, 1261 (2025).

505 **Lipidome plasticity preserves membrane function in sphingolipid-depleted HAP1 cells**
Monasterio BG, Garcia-Arribas AB, Riezman H, Goni FM, Alonso A, and Jimenez-Rojo N.
The FASEB Journal 39, e71238 (2025).

506 **How many distinct and reliable multireference diagnostics are there?**
Xu X, Soriano-Agueda L, Lopez X, Ramos-Cordoba E, and Matito E.
The Journal of Chemical Physics 162, 124102 (2025).

507 **Long-term memory in lipid assemblies: Rate-independent hysteresis in the ripple-to-liquid-disordered transition of sphingomyelin bilayers**
Llombart P, de la Arada I, Gonzalez-Ramirez EJ, Alonso A, MacDowell LG, and Goni FM
The Journal of Chemical Physics 162, 135101 (2025).

508 **Femtosecond laser-induced diffusion and desorption of CO adsorbed on a weak electron-phonon coupling surface: Cu(110)**
Gonzalez FJ, Muzas AS, Juaristi JI, Alducin M, and Busnengo HF
The Journal of Chemical Physics 162, 174701 (2025).

509 **Quantum geometry and adiabaticity in molecules and in condensed matter**
Resta R.
The Journal of Chemical Physics 162, 234102 (2025).

510 **Photoinduced dynamics of CO on Ru(0001): Understanding experiments by simulations with all degrees of freedom**
Mladineo B, Juaristi JI, Alducin M, Saalfrank P, and Loncaric I.
The Journal of Chemical Physics 163, 044103 (2025).

511 **Toward a formulation of a CISS theory with the inclusion of two-particle relativistic effects, electron-phonon coupling, and electron-electron correlation. An application to NMR-based chiral discrimination**
Ludena EV, Ugalde JM, Lopez X, Bouchard LS, and Mujica V
The Journal of Chemical Physics 163, 124119 (2025).

512 **The glass transition and the dynamics of water within pectin and metal-organic framework nanochannels**
Coin F, Di Lisio V, Cangialosi D, and Cerveny S
The Journal of Chemical Physics 163, 164507 (2025).

513 **Temperature induced metallicity of the Si(001) surface: Insights from molecular dynamics simulations with machine learned interatomic potentials**
Joshi S, Janisch J, Le D, and Rahman TS
The Journal of Chemical Physics 163, 244708 (2025).

514 **Computational analysis of the Lewis acid-catalyzed zwitterionic ring-expansion polymerization (ZREP) of monosubstituted ethylene oxide**
Gastearena X, Barroso-Bujans F, Ruiperez F, and Matxain JM.
The Journal of Organic Chemistry 90, 2592 (2025).

515 **Mechanistic insights into copper-catalyzed alkene aminofluorination and rational design of a metal-free strategy**
Zhang Y, Zhang S, Xu J, Ge S, Sun S, Frenking G, and Zhao L.
The Journal of Organic Chemistry 90, 8601 (2025).

516 **Toward a systematics for the lowest excited states of heteroaromatics enabled via cyclic ϖ-conjugated carbenes and heteroelement analogues**
Vedin NP, Toldo JM, Escayola S, Radenkovic S, Sola M, and Ottosson H.
The Journal of Organic Chemistry 90, 9743 (2025).

517 **Oligothiophene-based photovoltaic materials for organic solar cells: Exciton properties by the CNDOL Fockian approach**
Guerra-Barroso A, Perez-Badell Y, Montero-Alejo AL, and Montero-Cabrera LA.
The Journal of Physical Chemistry A 129, 3202 (2025).

518 **A-H•••π Hydrogen bonds - Where are proton acceptor sites located?**
Grabowski SJ.
The Journal of Physical Chemistry A 129, 11650 (2025).

519 **Assessing second-order perturbative corrections to restricted active space CI for valence excitations in organic molecules**
Perumal Marisami JB, and Casanova D.
The Journal of Physical Chemistry A 129, 11736 (2025).

520 **Second harmonic response of azobenzene self-assembled monolayers: the effect of push/pull substitution**
Dellai A, Muccioli L, Castet F, and Tonnele C.
The Journal of Physical Chemistry C 129, 8417 (2025).

521 **Semianalytical treatment of collective vibrational strong coupling in infrared phononic and plasmonic nanoantennas**
Sepulveda J, Montano-Priede JL, Aizpurua J, and Esteban R.
The Journal of Physical Chemistry C 129, 12374 (2025).

522 **The electron-phonon interaction at the (110) surface of hydrogen-covered $Mo_{1-x}Re_x$ alloys from helium atom scattering**
Benedek G, Flach B, Manson JR, Miret-Artes S, and Toennies JP.
The Journal of Physical Chemistry C 129, 17632 (2025).

523 **Ab Initio atomistic characterization of confined bulk and Bennett plasmons in metallic nanoparticles as probed by penetrating electrons**
Candelas B, Urbieta M, Babaze A, Ogando E, Borisov AG, Zabala N, and Aizpurua J.
The Journal of Physical Chemistry Letters 16, 2965 (2025).

524 **Highly oriented nitrogen-doped flower-like ZnO nanostructures for boosting photocatalytic and photoelectrochemical performance: a combined experimental and DFT study**
Wary RR, Das A, Amirov ES, Liu D, Gumber S, Kazakova EA, Vasenko AS, and Prezhdo OV.
The Journal of Physical Chemistry Letters 16, 5180 (2025).

525 **Optical addressability of the arylnitrene spin triplet**
Ricci G, Tonnele C, and Casanova D.
The Journal of Physical Chemistry Letters 16, 5659 (2025).

526 **Exciton properties and broadband emission in two-dimensional Ruddlesden-Popper perovskites**
Tan J, Jiang X, Liu D, Tang ZK, Chulkov EV, and Vasenko AS.
The Journal of Physical Chemistry Letters 16, 7659 (2025).

527 **Anharmonic motion-induced self-passivation of hydrogen defects in hybrid organic-inorganic perovskites: Ab initio quantum dynamics**
Tian X, Vasenko AS, Chulkov EV, and Long R.
The Journal of Physical Chemistry Letters 16, 10466 (2025).

528 **Molecular derailment via pressurization in methylammonium lead iodide**
Marin-Villa P, Gila-Herranz P, Jimenez-Ruiz M, Ivanov A, Armstrong J, Druzbicki K, and Fernandez-Alonso F.
The Journal of Physical Chemistry Letters 16, 10906 (2025).

529 **Compression-induced lattice tilting quenches ion migration at metal halide perovskite grain boundaries: A machine learning molecular dynamics study**
Samatov MR, Liu D, Amirov ES, Bubnova MA, Abrameshin AE, Kramarenko AS, Troshin PA, Chu W, Zhou H, Prezhdo OV, and Vasenko AS.
The Journal of Physical Chemistry Letters 16, 13068 (2025).

530 **Hydrogen disproportionation reduces the bandgap and prolongs the carrier lifetime in $Cs_2AgBiBr_6$: Quantum dynamics analysis**
Amirov ES, Liu D, Samatov MR, Abrameshin DA, Abrameshin AE, Kramarenko AS, Troshin PA, Chu W, Zhou H, Vasenko AS, and Prezhdo OV.
The Journal of Physical Chemistry Letters 16, 13075 (2025).

531 **Intrinsic mechanical properties and seeding effect of tobermorite synthesized in supercritical water**
Musumeci V, Li J, Saeed E, Camacho PS, Xu K, Monteiro PJM, Dolado JS, and Aymonier C.
The Journal of Supercritical Fluids 225, 106710 (2025).

532 **Illuminating the physics of dark energy with the discovery simulations**
Beltz-Mohrmann GD, Pope A, Alarcón A, Buehlmann M, Frontiere N, Hearin AP, Heitmann K, Ortega-Martinez S, Pearl A, Rangel E, et al.
The Open Journal of Astrophysics 8, (2025).

533 **J-PLUS: Tomographic analysis of galaxy angular density and redshift fluctuations in Data Release 3. Constraints on photo-z errors, linear bias, and peculiar velocities**
Hernández-Monteagudo C, Balaguera-Antolínez A, von Marttens R, del Pino A, Hernán-Caballero A, Abramo LR, Chaves-Montero J, López-Sanjuan C, Marra V, Tempel E, et al.
The Open Journal of Astrophysics 8, (2025).

534 **The J-PLUS collaboration. Additive versus multiplicative systematics in surveys of the large scale structure of the Universe**
Hernández-Monteagudo C, Aricò G, Chaves-Montero J, Abramo LR, Arnalte-Mur P, Hernán-Caballero A, Galindo-Guil FJ, López-Sanjuan C, Marra V, von Marttens R, et al.
The Open Journal of Astrophysics 8, (2025).

535 **Electronic spin relaxation in triangulene-based nanographenes**
Omist A, and Boto RA.
Theoretical Chemistry Accounts 144, 70 (2025).

536 **Bi-directional LEEM and eV-TEM spectroscopy on a graphene-hBN heterostack**
Neu PS, Krasovskii EE, Tromp RM, and van der Molen SJ.
Ultramicroscopy 271, 114117 (2025).

Books

1 **Lewis Acid–Lewis Base Interactions: Mechanisms and related phenomena**
Grabowski SJ
World Scientific, 2025

Books chapters

1 **Various theoretical approaches to analyze different kinds of interactions**
Grabowski SJ
Theoretical and Computational Chemistry, vol. 24, pp. 117-136
Ed: Slawomir Janusz Grabowski SJ. Elsevier (2025)

2 **Enhancing the computational efficiency of the DoNOF program through a new orbital sorting scheme**
Boutou É, Lew-Yee JFH, Mercero JM, and Piris M
Advances in Quantum Chemistry, vol. 91, pp. 169-189
Eds: Philip E. Hoggan PE, Coletti C. Elsevier (2025)

3 **Topological band structure.**
Iraola M, Robredo I, and Vergniory MG.
Comprehensive Semiconductor Science and Technology, Second Edition: vol. 1-3, pp. 352-388 Elsevier (2025)

DIPC Community

Pictured here is DIPC Community during the 25th anniversary celebration held at the Kursaal in Donostia / San Sebastián in December 2025.

Researchers

DIPC Associates

Maite Alducin Ochoa CSIC
Ignacio Arganda-Carreras EHU
Andrés Arnau Pino EHU
Emilio Artacho Cortés CIC nanoGUNE
Andrés Ayuela Fernández CSIC
Rolindes Balda de la Cruz EHU
Sara Barja Martínez EHU
Aitor Bergara Jauregi EHU
Sebastian Bergeret CSIC
María Blanco Rey EHU
Pedro Braña Coto CSIC
Tom J. Broadhurst EHU
Igor Campillo Santos Euskampus
Daniele Cangialosi CSIC
Silvina Cerveny CSIC
Aurelia Chenu Université du Luxembourg
Deung-Jang Choi MPC
Martina Corso CSIC
Fernando Cossío Mora EHU
David De Sancho Sánchez EHU
Nuno De Sousa Teixeira Simia Technologies
Adolfo Del Campo Echevarría Université du Luxembourg
Asier Eiguren Goyenetxea EHU
Ion Errea López EHU
Rubén Esteban Llorente CSIC
Joaquín Fernández Rodríguez EHU
Félix Fernández Alonso CFM
Elena Formoso Estensoro EHU
Daniel Franco Barranco University of Cambridge
Idoia García de Gurtubay Gálligo EHU
Vitaly Golovach CFM
Elton Gomes Dos Santos University of Edinburgh
Miguel Ángel Gosálvez Ayuso EHU
Marek Grzelczak CSIC
Julen Ibáñez Azpiroz CFM
Elisa Jiménez-Izal EHU
Iñaki Juaristi Oliden EHU
Stefan Kurth EHU
Aritz Leonardo Lizeranzu EHU
Xabier López Pestaña EHU
Nicolás Lorente Palacios CSIC
Jon Mattin Matxain Beraza EHU
José María Mercero Larraza EHU
Salvador Miret Artés IFF - CSIC
Gabriel Molina Terriza MPC
Álvaro Moreno Bergareche EHU
Ángel Moreno Segurado CSIC
Enrique Ortega Conejero EHU
Mikhail Otrokov CSIC-Unizar
José Ignacio Pascual Chico CIC nanoGUNE
Juan Ignacio Pérez Iglesias EHU
José María Pitarke de la Torre EHU
Yury Rakovich EHU
Daniel Reta Mañeru EHU
Elixabete Rezabal Astigarraga EHU
Enrique Rico Ortega EHU
Alberto Rivacoba Otxoa EHU
Celia Rogero Blanco CSIC
Jorge Sánchez Dolado CSIC
Daniel Sánchez Portal CSIC
Ane Sarasola Iñiguez EHU
Frederik Schiller CSIC
Gustavo Schwartz Pomeraniec CSIC
Ivo Souza EHU
Ilya Tokatly EHU
Miquel Torrent Sucarrat EHU
Geza Toth EHU
Jesús Ugalde Uribe-Etxebarria EHU
Lucía Vitali EHU
Nerea Zabala Unzalu EHU

Ikerbasque Research Professors

Slawomir Grabowski
01/01/2012 – Present
Hydrogen bonds in gas phase and crystals; quantum theory of atoms in molecules and natural bond orbitals approaches; intermolecular interactions as preliminary stages of chemical reactions.

Andreas Heidenreich
01/01/2012 – Present
Computer simulations of nanoplasma formation, Coulomb explosions and nuclear fusion induced by ultraintense and ultrashort laser pulses. Computer simulations of pump-probe signals.

Eugene Krasovskii
01/01/2012 – Present
Electronic structure and dynamics at surfaces and computational spectroscopy: ab initio electron diffraction and photoemission.

Mario Piris Silvera
01/01/2012 – Present
Energy functional method development. Computational modeling of semiconductor nanocluster and molecular solid phases and polymorphism.

Vyacheslav Silkin
01/01/2012 – Present
Ultrafast dynamics of the one-particle and collective electronic excitations in metals and their surfaces. The study of electronic excitations at adsorbates on metal surfaces.

Thomas Frederiksen
15/08/2012 – Present
Nanoelectronics - theory and simulation.

Geza Giedke
01/09/2014 – Present
Quantum systems and technologies.

Fabienne Barroso Bujans
01/02/2016 – Present
Novel complex cyclic polymers, from synthesis to physical properties. Devices and nanodevices based on cyclic polymers/graphene hybrid materials.

Luca Salassa
01/01/2017 – Present
Development of photoactivatable anticancer metal complexes and nanomaterials. Experimental and computational inorganic photochemistry.

Denis Vyalikh
01/01/2017 - Present
Photoemission measurements of magnetic surface states.

Juan José Gómez Cadenas
14/03/2018 – Present
Experimental particle physics.

Román Orús Lacort
01/09/2018 – Present
Quantum systems and technologies.

Miguel Ángel Cazalilla Gutiérrez
01/09/2020 - Present
Charge and spin transport properties in low dimensional systems, highly correlated systems, superconductors, and quantum devices. Quantum Dissipation and Open Quantum Systems.

Nathan John Bastian
01/03/2021 – Present
Stellar population studies.

Juan Ignacio Collar Colmenero
23/11/2022 – Present
Neutrino physics at the European spallation source.

Ronen Zangi
01/02/2023 – Present
Computer Simulations of Biological and Chemical Systems. Statistical Mechanics of Finite Systems.

Miguel Moreno Ugeda
15/06/2023 – Present
Low-temperature scanning tunneling microscopy and spectroscopy of 2D materials and nanostructures.

Javier Aizpurua Iriazabal
01/12/2023 – Present
Theory of nanophotonics.

Distinguished Researchers

Arantzazu García Lekue
01/01/2024 – Present
Theory and simulation of quantum nanoelectronics.

Juan Manuel García Ruiz
01/01/2024 – Present
Crystallography and Crystal Growth.

Eduard Matito Gras
01/01/2024 – Present
Development of electronic structure methods and real-space descriptors of chemical bonding and aromaticity.

Konstantin Bliokh
01/05/2024 – Present
Complex classical and quantum waves.

Raúl Esteban Angulo de la Fuente
01/01/2025 – Present
Numerical simulations in cosmology.

David Casanova Casas
01/01/2025 – Present
Electronic structure of molecular excited states and photophysical process: theory and applications.

Alexey Nikitin
01/01/2025 – Present
Nanophotonics of 2D materials.

Adolfo González Grushin
01/07/2025 – Present
Advanced materials.

Irina Sklyadneva
01/05/2003 - Present
Electron-phonon coupling in the 3D topological isolators and Weil semiconductors as well as and in ultrathin lead and indium films on the Si substrate (superconductivity).

Albert Fert
01/01/2020 - Present
Conversion between spin and charge currents at room temperature by Rashba or topological insulator interfaces, 2D magnets and perspective for low power spintronic devices.

George Fitzgerald Smoot
01/11/2020 – 18/09/2025 ✝
Measuring the sum of neutrino masses and properties, interpreting LIGO/Virgo events and testing the nature of Dark Matter.

Roman Kuzian
01/07/2022 - Present
Time-resolved photoemission from solids.

Anatolii V. Goncharenko
01/09/2022 - Present
Plasmonics and nanooptics.

Francisco Guinea López
01/09/2022 – Present
Two dimensional materials.

Tonica Valla
01/10/2022 – Present
Condensed Matter Physics – Emergent Phenomena at Quantum Interfaces.

Maia García Vergniory
01/01/2023 – Present
Prediction of new topological phases and materials.

Daniel Rubén Zerzión
01/03/2023 – 28/02/2025
Development and construction of the XeESS detector. Neutrino physics at the ESS.

Francesca Ferlaino
01/10/2024 – Present
Quantum Science Lab.

Evgueni Tchulkov Savkin
01/01/2025 – Present
Attosecond physics and electron dynamics.

Reidar Lund
02/10/2025 – Present
Polymers & Soft Matter.

Ikerbasque Research Associate Professors

Dario Bercioux
01/10/2019 – 31/12/2025
Quantum transport in nanostructures.

Santiago Blanco Canosa
01/10/2019 – 31/12/2025
Synchrotron research in high Tc superconductors and low dimensional ferromagnets.

Iván Rivilla De la Cruz
01/02/2021 – Present
Field of molecular indicators for single atom detection in dry media, with major applications to neutrino physics and a clear potential for biomedical.

Francesc Monrabal Capilla
01/02/2022 – Present
Development of xenon detectors for basic and applied physics.

Silvia Bonoli
01/09/2023 – Present
Formation and evolution of supermassive black holes in a cosmological context, combining theoretical models and observational data.

Fernando de Juan Sanz
01/09/2023 – Present
Topology and electronic correlations in quantum materials.

Aitzol García Etxarri
01/11/2024 – Present
Nanophotonics theory.

Bo Chen
18/02/2025 – Present
Nanothread chemistry and physics; high-pressure chemistry; carbene and diradical chemistry.

Martin Schnell
01/09/2025 – Present
Infrared (nano)imaging for label-free biomedical diagnosis.

Ikerbasque Research Fellows

Bo Chen
18/02/2020 – 17/02/2025
Nanothread chemistry and physics; high-pressure chemistry; carbene and diradical chemistry.

Carlos Sánchez Cano
01/09/2021 – Present
Quantum simulation and synthetic quantum matter.

Tobias Daniel Grass
01/10/2022 – Present
Quantum simulation and synthetic quantum matter.

Claire Tonnelé
01/09/2023 – Present
Electronic structure in molecular photophysics and optoelectronics.

Stefano Roberto Soleti
01/09/2024 – Present
Neutrinoless double-beta decay with the NEXT experiment.

Martin Schnell
01/01/2025 – 31/08/2025
Infrared (nano)imaging for label-free biomedical diagnosis.

Fellows

María Navarro Gastiasoro
01/01/2023 - Present
Exotic superconductivity and correlation in quantum materials.

Helena Almazán Molina
15/09/2024 - Present
Neutrino physics in NEXT and WCTE experiments.

Verónica Postils Ribó
01/11/2025 - Present
Improvement in the description of photophysical and optical processes that came from light-matter interactions in medium-size complex real systems.

Postdoctoral Positions

Pablo Fernández Menéndez
01/10/2021 – 31/08/2025
Development of water Cherenkov test beam experiment.

Rodrigo Voivodic
06/12/2021 – 17/11/2025
Cosmology – Large scale structure.

Roberto Álvarez Boto
01/03/2022 – 28/06/2025
Quantum Technologies - Optical properties of doped nanographenes.

Ander Simón Estévez
01/03/2022 – 28/02/2025
Coherent neutrino-nucleus scattering at ESS.

Alexey Brodoline
08/03/2022 – Present
Optics, fluorescence.

Raphael Enoque de Paiva
30/09/2022 – 31/08/2025
Development of photoactivatable anticancer metal complexes and nanomaterials. Experimental and computational inorganic photochemistry.

María Isabel Ardaya Franco
04/04/2022 – Present
Neurobioscience – nanoneuro: optically manipulating neuronal activity with nanoparticles.

Siddhartha Patra
18/11/2022 – 31/07/2025
Tensor networks and artificial intelligence for quantum matter.

Douglas Nakahata
21/11/2022 – 31/08/2025
Metal catalysis for the chemical modification of proteins.

Ana Cristina Carrasco Gento
01/01/2023 – Present
Bioorthogonal photocatalysis towards metal substrates.

Ricardo Rama Eiroa
16/01/2023 – 09/03/2025
Designing the next generation of hard-drives using 2D materials.

Fei Gao
23/01/2023 – 31/07/2025
Hybrid graphene nanoarchitectures for electrochemical sensing.

Jose Eduardo Barcelon
04/02/2023 - Present
On-surface trapping of Ba ions by functionalized surfaces.

Charles Mark Lewis
01/04/2023 - Present
Neutrino Physics as part of ESSCEvNS.

Óscar Rodríguez Ballesteros
10/04/2023 – 21/04/2025
Computational design of proteins.

Mikel Iraola Iñurrieta
11/04/2023 – 10/04/2025
Topological phases in interacting-electron systems.

Fernando Peñaranda del Río
01/05/2023 - Present
Multiscale modelling of moiré materials.

Galder Llorente
01/06/2023 - Present
Organic Chemistry, Neuroscience.

Peru D'Ornellas
29/09/2025 - Present
Organic Chemistry, Neuroscience.

Álvaro Pozo Larrocha
01/06/2023 - Present
Wave Dark Matter.

Ilya Klimovskikh
19/06/2023 - Present
Electronic Properties of Quantum Interfaces Studied in ARPES.

Sourav Biswas
01/07/2023 – 31/08/2025
Quantum technologies.

Haojie Guo
01/07/2023 – 30/09/2025
Condensed Matter Physics and Strong electron correlations in moiré quantum matter.

Yi Jiang
01/07/2023 - Present
HPC&IA – Magnetic properties of flat band kagome lattices studied by Inelastic Neutron Scattering.

Arunava Kar
01/07/2023 – 31/12/2025
Electronic properties of flat band kagome lattices studied by ARPES.

Nico Leumer
01/07/2023 – 30/06/2025
Spin physics in driven graphene nanostructures.

Germán Eduardo Pieslinger
01/07/2023 – 31/12/2025
Green H2 generation.

Mario Zapata Herrera
06/07/2023 – 29/11/2025
Nanophotonics.

Shivaprasad Achary Balahoju
01/09/2023 - Present
Organic Donor-acceptor pi-conjugated molecular systems.

Tamara Richardson
01/09/2023 - Present
Cosmology.

Rodrigo Martínez Peña
01/10/2023 - Present
Hybrid quantum algorithms for time series analysis.

Hoang Nhan Luu
20/11/2023 – 30/06/2025
Exploring the nature of the standard cosmological model.

Moritz Frankerl
01/12/2023 – 31/05/2025
Theory of light emission from current-driven plasmonic nanocavities.

Antoine Patt
01/12/2023 - Present
Theory and modelling, clathrate hydrates, porous materials.

Safa Hamreras
11/12/2023 - Present
Hybrid quantum algorithms for pattern recognition.

Chan Young Lim
05/01/2024 - Present
Electronic properties of flat band kagome lattices studied by ARPES and scattering.

Ngoc Duc Le
15/01/2024 – 15/02/2025
Nano-optics, nano-photonics and nano-plasmonics.

Juan Felipe Huan Lew Yee
15/01/2024 – Present
Solving the EoM for the 1RDM on quantum computing devices.

Manuel José Sánchez del Castillo
22/01/2024 - Present
ECC- Experimental Chemistry clusterX-rays for Inorganic biochemistry lab.

Artem Korshunov
08/04/2024 – Present
Uniaxial strain control of competing order parameters in complex quantum materials.

José Aarón Rodríguez Jiménez
11/04/2024 – 21/04/2025
Quantum Lanczos Methods for Quantum Chemistry.

Jorge Diogo Marques Laranjeira
01/05/2024 – Present
High-pressure computational organic chemistry.

Kaycee Underwood
15/06/2024 - Present
Novel forms of superconductivity and magnetism in two-dimensional materials.

Samuele Torelli
18/06/2024 - Present
Search for neutrinoless double beta decay with high pressure xenon time projection chambers.

Hanqi Pi
01/07/2024 - Present
Electronic structure of twisted 2 TMDs.

Nicholus Bhattacharjee
01/09/2024 – 16/12/2025
Computational mechanistic studies of the biological function of deprotonated diradicals.

Heqiu Li
01/09/2024 - Present
Interactions, Superconductivity, Catalysis and Topology in Flat Bands.

Tamar Meshveliani
01/09/2024 – 31/08/2025
Massive black holes and galaxy evolution.

Christian Jenewein
02/09/2024 - Present
Patterns on the rocks.

Aleksander Bach Lorentzen
09/09/2024 – 24/09/2025
Theory and simulation of time-dependent nanoelectronics.

Rafael Ramis Cortés
16/09/2024 – 31/08/2025
AI-Powered Interpretation of Missense Variants in Actionable Genes.

Dulce Consuelo Guzmán Ocampo
01/10/2024 – 31/12/2025
Molecular Dynamics Simulation of Proteins.

Stephen Ross McMillan
01/11/2024 - Present
Spin qubits and graphene-based nanostructures.

Borja Aparicio Gil
18/11/2024 - Present
Prebiotic Chemistry and Origin of Life.

Irene Casademont Reig
01/12/2024 - Present
Molecular optical properties and aromaticity.

Gonzalo Martínez Lema
06/12/2024 – 31/08/2025
Development of the GanESS detector.

Mateo Uldemolins Nivela
01/01/2025 – 30/04/2025
Theory of Quantum Transport in superconducting and magnetic materials.

Virginia San Nacianceno Fernández
13/01/2025 - Present
Synthesis and characterisation of compounds with potential antitumor activity.
Application in vitro devices.

Gaetano Ricci
15/01/2025 - Present
Modeling electronic spin states and optical properties in organic molecules.

Stefano Scoditti
01/02/2025 - Present
Methylene blue and analogues as bioorthogonal catalysts for the activation of metallodrugs.

Yun Chen
17/03/2025 – 16/09/2025
Ceramic and Cement-Based Materials.

Juan José Esteve Paredes
14/04/2025 – 13/09/2025
Mechanisms for the flexophotovoltaic effect by strain.

Juan Carlos Jiménez
16/04/2025 - Present
Computational design of enzyme inmobilization.

Asier Urriolabeitia Rodrigo
16/05/2025 – Present
Non-covante indexes and Biological Systems.

Bárbara Andrade dos Santos
28/05/2025 – 31/12/2025
Quantum simulations of lattice gauge theories.

Garen Avedissian
01/06/2025 - Present
Fabrication of vdW heterostructures based on low dimensional quantum materials and low temperature (30mK) electronic characterization of the emerging ultra flat bands in twisted graphene.

Ishita Bhattacharjee
01/06/2025 - Present
Electron Correlation Measures and Diagnostics.

Ariadna Pazos Pérez
01/06/2025 – Present
Development of luminescent chemical sensors for the detection of Ba++.

Edison Xabier Salazar Quezada
01/06/2025 – Present
Theoretical and computational chemistry, focused on non-adiabatic dynamics.

Amanda Ribeiro Guimaraes
04/06/2025 – 18/08/2025
Theoretical chemistry.

Laura Cervera Gabalda
15/06/2025 - Present
Nanobio. Rational design and development of nanostructured self-assembled platforms for membrane biophysics, biotechnology and biomedical applications.

Francisca Javiera Benítez Olivares
17/06/2025 - Present
Eutectozyme-based biomaterials design.

Alexander Vernon
23/06/2025 - Present
Topological and dynamical properties of structured waves.

Liancheng Ji
26/06/2025 - Present
Development of the GanESS detector.

Jason Tarunesh Francis
18/07/2025 - Present
Quantum Optics.

Tristan Béranger
01/08/2025 - Present
Optimising hydrogel composition for research on the brain extracellular space.

Alejandro Jimeno Pozo
01/08/2025 - Present
Two-dimensional materials, correlations, superconductivity.

Sisheng Duan
18/08/2025 - Present
Electronic characterization of real- and momentum-space topology of flat bands.

Moritz Fischer
01/09/2025 - Present
Numerical simulations in cosmology.

Andrei Kardashin
01/09/2025 - Present
Quantum Systems and Technologies.

Andrés Ernesto Rentería Olivo
01/09/2025 - Present
Quantum Algorithms for Condensed Matter Physics.

Yuelin Shao
03/09/2025 - Present
Theoretical Condensed Matter Physics.

Alaa Mohammed Idris Bakhit
15/09/2025 - Present
Interfaces and Low-Dimensional Systems.

Bruno Candelas Peñalba
29/09/2025 - Present
Quantum Key Distribution over fiber-based communication Networks.

Mathilde Pinon
01/10/2025 - Present
Cosmology with the large-scale structure of the Universe.

Maxime Durelle
20/10/2025 - Present
Mineral self-organization and Origin of Life.

Aurelian Loirette Pelous
01/11/2025 - Present
Vibrational and electronic spectroscopy of molecules and metals.

Research Collaborators

Jorge Pelegrín Mosquera
08/09/2021 – Present
Development of gas handling system for NEXT experiment.

Sergio Contreras Hantke
01/12/2021 – 30/06/2025
Modeling of galaxy formation physics and its impact on clustering and cosmological parameters.

Abel Carreras Conill
01/04/2025 - Present
Quantum Computing for Quantum Chemistry.

Leire Larizgoitia Arcocha
14/10/2025 - Present
Development of gaseous detectors for the ESS.

Sunny Pradhan
31/10/2025 - Present
Quantum simulation of lattice gauge theories.

Jiashuo Zhang
14/11/2025 - Present
Cosmology with Gravitational Lenses.

Mario Zapata Herrera
30/11/2025 - Present
Nanophotonics.

Enrique Francés Poveda
01/12/2025 - Present
Synthesis of Metal-Polymer Hybrid Systems: Optical and Catalytic Properties.

Aitor Díaz Andrés
20/12/2025 - Present
Photophysical processes in molecules, molecular aggregates and molecular solids.

PhD Students

Antonio David Subires Santana
01/02/2021 – 31/01/2025
Electronic and magnetic ordering in low dimensional systems.

Irián Sánchez Ramírez
01/07/2021 – 30/06/2025
Modeling of strongly correlated electronic systems.

Aitor Díaz Andrés
01/08/2021- 31/07/2025
Photophysical processes in molecules, molecular aggregates and molecular solids.

Juan Sánchez-Camacho Sánchez
01/08/2021 – 31/07/2025
Development of new biorthogonal photocatalytic catalysts for cancer therapy.

Antonio Cebreiro Gallardo
01/09/2021 – 31/08/2025
Quantum computational chemistry.

Kateryna Domina
01/09/2021 – 31/08/2025
Anomalous wave phenomena in 2D materials.

Divya Jyoti
02/09/2021 – 01/09/2025
Impurities on superconductor.

Mohammed Loukili
15/09/2021 – 14/09/2025
Exploring organic chemistry under pressure with computations.

Francisco Germano Maion
27/09/2021 – 26/09/2025
Cosmological large-scale structure.

Lurdes Ondaro Mallea
01/10/2021 – 11/07/2025
Research in computational cosmology.

Markos Polkas
15/10/2021 – 14/10/2025
Supermassive black holes and galaxy evolution.

Xabier Díaz de Cerio Palacio
01/11/2021 – 28/02/2025
Electronic properties of carbon-based nanostructures.

Adam Roselló Sánchez
01/11/2021 – 31/10/2025
Light-matter interactions in molecular systems on surfaces.

Carlo Andrea Pagnacco
15/11/2021 – 14/11/2025
Synthesis of cyclic polymers for biomedical applications.

Kirill Voronin
13/12/2021 – 30/09/2025
Nanophotonics with Van der Waals crystals.

Sara Ortega Martínez
01/01/2022 – 31/12/2025
Cosmos: computational cosmology.

Andrei Paulau
12/01/2022 – 31/12/2025
Theoretical chemistry.

Leire Larizgoitia Arcocha
17/01/2022 – 13/10/2025
Development of gaseous detectors for the ESS.

Chen-How Huang
03/05/2022 – 02/05/2025
Low dimensional system, quantum systems in non-equilibrium.

Andrés Bejarano
06/05/2022 – 31/12/2025
Quantum transport.

Julen Aduriz Arrizabalaga
13/05/2022 – Present
Theoretical simulation of metal-Abeta complexes.

Teresa Itziar Celaya Garmendia
17/05/2022 – Present
NanoNeuro: optically manipulating neuronal activity with nanoparticles.

Nerea Salor Iguiñiz
01/08/2022 – Present
Medical Physics.

Duy Hoang Minh Nguyen
01/09/2022 – Present
Twisted 2D materials.

Sandra Sajan
01/09/2022 – Present
Unconventional superconductivity in 2D materials.

María de los Ángeles del Barrio Torregrosa
01/10/2022 – Present
Neutrinoless double beta decay with the NEXT experiment.

Eric Gómez Urreizti
01/10/2022 – Present
Synthesis of cyclic polymers for biomedical applications.

Martin Irizar Landa
01/10/2022 – Present
Towards spin-qubits in 2.

Antonio Morales Pérez
01/10/2022 – Present
Artificial Intelligence algorithms for the topological control of quantum emitters.

Josianne Imbola Owona
01/10/2022 – Present
Theoretical Chemistry and Computational Modelling

Pablo Manuel Bermejo Navas
01/12/2022 – Present
Hybrid quantum machine learning for NISQ devices. Analysis of QML methods, tensor networks and neuromorphic computing.

Marta Costa Verdugo
15/12/2022 – Present
Development of new photocatalytic materials for drug delivery.

Javier Domínguez Calvo
19/12/2022 – Present
Development of new density functional approximations.

Esteban Zingales
09/01/2023 - Present
Metal modulation of glucose metabolism.

Mikel Elorza Romera
23/01/2023 - Present
Development of slow control system for the GaP detector.

Aitor González Marfil
06/03/2023 - Present
Deep Self-Supervised Learning methods for Bioimage Analysis.

Daniel García Pina
15/03/2023 - Present
Magnetism in graphene nanostructures: spin chains with tunable interactions.

Paschalis Agapitos
01/04/2023 - Present
Complex networks methods applied to cultural analytics.

Nonia Vaquero Sabater
01/04/2023 - Present
Quantum Algorithms for Quantum Chemistry.

Elena Ramos Cascón
12/06/2023 - Present
Development, data collection and physical analysis in the WCTE and Hyper-Kamiokande experiments.

Hanae Boulehjour
01/07/2023 - Present
Quantum Technologies – Asymmetric dilanthanide clusters as platforms for addressable qubits.

Hussen Oumer Mohammed
01/07/2023 - Present
Computational Design of Draw Solutes for Forward – Osmosis Seawater Desalination.

Shah Jee Rahman
01/07/2023 - Present
Optical Trapping and levitation.

Andoni Agirre Arabolaza
01/10/2023 - Present
Tensor Network methods for interacting electrons in quasi-1D graphene nanostructures.

Francisco Manuel Ballester Macià
16/10/2023 - Present
Study and application of topological phonons.

Ramón María Bergua López
16/10/2023 - Present
Study of fluxionality and environment effects on Pt nanoclusters for applications in catalysis.

Pablo Ramón García Valle
16/10/2023 - Present
Development of luminiscent chemical sensors for the selective selection of Ba++.

Carolina Adriana Iacovone
23/10/2023 - Present
Polymers and Soft Matter.

Marc Justin Seemann
27/10/2023 - Present
Experimental particle physics: towards next-generation high pressure xenon time projection chambers for neutrinoless double beta decay.

Irene Valderrama Flores
01/11/2023 - Present
Galaxies.

Alfonso Yubero Navarro
01/11/2023 - Present
Neutrino physics, surface physics.

Victor Sierka
03/11/2023 - Present
Design of quantum materials for channeling light and electrons.

Yongsong Wang
13/12/2023 - Present
Electronic characterization of real- and momentum-space topology of ultra flat bands.

Joan Grèbol Tomás
01/01/2024 - Present
Aromaticity in large conjugated circuits.

Alaitz Lecuona Isasa
01/01/2024 - Present
Chiral Multicolor Quantum Dots for Monitoring Biologically Relevant Phenomena.

Alfredo Manuel Rotundo
01/01/2024 - Present
Photoactive anticancer drugs.

Nitin Kumar
01/02/2024 - Present
Catalysis and photocatalysis.

Guilherme Henrique de Oliveira
02/02/2024 - Present
Correlative X-ray and non-linear optical microscopy to characterise protein aggregates.

Jehyeok Ryu
29/02/2024 - Present
Plasmon-exciton quantum emitters for applications in quantum technologies.

Ainhoa Villoria Bárcena
01/05/2024 - Present
New Biomolecules with Huisgenase Activity: Metalloproteins as Biocatalysts for (3 + 2) Cycloadditions.

Javier Antonio Vélez Simanca
06/05/2024 – 31/10/2025
Chaos, magnetic materials and Antiferromagnetics.

Aymeric Saunot
25/09/2024 - Present
Topological magnetic Moiré heterostructures.

Santiago Villodre Martínez
01/10/2024 - Present
Condensed matter models implemented in quantum computers.

Markel García Ibarluzea
15/10/2024 - Present
Biophysics of potassium channels: from atomistic protein folding, to clinical testing and drug design.

Carolina Martínez Strasser
01/11/2024 - Present
Physics of nanostructures and advanced materials.

Alicia Omist Gálvez
16/11/2024 - Present
Quantum Technologies

Ludovic Donneger
01/12/2024 - Present
Gaseous detectors for neutrino Physics.

Irati Lizaso Berrueta
13/01/2025 - Present
Galaxy formation and cosmology.

Marcos Lequerica Mateos
10/04/2025 – 31/05/2025
Enhancing Protein Structure and Active Site Prediction.

Silvia García Ulloa
01/09/2025 - Present
Computational chemistry.

Sergi Mas Mendoza
01/09/2025 - Present
ZX tensor networks for disordered many-body systems.

Hector Roche
01/09/2025 - Present
Topological Superconductivity in disordered systems.

Kamil Dutkiewicz
01/10/2025 - Present
Strongly correlated quantum states.

Guillermo Santamaría Fernández
01/10/2025 - Present
Study of anharmonicity in crystals and its effects in charge and heat transport.

Selom Jedidah Goto
01/11/2025 - Present
Predicting Linear and Nonlinear Optical Properties of Organic Chromophores through Structural and Electronic Descriptors.

Research Assistants

Mikel Olano Aranburu
01/06/2023 – 31/10/2025

Irati Lizaso Berrueta
23/10/2023 – 12/01/2025

Bruno Candelas Peñalba
01/01/2024 – 30/06/2025

David Silva Brea
01/01/2024 – 01/06/2025

Sara Lois Cerdeira
07/01/2024 – 30/04/2025

Janaarthana Babu Perumal Marisami
22/01/2024 - Present

Diego Herrero Carrión
14/10/2024 – 31/12/2025

Laura Navarro Cozcolluela
14/10/2024 – 31/12/2025

Shiyue Zhang
16/12/2024 – 07/04/2025

Martín Fuentetaja Leza
27/01/2025 – Present

Antonio David Subires Santana
01/02/2025 – 30/04/2025

Haozhe Tong
17/02/2025 – Present

Mikel García Díez
20/02/2025 – 06/04/2025

Ester Carranza Botey
03/06/2025 – 31/12/2025

Aitor Díaz Andrés
01/08/2025 – 19/12/2025

Pablo Vázquez Cabaleiro
01/09/2025 – 31/12/2025

Iratxe Garmendia Eguzkitza
08/09/2025 – Present

Jin Wang
15/09/2025 – Present

Isidora Araya Day
01/10/2025 – Present

Ivan Zugec
05/10/2025 – Present

Dawid Halka
06/10/2025 – Present

Sergio Fernández Expósito
15/10/2025 – Present

Amaia Tellería Flores
15/10/2025 – Present

Koldo Arzalluz Etxeberria
20/10/2025 – Present

Adam Yanis Chaou
20/10/2025 – Present

Alberto Saborido Patiño
01/11/2025 – 31/12/2025

Ainhoa Zubiaur Arsuaga
01/11/2025 – Present

Katy Andrea Domínguez Farinango
03/11/2025 – Present

Santiago Sanz Wuhl
03/11/2025 – Present

Georg Monninger
21/11/2025 – Present

Junior Research Assistants

Clara Clemente Marcuello
01/09/2025 – Present

Citrin Andoyi
01/12/2025 - Present

Engineers

Jordi Torrent Collell
16/06/2018 – Present

Eva Oblak
14/09/2020 – Present

José María Benlloch Rodríguez
22/01/2022 – Present

Asier Castillo Litago
02/02/2022 – Present

Alejandro Taboada Fernández
11/09/2022 – 31/12/2025

Pablo Ezequiel Dietz
02/01/2024 – Present

Oier Peñasco Escandell
23/12/2024 – 16/05/2025

Cristo Mourani Mansour
18/08/2025 – Present

Pablo Ferrero Mancheño
01/09/2025 – Present

Technical Assistants

Francisco López Gejo
01/01/2021 – Present

Carlos Echeverría Lizarraga
01/03/2022 – Present

Andrés Blanco Galán
03/09/2024 - Present

Internships

Noa Andueza Arín
Zubiri Manteo, Spain
02/12/2024 – 20/02/2025
Supercomputing Centre.

Bixente Sempé
Université de Bordeaux, France
20/01/2025 – 20/06/2025
Stereodynamics of hydrogen isotopes recombination on W(110).

Julien Robin
UCLovain, Belgium
23/01/2025 – 04/04/2025
Crystallization of calcium carbonate in silica-rich solution.

Paula Muñoz Izquierdo
Universidad Politécnica de Valencia, Spain
03/02/2025 – 20/06/2025
Development of CsI crystal PET prototype.

Jorge Domínguez Becerril
CIFT Politécnico Easo, Spain
24/02/2025 – 04/04/2025
Mechanical engineering.

Iker Rojo Sanz
Zubiri Manteo, Spain
28/02/2025 – 28/05/2025
Administration of networked computer systems.

Ruben Pietro Vincenzo Di Fiore
University of Padova, Italy
03/03/2025 – 17/08/2025
Synthesis of flavin-based ligands for the design of photoactive metallodrugs.

Marco Antonio Alcázar Peredo
Universidad de Barcelona, Spain
15/03/2025 – 31/07/2025
Simulations of quantum operations on a single molecular qubit.

Miguel Ángel Rodríguez García
Universidad Internacional de La Rioja, Spain
17/03/2025 – 17/05/2025
Most likely structure of a Bayesian network.

Roberto Incerti
University of Naples Federico II, Italy
24/03/2025 – 24/07/2025
Planetary Exploration, ExoMars Project.

Davide Condotta
Università degli studi di Padova, Italy
31/03/2025 – 30/06/2025
Flavin-based anticancer metallodrugs.

Elisa Mari
Institut d'Optique, France
07/04/2025 – 06/06/2025
Study of the interaction of quantum optical emitters and nanocavities.

Mikel Puy Sorondo
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
07/04/2025 – 06/07/2025
Correlated phases in Transition Metal Dichalcogenides.

Eduardo Catalina Ledesma
Universidad Internacional de La Rioja, Spain
13/05/2025 – 26/06/2025
Machine learning Bayesian networks.

Raúl Medrano Millán
Universidad Internacional de La Rioja, Spain
13/05/2025 – 26/06/2025
Machine learning of a Bayesian network.

Pedro David Montero Gómez
Universidad Internacional de La Rioja, Spain
13/05/2025 – 26/06/2025
Structure.

Juan Luis Salas Montoro
Universidad Internacional de La Rioja, Spain
13/05/2025 – 26/06/2025
Machine learning of a Bayesian network.

Julen Arranz Turégano
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
01/06/2025 – 30/07/2025
Development of Novel Epigenetic Chimeric Entities Against Cancer Cells.

Ane Paniagua González de Chavarri
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
01/06/2025 – 30/09/2025
Implementation and Evaluation of ConvNeXt and U-Net Models in BiaPy for Computer Vision Tasks.

Carla García Gazulla
Universidad de Barcelona, Spain
02/06/2025 – 02/08/2025
Neutrino Research with the Hyper-Kamiokande Detector.

Unai Miranda Redondo
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
02/06/2025 – 01/08/2025
Photoemission Experiments with Quantum Materials.

Ibai Mayoral Azurmendi
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
04/06/2025 – 30/07/2025
Development of Open-Source Deep Learning Tools for Bioimage Analysis.

Javier Borja Marvizón Valera
Universidad de Sevilla, Spain
10/06/2025 – 05/08/2025
Expanding the Scope of Radical Ion Pairs.

Iván Atienza Albalejo
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
12/06/2025 – 12/08/2025
Proton Dynamics in Enzymatic Processes.

Xabier Arrue Díaz
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
16/06/2025 – 16/08/2025
Neutrino Research with Hyper-Kamiokande Detector.

Jaime Lorente Martínez
Universidad de Zaragoza, Spain
16/06/2025 – 15/08/2025
Understanding electron correlation in excited states.

Bruno Pérez Gómez
Universidad Autónoma de Madrid, Spain
22/06/2025 – 22/08/2025
Quantum control of molecular qubits.

Gemma Moya García
Universidad de Navarra, Spain
30/06/2025 – 29/08/2025
Mineral self-organization and prebiotic chemistry.

Lucía Romero Sánchez
Universidad Autónoma de Madrid, Spain
30/06/2025 – 29/08/2025
Exploring superconductivity in M-valley twisted moiré materials.

Marta Alonso Iglesias
Universidad de Salamanca, Spain
01/07/2025 – 31/08/2025
Assessing Au-Protein coordination in bacteria using X-rays.

Manuel Casas Calvo
Universidad de Santiago de Compostela, Spain
01/07/2025 – 31/08/2025
Neutrino Research with the Hyper-Kamiokande Detector.

Katy Andrea Domínguez Farinango
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
01/07/2025 – 31/08/2025
Synthesis of hyperbranched polymer architectures for biomedical applications.

Aritz Montoya Retegui
Universidad Europea de Valencia, Spain
01/07/2025 – 31/08/2025
Exploring superconductivity in M-valley twisted moiré materials.

Maddi Vicente Galiana
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
01/07/2025 – 31/08/2025
Natural deep eutectic solvents for electrochemical applications: theoretical insights into metal speciation.

Eric Lizalde Panadés
Universitat Autònoma de Barcelona, Spain
07/07/2025 – 05/09/2025
Cosmological Simulations.

Leire Goikoetxea Herrero
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
10/07/2025 – 27/08/2025
Assesing Au-Protein coordination in bacteria using X-rays.

Francisco Javier Adillon Gálvez
University of Amsterdam, Netherlands
21/07/2025 – 19/09/2025
Correlated phases in Transition Metal Dichalcogenides.

María Iturrioz Izaguirre
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
05/11/2025 - Present
NEXT Project

Anna Zilio
University of Padova, Italy
10/11/2025 - Present
Flavin-based anticancer metallodrugs.

Maelys Michel
CESI Engineering School, France
01/12/2025 - Present
Enhancing the convergence in Natural Orbital Functionals with data science.

Undergraduate Students

Xabier Arrue Díaz
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
30/09/2024 – 31/07/2025
Experimental Physics - Particle Physics.

Unai Miranda Redondo
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
01/10/2024 – 30/06/2025
Synchrotron radiation

Master's Degree Students

Katy Andrea Domínguez Farinango
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
03/10/2024 – 31/08/2025
Cyclic polymers.

Rodrigo Kloster Albarracín
Universidad del País Vasco / Euskal Herriko Unibertsitatea (EHU), Spain
01/07/2025 – 01/09/2025
Skin effect in two-dimensional non-Hermitian lattice system with a flat band.

Special Assignments

Fabienne Barroso Bujans
DIPC Summer Internships

David de Sancho Sánchez
DIPC Seminars

Arantzazu García Lekue
DIPC Calls for Young Researchers

Geza Giedke and Thomas Frederiksen
DIPC Colloquia

Deung-Jang Choi and Nicolás Lorente Palacios
DIPC Courses

Luca Salassa
DIPC Workshops and DIPC Schools

Carlos Sánchez Cano
PhD Seminars

Gustavo Schwartz
Mestizajes Program

Claire Tonnelé and Paula Malo de Molina
DIPC Transferable Skills Courses

Andrés Arnau Pino, Claire Tonnelé, Francesc Monrabal Capilla and María Navarro Gastiasoro.
Scientific Newsletter

Gender Equality Committee

Amaia Arregi Buldain
Dario Bercioux
Hanae Boulehjour
Silvia Bonoli
David Casanova Casas
Teresa Celaya Garmendia
Ricardo Díez Muiño
Luz Fernández Vicente
Aitzol García Etxarri
Olatz Leis Esnaola
Tamara Richardson
Valentina Rodríguez Castro
Beatriz Suescun Rodríguez
Marta Vega de Seoane López de Goicoechea

Open Science Working Group

Itxaso Azcune Tolosa
Nate Bastian
Dario Bercioux
Aran Garcia Lekue
Nora González Lacunza
Olatz Leis Esnaola
Carlos Pérez Miguel
Txomin Romero Asturiano
Luca Salassa
Roberto Soleti
Jone Zabaleta Llorens

Visiting Researchers

Long visits

Bárbara Andrade dos Santos
ICFO – The Institute of Photonic Sciences, Spain
01/05/2024 – 01/05/2025
Real-time evolution of lattice gauge theories using modern quantum devices.

Nischal Acharya
28/09/2024 – 28/09/2025
Connecting active galactic nuclei to host galaxy properties.

Julio Navarro
University of Victoria, Canada
01/10/2024 – 31/03/2025
Dark matter clues from the faintest galaxies in the universe.

Amaia Elizaran Mendarte
Universidad del País Vasco / Euskal Herriko Unibertsitatea, Spain
15/11/2024 – 28/02/2025
Neural networks optimisation in data scarcity scenarios.

Junze Deng
Aalto University, Finland
30/11/2024 – 30/06/2025
Study on kagome flat band materials.

Haoyu Hu
Princeton University, United States
01/12/2024 – 01/10/2025
SuperFlat.

An Wei
University of Science and Technology Beijing, China
11/12/2024 – 10/12/2025
Quantum treatments of molecule-nanoresonator coupling.

Rodrigo Humberto Aguilera del Toro
Universidad de Valladolid, Spain
12/12/2024 – 12/01/2025
On the quest of new magnetic 2D materials.

Maxim Kagan
Higher School of Economics, Russia
16/12/2024 – 14/01/2025
18/12/2025 – 16/01/2026
Investigation of doping dependence and plasmon poles of the dielectric function of cuprate high-T-c superconductors.

Mattia Bassotti
Università de Perugia, Italy
01/01/2025 – 31/03/2025
Electronic properties of phosphorene superstructures.

Matyas Nachtigall
University of Luxembourg, Luxembourg
01/01/2025 – 28/02/2025
Molecular manipulation with electronic currents.

Vladimir Nazarov
The Hebrew University of Jerusalem, Israel
01/01/2025 – 31/03/2025
Dynamic exchange-correlation effects in plasmonics and transport.

Rubén Miguel Otxoa de Zuazola
Hitachi-Cambridge Laboratory, United Kingdom
01/01/2025 – 30/06/2025
Quantum computing and quantum error correction.

Biyu Song
Beihang University, China
05/01/2025 – 05/01/2026
Topological and electronic properties in 2D TMDs.

Yetli Rosas Guevara
05/01/2025 – 31/05/2025
Bar formation and galaxy formation.

Jochen Eeckhoudt
Vrije Universiteit Brussel, Belgium
08/01/2025 – 08/04/2025
Effect of pressure on electrocyclizations.

Ioannis Kanavos
Institut des Sciences Analytiques et de Physico-Chimie pour l'Environnement et les Matériaux (IPREM), France
10/01/2025 – 10/06/2025
Photoactive metal anticancer metal complexes and their biological targets.

Dmitri Efetov
LMU Munich, Germany
22/01/2025 – 21/02/2025
01/07/2025 – 31/07/2025
Investigation of flat-band physics in 2D moire bilayers and Kagome systems.

Pawel Rejmak
Institute of Physics, Polish Academy of Sciences, Poland
01/02/2025 – 28/02/2025
Computational studies on cement materials.

Joseph Richard Manson
Clemson University, United States
03/02/2025 – 05/03/2025
01/10/2025 – 15/11/2025
Electron-phonon interactions at surfaces.

Sergio Ceravolo
Istituto Nazionale di Fisica Nucleare, Italy
04/02/2025 – 13/03/2025
Detectors for neutrino physics.

Ivano Sarra
Istituto Nazionale di Fisica Nucleare, Italy
04/02/2025 – 13/03/2025
Detectors for neutrino physics.

Antonio Zelaquett Khoury
Universidade Federal Fluminense, Brazil
07/02/2025 – 06/04/2025
Quantum nanophotonics.

María Paula Días Carneiro Miguel
Institute of Chemistry - UNICAMP, Brazil
20/02/2025 – 31/07/2025
Silver(I) and copper(II) metal complexes with Schiff bases derived from mafenide and ethylmafenide: synthesis, characterization and evaluation of antibacterial and antitumour activities.

Francisco Mastrobuono Cordeiro de Almeida
Institute of Chemistry, State University of Campinas (UNICAMP), Brazil
20/02/2025 – 30/07/2025
Metal complexes and nucleobase analogs: a proposal for the treatment of skin squamous cell carcinoma.

Sergio Moles Quintero
Vrije Universiteit Brussel, VUB, Belgium
24/02/2025 – 06/04/2025
Computational characterization of organic compounds with promising optoelectronic properties.

Andrey Borissov
Institut des Sciences Moléculaires d'Orsay - Université Paris-Saclay, France
03/03/2025 – 30/04/2025
Strong field processes in plasmonic gaps.

Vicente Izzo
Universidad Técnica Federico Santa María, Chile
01/04/2025 – 01/07/2025
Computational cosmology.

Igor Karnaukhov
G.V. Kurdyumov Institute for Metal Physics, Ukraine
01/04/2025 – 30/06/2025
Interacting electrons in 1D chains.

Juan Faustino Aguilera Granja
Universidad Autónoma de San Luis Potosí, Mexico
03/04/2025 – 30/04/2025
03/06/2025 – 30/07/2025
Nanostructures made of new components.

Citrin Andoyi
University of Nairobi, Kenya
28/04/2025 – 27/06/2025
PROTOS.

Julia Contreras García
Laboratoire de Chimie Théorique, Sorbonne Université, France
01/05/2025 – 31/05/2025
Non covalent interactions in proteins.

Isabel Yajaira Rojas Martinez
Universidad Nacional Autónoma de México, Mexico
01/05/2025 – 31/05/2025
Disordered plasmonic nanoparticle metasurfaces.

Samara Lourdes Medina Rivero
University of Antwerp, Belgium
05/05/2025 – 08/07/2025
Quantum chemistry calculations for optically-addressable diradical qubits.

Facundo Rodriguez
Instituto de Astronomía Teórica y Experimental (IATE), Argentina
29/05/2025 – 25/06/2025
Alignment and assembly bias in the large-scale structure of the universe.

Juan Pablo Echeverry Enciso
Universidad de Ibagué, Colombia
01/06/2025 – 30/07/2025
Optical properties of TMDCs.

Francisco José García Vidal
Facultad de Ciencias. Universidad Autónoma de Madrid., Spain
01/06/2025 – 31/07/2025
Quantum light-matter interaction.

Elton Santos
University of Edinburgh, United Kingdom
01/06/2025 – 01/09/2025
Correlated materials properties based quantum technologies.

Pavel Jelinek
Institute of Physics of the Czech Academy of Science, Czech Republic
01/06/2025 – 11/07/2025
Magnetism at molecular structure.

Oleg Prezhdo
University of Southern California, United States
01/06/2025 – 31/08/2025
Excited state dynamics in novel nanoscale materials for optoelectronic applications.

Stephanie Louise Yardley
Northumbria University, United Kingdom
01/06/2025 – 01/09/2025
Solar orbiter mission and predicting space weather.

Godfrey Gumbs
Hunter College, City University of New York, United States
03/06/2025 – 09/07/2025
Thermoelectric response of magic-angle twisted bilayer graphene under external fields.

Gabriel Alejandro Cwilich
Yeshiva University, United States
08/06/2025 – 17/10/2025
Network theory applied to cultural networks in the digital humanities.

Alfredo Correa
Lawrence Livermore National Laboratory, United States
15/06/2025 – 15/09/2025
Large scale simulations of electron dynamics.

Reidar Lund
University of Oslo, Norway
16/06/2025 – 16/08/2025
Polymeric nanostructures for drug delivery.

Roubing Lang
Université Paris-Saclay, France
30/06/2025 – 29/08/2025
Potential energy surfaces of compressed molecules.

Luz Stefany Murcia Correa
Universidade Federal de Sao Paulo - UNIFESP, Brazil
30/06/2025 – 28/09/2025
Study of substrates with high potential SERS activity for diagnosis, monitoring and detection of biomolecular substances.

Dmitri Efetov
LMU Munich, Germany
01/07/2025 – 31/07/2025
Investigation of flat-band physics in 2D moire bilayers and Kagome systems.

Diana Gabriela Heredia Pardo
Université de Toulouse, France
01/07/2025 – 31/08/2025
On the validity of the baird rule.

María Ángeles Hernández Vozmediano
Instituto de Ciencia de Materiales de Madrid, CSIC, Spain
01/07/2025 – 31/07/2025
Topological matter.

Nikolay Kabachnik
European XFEL GmbH, Germany
01/07/2025 – 27/09/2025
Theoretical description of time-delay in photoemission from solid surfaces.

Luis Martín Moreno
Instituto de Nanociencia y Materiales de Aragón, Universidad de Zaragoza, Spain
01/07/2025 – 30/07/2025
Theory on nanophotonics.

Jean-François Nierengarten
UMR 7042 (LIMA, University of Strasbourg and CNRS), France
01/07/2025 – 10/08/2025
Dynamic studies of pillar[5]arene-based rotaxanes and molecular machines.

Andrey Vasenko
HSE University, School of Electronic Engineering, Russia
01/07/2025 – 30/09/2025
Photo-excitation dynamics in nanoscale systems.

Rafael Yuste Rojas
Columbia University, United States
01/07/2025 – 31/08/2025
NanoNeuro.

Liang Wu
University of Pennsylvania, United States
05/07/2025 – 02/08/2025
Ultrafast THz photocurrents in chiral and magnetic materials.

María Candela Cerdosino
Instituto de Astronomía Teórica y Experimental (IATE), Argentina
06/07/2025 – 02/10/2025
HOD and SHAMe models with LAEs.

Sara Cabrero Jiménez
Universidad de Granada, Spain
07/07/2025 – 05/09/2025
Positron emission tomography with monolithic crystals.

Ion Gárate Aramberri
Université de Sherbrooke, Canada
07/07/2025 – 21/08/2025
Theory of topological materials.

Ziya Aliyev
Institute of Physics, Ministry of Science and Education of Azerbaijan, Azerbaijan
10/07/2025 – 10/08/2025
Crystal growth and materials physics of magnetic quantum materials.

Vito Despoja
Institute of Physics, University of Zagreb, Croatia
31/07/2025 – 01/10/2025
Plasmon-photon-phonon coupling in 2D materials.

Gernot Frenking
Pilipps Universität Marburg, Germany
01/08/2025 – 31/10/2025
Chemical bonding.

Run Long
Beijing Normal University, China
01/08/2025 – 30/08/2025
Strong spin-orbit interaction effects in topological materials and in chemistry of complex perovskites.

Gabriel Pimenta Martins
Universidade Federal de Minas Gerais, Brazil
01/08/2025 – 31/08/2025
Quantum entanglement in two-dimensional systems.

Dadong Yang
Zhejiang University, China
01/08/2025 – 30/08/2025
Theoretical studies on soft matter physics.

Arthur Ernst
Johannes Kepler University of Linz, Austria
06/08/2025 – 05/09/2025
Electronic and magnetic properties of 2D materials.

Oleksiy Roslyak
Fordham University, United States
08/08/2025 – 31/10/2025
Exchange and correlation energies: application to Dirac materials with isotropic and anisotropic energy bands.

Frank Scheffold
University of Fribourg, Switzerland
09/08/2025 – 17/09/2025
Scattering and transport properties of light for strongly resonant dielectrics.

Ceferino López Fernández
Institute of Materials Science of Madrid, Spain
01/09/2025 – 30/09/2025
Disorder photonics.

Leonid Sandratskii
Charles University, Czech Republic
01/09/2025 – 30/11/2025
Ab initio calculation and spin-space-symmetry analysis of magnetic excitations in 2D materials.

Raúl Bombín Escudero
Institute des Sciences Moléculaires, Université de Bordeaux, France
01/09/2025 – 31/07/2026
Investigation of quantum mechanical effects in H atom scattering from tungsten surface.

Juan Sánchez Camacho
Universidad del País Vasco / Euskal Herriko Unibertsitatea (vEHU)
01/09/2025 – 31/12/2025
Research of flavin metal complexes photochemistry.

Diego Antonio Villalba González
Facultad de Ciencias, Universidad Nacional Autónoma de México, Mexico
01/09/2025 – 30/11/2025
Cosmology and machine learning.

Kateryna Domina
01/09/2025 – 12/12/2025
Anomalous wave phenomena in 2D materials.

Ruijie Xue
Peking University, China
02/09/2025 – 02/02/2026
Machine learning approach for high-Tc superconductor discovery.

Antonio Santacesaria
Sapienza Università di Roma, Italy
15/09/2025 – 15/03/2026
Exotic superconductivity and correlation in quantum materials.

Kyosuke Imai
Institute of Science Tokyo, Japan
16/09/2025 – 15/03/2026
Development of catalysis schemes for therapy.

Julio Alonso Martín
Universidad de Valladolid, Spain
01/10/2025 – 31/10/2025
Reactions at the surface of layered materials.

Aurelian Loirette Pelous
Institut d'Optique, France
01/10/2025 – 31/10/2025
Vibrational and electronic spectroscopy of molecules and metals.

Hicham Mahdjoub-Araibi
Hassiba Benbouali University of Chlef, Algeria
01/10/2025 – 30/10/2025
Electron delocalization and aromaticity.

Soo-hyon Phark
Institute for Basic Science, Center for Quantum Nanoscience, Korea, South
01/10/2025 – 31/10/2025
Electron spin resonance with the scanning tunneling microscope.

Joseph Sink
University of Iowa, United States
01/10/2025 – 05/11/2025
Simulation of Majorana zero edge states for topological quantum computation.

Raffaele Resta
CNR-IOM Istituto Officina dei Materiali, Italy
01/10/2025 – 31/12/2025
Geometry and topology in condensed matter.

Kirill Voronin
01/10/2025 – 31/12/2025
Nanophotonics with van der Waals crystals.

Valerii Chuiko
McMaster University, Canada
13/10/2025 – 31/12/2025
Toward accurate bond breaking: revising natural orbital functionals in RDMFT.

Gotthard Seifert
Technische Universität Dresden, Germany
15/10/2025 – 15/11/2025
Electronic excitations in surfaces and nanostructures.

Frederic Rauch
Institute of Physics at the TU Ilmenau, Germany
16/10/2025 – 31/01/2026
Nanoelectronics: theory and simulation.

Luis Alberto Montero Cabrera
Universidad de La Habana, Cuba
31/10/2025 – 22/12/2025
Molecular excitons of very big systems.

Leila Pujal Gomez
Universitat de Girona, Spain
01/11/2025 – 31/12/2025
Theoretical evaluation of molecular and spectroscopic properties.

Short visits

Alessio Spurio Mancini
Royal Holloway, University of London, United Kingdom
12/01/2025 – 15/01/2025
Cosmology/Astrophysics.

Miquel Llunell i Marí
Universitat de Barcelona, Spain
13/01/2025 – 17/01/2025
Improvement of an Extended Hückel code for applications in continuous symmetry analysis of molecular systems.

Quansheng Wu
The Institute of Physics, Chinese Academy of Sciences, China
18/01/2025 – 25/01/2025
Topological insulators.

Tiago Costa
Newcastle University, United Kingdom
20/01/2025 – 26/01/2025
Simulations of quasars.

Nils Hoyer
Max Planck Institute for Astronomy, Germany
20/01/2025 – 24/01/2025
25/05/2025 – 31/05/2025
L-Galaxies code development.

Ilaria Maccari
ETH Zürich, Switzerland
22/01/2025 – 25/01/2025
Exotic superconductivity and correlation in quantum materials.

Augustin Davignon
Institut Quantique, Université de Sherbrooke, Canada
25/01/2025 – 08/02/2025
Topological materials.

Théo Nathaniel Dionne
Institut Quantique, Université de Sherbrooke, Canada
25/01/2025 – 08/02/2025
Topological Materials.

Clara Murgui Gálvez
CERN, Switzerland
05/02/2025 – 07/02/2025
Atom interferometers as particle detectors.

Shinjae Nam
Regensburg Universität, Germany
10/02/2025 – 12/02/2025
Exploring in-plane interactions beside an adsorbed molecule.

Lorenz Huber
Institut für Physik, Austria
17/02/2025 – 28/02/2025
Non-local nanophotonics.

Diana Navas
CIEMAT, Spain
19/02/2025 – 21/02/2025
Detectors for neutrino physics.

Yonatan Sivan
Ben-Gurion University, Israel
23/02/2025 – 26/02/2025
Nanophotonics.

Susanne Leitherer Stenger
University of Copenhagen, Denmark
26/02/2025 – 01/03/2025
Electron transport through molecules and 2D nanostructures.

Giorgio Benedek
Università di Milano-Bicocca, Italy
03/03/2025 – 10/03/2025
09/10/2025 – 24/10/2025
Surface dynamics and electron phonon interaction.

Salvador Miret Artés
Instituto de Física Fundamental, Spain
03/03/2025 – 07/03/2025
20/10/2025 – 25/10/2025
Electron phonon interaction.

Giovanni Aricò
Istituto Nazionale di Fisica Nucleare, Italy
10/03/2025 – 17/03/2025
07/07/2025 – 24/07/2025
BACCO.

William Coulton
Kavli Institute for Cosmology, University of Cambridge, United Kingdom
11/03/2025 – 13/03/2025
Tracing out cosmic gas.

Fernando Rull Pérez
Espectroscopia Raman-IR en Cosmogeoquímica y Astrobiología, Universidad de Valladolid, Spain
11/03/2025 – 14/03/2025
Raman and infrared spectroscopy of crystals and minerals.

Jorge Vago
European Space Agency, Netherlands
11/03/2025 – 14/03/2025
Patterns & Miller-Urey experiments.

Cindrilla Chumduri
Aarhus University, Denmark
12/03/2025 – 14/03/2025
Antiviral and antibacterial agents.

Valentina Dell'Oste
Health and Pediatric Sciences, University of Turin, Italy
12/03/2025 – 14/03/2025
Antiviral and antibacterial agents.

Magdalena Rafecas López
Institute of Medical Engineering (IMT) University of Lübeck, Germany
14/03/2025 – 16/03/2025
Nuclear imaging.

Jens Oliver Stücker
University of Vienna, Austria
17/03/2025 – 21/03/2025
02/11/2025 – 08/11/2025
Cosmology.

Andrew Patton Weber
University of Missouri-Kansas City, United States
21/03/2025 – 30/03/2025
Surface science for plasmonic materials.

Weiguang Cui
Universidad Autónoma de Madrid, Spain
22/03/2025 – 26/03/2025
A deep-learning approach to infer cluster masses.

Sheref Mansy
University of Trento, Italy
23/03/2025 – 26/03/2025
Synergy.

Sabine Müller
University of Greifswald, Institute of Biochemistry, Germany
23/03/2025 – 26/03/2025
Synergy.

Mikolaj Kajetan Schmidt
Macquarie University, Australia
23/03/2025 – 01/04/2025
Cavity-quantum electrodynamics methods for plasmon-enhanced molecular spectroscopy.

Manfred Mark
Universität Innsbruck, Institut für Experimentalphysik, Austria
31/03/2025 – 04/04/2025
Novel quantum phases in ultracold dipolar gases.

Alicia Pérez Rodrigo
Universidad Complutense de Madrid, Spain
07/04/2025 – 08/04/2025
Forecasting constraints on Neutrino Masses from galaxy clustering data.

Rodrigo Humberto Aguilera del Toro
Universidad de Valladolid, Spain
10/04/2025 – 23/04/2025
On the quest of new magnetic 2D materials.

Marcos Pellejero Ibáñez
University of Edinburgh, Royal Observatory of Edinburgh, United Kingdom
24/04/2025 – 01/05/2025
Hybrid bispectrum computation from the BACCO model.

Gotthard Seifert
Technische Universität Dresden, Germany
04/05/2025 – 08/05/2025
Electronic excitations in surfaces and nanostructures.

Liang Wu
University of Pennsylvania, United States
08/05/2025 – 10/05/2025
Ultrafast THz photocurrents in chiral and magnetic materials.

Liancheng Ji
Institute for Nuclear Physics, Germany
11/05/2025 – 26/05/2025
Development of the GanESS detector.

James De Yoreo
Pacific Northwest National Laboratory, United States
12/05/2025 – 15/05/2025
In situ studies of hierarchical nucleation pathways in silicate and carbonate systems.

Maarten Goesten
Aarhus University, Denmark
12/05/2025 – 15/05/2025
Diradicals and electron-phonon coupling.

Glenn Wagner
ETH Zurich, Switzerland
18/05/2025 – 21/05/2025
Fractional topological insulators in twisted MoTe2.

Kate Storey-Fisher
Stanford University / KIPAC, United States
24/05/2025 – 16/06/2025
Simulation-based inference for galaxy clustering.

Mathilde Pinon
CEA, Irfu, France
25/05/2025 – 28/05/2025
Large-scale structure of the universe.

Natercia Barbosa Gonçalves
University of Geneva, Switzerland
26/05/2025 – 30/05/2025
Study on calcium carbonate gel morphology.

Mikhail Otrokov Manokhin
Instituto de Nanociencia y Materiales de Aragón, Spain
26/05/2025 – 30/05/2025
Magnetism, electronic properties and epitaxial growth of monolayers of non-centrosymmetric two-dimensional van der Waals materials.

Michele Parrinello
Fondazione Istituto Italiano di Tecnologia, Italy
26/05/2025 – 30/05/2025
Collaboration on applying a new simulation methodology for studying crystal nucleation.

Michele Grossi
CERN, Switzerland
27/05/2025 – 29/05/2025
Quantum computing.

Yoann Olivier
University of Namur, Belgium
27/05/2025 – 29/05/2025
Electronic structure in molecular photophysics and optoelectronics.

Daniele Pascuale Spinoso
Como Lake Center for AstroPhysics, CLAP, University of Insubria, Italy
27/05/2025 – 05/06/2025
Formation and evolution of super-massive BHs in the L-Galaxies semi-analytical model.

Izaskun Jiménez Serra
Centro de Astrobiología (CAB), CSIC-INTA, Spain
28/05/2025 – 01/06/2025
Donostia is Science.

Ahmed Abouelkomsan
Massachusetts Institute of Technology, United States
01/06/2025 – 06/06/2025
New aspects of fractionalization in Chern bands.

Diego Blas Temino
IFAE, Spain
05/06/2025 – 06/06/2025
Nature of dark matter.

Pedro Paulo Corbi
University of Campinas-UNICAMP, Brazil
05/06/2025 – 07/06/2025
Metal complexes and nucleobase analogs: a proposal for the treatment of skin squamous cell carcinoma.

Mokhtaria Belhadj
University of Mostaganem, Algeria
09/06/2025 – 16/06/2025
Nanophotonics of 2D materials and nanooptics of van der Waals crystals.

John Waiton
University of Manchester, United Kingdom
09/06/2025 – 12/06/2025
High energy calibration.

Chun Ning Lau
The Ohio State University, United States
10/06/2025 – 14/06/2025
Two dimensional materials.

Moritz Fischer
Ludwig Maximilian University of Munich, Germany
23/06/2025 – 03/07/2025
Self-interacting dark matter.

Jose Luis Bernal Mera
Instituto de Física de Cantabria, Spain
25/06/2025 – 27/06/2025
Cosmology and the large-scale structure of the universe.

Igor Aharonovich
University of Technology Sydney, Australia
28/06/2025 – 02/07/2025
Quantum optics with single photon emitters.

Alexander Khanikaev
University of Central Florida, United States
29/06/2025 – 21/07/2025
Topological photonics.

Simon Mun
Gwangju Institute of Science and Technology, Korea, South
30/06/2025 – 05/07/2025
Surface science using ambient-pressure XPS

Elizabeth Martín Jefremovas
University of Luxembourg, Luxembourg
03/07/2025 – 04/07/2025
Nanoneuro.

Giulia Despali
University of Bologna, Italy
09/07/2025 – 12/07/2025
Cosmological structure formation.

Javier García de Abajo
ICFO-Institut de Ciencies Fotoniques, Spain
10/07/2025 – 17/07/2025
15/09/2025 – 23/09/2025
Plasmonics in atomically thin crystalline silver films.

Marc Vila Tusell
Lawrence Berkeley National Laboratory, United States
14/07/2025 – 16/07/2025
Altermagnets.

Jerzy Cioslowski
University of Szczecin, Poland
15/07/2025 – 29/07/2025
Natural densities and their applications to understand the electron correlation problem.

Min Seok Jang
Korea Advanced Institute of Science and Technology (KAIST), Korea, South
16/07/2025 – 21/07/2025
Nano optics of van der Waals crystals.

Wilfred Tysoe
University of Wisconsin-Milwaukee, United States
20/07/2025 – 23/07/2025
Mechanochemistry.

David Barton
Northwestern University, United States
27/07/2025 – 02/08/2025
Nanoscale light matter interactions.

Jiangping Hu
Institute of Physics, Chinese Academy of Sciences, China
29/07/2025 – 14/08/2025
High temperature superconductor and topological physics.

Adiel Stern
Weizmann Institute of Science, Israel
03/08/2025 – 17/08/2025
Flat bands in multi-layer systems.

Philip Phillips
University of Illinois at Urbana-Champaign, United States
13/08/2025 – 16/08/2025
Two dimensional materials.

Shuheng Pan
Chinese Academy of Sciences, China
14/08/2025 – 15/08/2025
Topological superconductivity.

Jörg Fink
Leibnitz Institute for Solid State and Materials Research, Germany
19/08/2025 – 23/08/2025
Plasmons in solids studied by electron energy-loss spectroscopy.

Xianpeng Zhang
Beijing Institute of Technology, China
19/08/2025 – 06/09/2025
Spintronics in superconductors and low-dimensional materials.

Inés Fernández Menéndez
Universidad de Barcelona, Spain
27/08/2025 – 12/09/2025
Experimental particle physics.

Sten Delos
Carnegie Observatories, United States
02/09/2025 – 06/09/2025
Modeling and detection of cosmic structure at subgalactic scales.

Marika Asgari
Newcastle University, United Kingdom
08/09/2025 – 11/09/2025
Computational cosmology.

Daiki Morita
Research center for neutrino science, Tohoku University, Japan
08/09/2025 – 05/10/2025
NEXT.

Simone Bianco
Altos Labs - Institute of Computation, United States
09/09/2025 – 19/09/2025
Nanoneuro.

Maxime Durelle
University of Leeds, United Kingdom
09/09/2025 – 12/09/2025
Mineral self-organization and the origin of life.

Sara Capponi
IBM Almaden Research Center, United States
10/09/2025 – 19/09/2025
Quantum computing: from fundamentals to applications.

Haibo Yu
University of California, Riverside, United States
13/09/2025 – 20/09/2025
Simulating self-interacting dark matter.

Ulrich Höfer
Philipps-Universität Marburg, Germany
15/09/2025 – 20/09/2025
Electron dynamics at interfaces.

Mohammed Loukili
Donostia International Physics Center
15/09/2025 – 24/10/2025
High-pressure organic chemistry.

Bart Kahr
New York University, United States
19/09/2025 – 30/09/2025
Crystal morphology.

Jorge Reñe Espinosa
Universidad Complutense de Madrid, Spain
24/09/2025 – 26/09/2025
Conformational dynamics of biomolecules.

Dante Paz García
Instituto de Astronomía Teórica y Experimental, Argentina
25/09/2025 – 09/10/2025
Galaxy bias on cosmic voids.

Lukasz Plucinski
Peter Gruenberg Institute PGI-6
Forschungszentrum Jülich GmbH, Germany
28/09/2025 – 04/10/2025
Computational solid state spectroscopy.

Eduardo Bañados
Max Planck Institute for Astronomy, Germany
01/10/2025 – 06/10/2025
Supermassive black holes.

Elisabetta Baracchini
Gran Sasso Science Institute, Italy
01/10/2025 – 03/10/2025
NEXT.

Kristina Kislyakova
University of Vienna, Austria
01/10/2025 – 03/10/2025
Stellar population studies.

Kuo Li
Center for High Pressure Science and Technology Advanced Research, China
05/10/2025 – 09/10/2025
Mechanisms of nanothread formation reactions.

Monika Blaimschein
University Linz, Austria
22/10/2025 – 25/10/2025
Electron-boson interactions in solids. Insights from experiment and theory.

Claudia Draxl
Humboldt-Universität zu Berlin, Germany
22/10/2025 – 25/10/2025
Electron-boson interactions in solids. Insights from experiment and theory.

Arthur Ernst
University Linz, Germany
22/10/2025 – 25/10/2025
Electron-boson interactions in solids. Insights from experiment and theory.

Miguel Marqués
Ruhr University Bochum, Germany
22/10/2025 – 24/10/2025
Electron-boson interactions in solids. Insights from experiment and theory.

Carlos García García
University of Oxford, United Kingdom
26/10/2025 – 31/10/2025
Observational constraints of the cosmological model.

Jens Bardarson
KTH Royal Institute of Technology, Sweden
28/10/2025 – 14/11/2025
Parastatistics.

Alexander Roskill
University of Oxford, United Kingdom
31/10/2025 – 22/11/2025
Bispectrum emulator.

Katsunori Tanaka
Institute of Science Tokyo School of Materials and Chemical Technology and Riken, Japan
09/11/2025 – 11/11/2025
Development of catalysis schemes in vivo for therapy.

Ylva Götberg
Institute of Science and Technology Austria (ISTA), Austria
10/11/2025 – 13/11/2025
The fate of planetary systems around evolving stars.

Santiago Torres Rodriguez
Institute of Science and Technology Austria (ISTA), Austria
10/11/2025 – 13/11/2025
The fate of planetary systems around evolving stars.

Simone Vinciguerra
Laboratoire D'Astrophysique De Marseille (LAM), France
12/11/2025 – 15/11/2025
Weak lensing higher order statistics in Euclid.

Giacomo Franceschetto
ICFO-Institut de Ciències Fotòniques, Spain
17/11/2025 – 21/11/2025
Quantum reservoir computing.

Pere Mujal Torreblanca
ICFO-Institut de Ciències Fotòniques, Spain
17/11/2025 – 20/11/2025
Quantum reservoir computing.

Katsuo Tsukamoto
Tohoku University/Nagoya University, Japan
22/11/2025 – 28/11/2025
PROTOS.

Laura Gómez Paz
Institut Néel, CNRS, France
24/11/2025 – 30/11/2025
Topology in disordered bismuth.

Talat Shahnaz Rahman
University of Central Florida, United States
01/12/2025 – 23/12/2025
Computational modelling of functional materials for energy applications.

Borja Anguiano
CEFCA, Spain
02/12/2025 – 05/12/2025
J-PLUS, J-PAS.

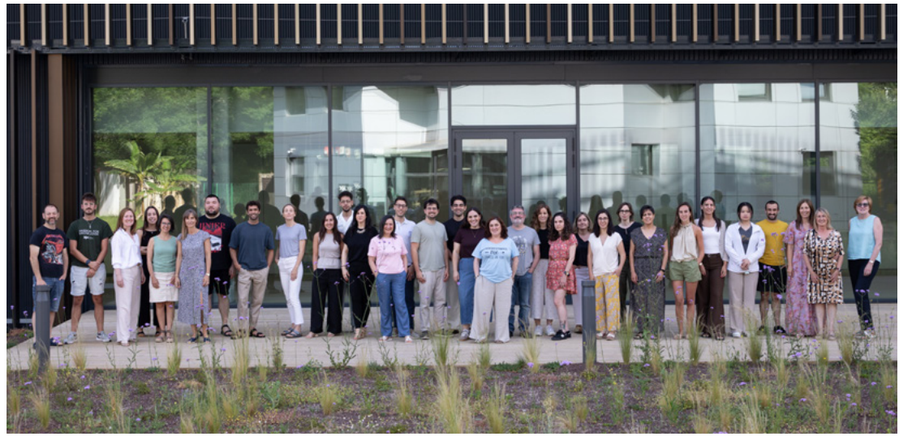
Chang Hoon Hahn
University of Texas at Austin, United States
03/12/2025 – 05/12/2025
Inference problems in cosmology.

Manoj Joshi
Institute for quantum optics and quantum information, Austria
10/12/2025 – 14/12/2025
Electron dynamics.

Lata Kharkwal
SISSA (International school for advanced studies), Italy
10/12/2025 – 14/12/2025
Electron dynamics.

Yijie Wang
International Center for Quantum Materials, School of Physics, Peking University, China
12/12/2025 – 17/12/2025
Strongly correlated quantum states in flat bands.

Administration and Services



General Management

Ricardo Díez Muiño
Director

Management

Arantzazu García Lekue
Director of Strategic Projects

Nora González Lacunza
Head of Outreach & Communication

Olatz Leis Esnaola
Head of Finance & Accounting and R+D+i Project Management

Txomin Romero Asturiano
Head of Supercomputing Center

Beatriz Suescun Rodríguez
Head of Administration, Human Resources and Legal Area

Administration

Karmela Alonso Arreche
Organization of Scientific Events and Administration

María del Mar Álvarez San Martín
Human Resources and Administration

Xabier De la Torre Arostegui
Public Procurements and Administration

Amaia Etxaburu Munduate
President's Assistant

Leire Herranz Erquicia
Finance & Accounting and Administration

Lorena Ibaiondo Basañez
Occupational Risk Prevention
As of 23/06/2025

Natasha Nedashkivska
Finance & Accounting and Administration

Yannick Sáenz Augusto
Finance & Accounting and Administration

Laura Sancho Ortega
Human Resources and Administration

María Tarazona Lorente
Public Procurements and Administration

Ainara Vélez Ara
Public Procurements and Administration

Jon Viedma García
Public Procurements and Administration
End of contract: 30/09/2025

Maintenance

Ekain Ugalde Goldarazena

Jarvin Baca Sánchez

Outreach and Communication

Amaia Arregui Buldain

Itxaso Azcune Tolosa

Valentina Rodríguez Castro

Marta Vega de Seoane López de Goicoechea

R&D+i Projects Management

Mikel Abadía Gutiérrez

Iñigo Díez García

Marina Santos Ovejero

Jone Zabaleta Llorens

Supercomputing Center

José Caballero Tobajas
HPC Resources Administration

Aitor Echeverría Ibarbia
HPC Infrastructure Maintenance

Luz Fernández Vicente
Help Desk & Microinformatics

Belén Isla Rodríguez
HPC Services Design

Diego Lasa Goicuria
HPC Software & Applications
As of 12/03/2025

Carmen Martín Pulpón
Security, Web & Networks

Iker Ortiz de Luzuriaga
HPC Resources Administration

Carlos Pérez Miguel
HPC Software & Applications

Youssef Raoudi Zakir
Help Desk & Microinformatics

Unai Sainz de la Maza Gamboa
Computing System Management
End of contract: 26/01/2025

Seminars

1 **DIPC Community Seminar: ten years developing electronic structure methods at the DIPC**
16/01/2025
Eduard Matito Gras
DIPC, Donostia / San Sebastián, Spain

2 **Quantitatively calculate the magnetoresistance and Hall effects of real materials from first principles methodology**
21/01/2025
Quan Sheng Wu
Chinese Academy of Sciences, China

3 **Role of topological phase excitations in two-dimensional and multicomponent superconductors**
23/01/2025
Ilaria Maccari
ETH Zürich, Switzerland

4 **Strongly correlated topological flat bands in the novel class of moiré materials**
23/01/2025
Dmitri K. Efetov
Ludwig Maximilians Universität, Germany

5 **Atom interferometers as particle detectors**
06/02/2025
Clara Murgui Gálvez
CERN, Switzerland

6 **Quantum computing with silicon technology**
07/02/2025
M. Fernando González Zalba
CIC nanoGUNE & Quantum Motion, Donostia / San Sebastián, Spain

7 **Friction in a single - atom resolution**
11/02/2025
Shinjae Nam
University of Regensburg, Germany

8 **Olympiad mathematics for children: How and Why?**
12/02/2025
Stepan Tsirkin
CFM, Donostia / San Sebastián, Spain

9 **Exploring quantum phenomena with electron and photon simulators**
13/02/2025
Dario Bercioux
DIPC & Ikerbasque, Donostia / San Sebastián, Spain

10 **Computational studies on blue and red ultramarines**
14/02/2025
Paweł Rejmak
Institute of Physics, Polish Academy of Sciences, Poland

11 **Exploring the quantum frontier: from HEP to condensed matter with quantum computing**
19/02/2025
Enrique Rico Ortega
UPV-EHU / Ikerbasque / CERN-TH, Donostia / San Sebastián, Spain

12 **Neutrino detection and imaging in opaque media**
20/02/2025
Diana Navas
CIEMAT, Donostia / San Sebastián, Spain

13 **"Hot" carriers in nanostructures - when they matter, and when they do not...**
24/02/2025
Yonatan Sivan
Ben-Gurion University, Israel

14 **News from the mediterranean Abyss: the neutrino event KM3-230213A**
24/02/2025
Alfonso Andres García Soto
IFIC, Spain

15 **Externally modulated electron transport through molecules and nanojunctions**
27/02/2025
Susanne Leitherer
University of Copenhagen, Denmark

16 **Spin dynamics and coupling in the f-block (4)**
07/03/2025
Nicholas Chilton
The Australian National University, Australia

17 **Searching for Signs of Life on Mars with Rosalind Franklin**
12/03/2025
Jorge Vago
European Space Agency, The Netherlands

18 **Patient-Derived Organoids for Infections, Disease Modeling, and Drug Testing**
13/03/2025
Cindrilla Chumduri
Aarhus University, Denmarc

19 **Exploiting Lipid Metabolism By Hsv-1: A Challenge to Rethink New Therapies for Alzheimer`s Disease**
13/03/2025
Valentina Dell'Oste
University of Turin, Italy

20 **Devices, models and algorithms for nuclear imaging and beyond**
14/03/2025
Magdalena Rafecas López
Universität zu Lübeck, Germany

21 **Quantum centric HPC in action: tensor-network enhanced multi-product formulas for Hamiltonian time evolution**
21/03/2025
Sergiy Zhuk
IBM, Ireland

22 **Studying galaxy groups and clusters with HYENAS and The300**
24/03/2025
Weiguang Cui
Universidad Autónoma de Madrid, Spain

23 **Exploring the origins of life: from prebiotic chemistry to RNA world dynamics**
24/03/2025
Sheref Mansy & Sabine Müller
University of Trento & University of Greifswald, Italy & Germany

24 **The Pulsar timing array results: a year after**
25/03/2025
Mikel Falxa
Università degli Studi di Milano-Bicocca, Italy

25 **DIPC Community Seminar: from ferroelectric metals to TMDs: a trip through electronic phases**
27/03/2025
Maria N Gastiasoro
DIPC, Donostia / San Sebastián, Spain

26 **Surface science of plasmonic materials**
28/03/2025
Andrew P. Weber
University of Missouri-Kansas City, USA

27 **Kimika Teorikoa Seminar: redefining the dielectric response of nanoconfined liquids: insights from water**
04/04/2025
Jon Zubeltzu Sesé
UPV/EHU & DIPC, Donostia / San Sebastián, Spain

28 **Quantum computing with silicon technology**
04/04/2025
Miguel Fernando Gonzalez Zalba
CIC nanoGUNE, Donostia / San Sebastián, Spain

29 **How Quantum Mechanics turned out not to be a Theory of Everything (1925-1932)**
04/04/2025
Alexander Blum
Munich Center for Mathematical Philosophy / MPI for the History of Science, Germany

30 **Quantum-centric supercomputing: a new perspective on computing**
11/04/2025
Antonio Corcoles
IBM, USA

31 **Kimika Teorikoa Seminar: Analysis of Local Descriptors of Dynamic and Nondynamic Correlation**
16/04/2025
Javier Dominguez Calvo
DIPC, Donostia / San Sebastián, Spain

32 **Kimika Teorikoa Seminar: Addressing chemical effects in Surface-Enhanced Raman Scattering**
30/04/2025
Roberto Álvarez Boto
DIPC, Donostia / San Sebastián, Spain

33 **Bridging scales in materials simulations - Quantum versus classical simulations**
07/05/2025
Gotthard Seifert
TU Dresden, Germany

34 **Novel nonlinear optical response in 2D antiferromagnets**
09/05/2025
Liang Wu
University of Pennsylvania, USA

35 **Quantum Molecular Tectonics**
14/05/2025
Maarten Goesten
Aarhus University, Denmark

36 **Kimika Teorikoa Seminar: POL-KT: Applying theoretical chemistry in polymer science**
16/05/2025
Mikel Irigoien
POLYMAT - UPV/EHU, Donostia / San Sebastián, Spain

37 **Recent advances in UV-vis spectroscopy of turbid solutions, and a brief overview of our activities in nano-optics**
16/05/2025
Baptiste Augué
Victoria University of Wellington, New Zealand

38 **Fractional topological insulators in twisted MoTe2**
19/05/2025
Glenn Wagner
ETH Zürich, Switzerland

39 **Entre el Arte y la Ciencia (11)**
23/05/2025
Juan Gonzalo Muga
EHU Quantum Center (UPV/EHU), Instituto de Estudios Avanzados en Física Atómica, Molecular y Fotónica (IUDEA), Univ. de la Laguna, Spain

40 **The weird and wonderful world of catalysis**
27/05/2025
Michele Parrinello
Italian Institute of Technology, Italy

41 **On the role of spin momentum in light-emitting and photochemical applications: A computational perspective**
27/05/2025
Yoann Olivier
University of Namur, Belgium

42 **Gravitational Wave Signals from Cosmic Strings**
28/05/2025
José Juan Blanco-Pillado
Ikerbasque & EHU Quantum Center, UPV/EHU, Donostia / San Sebastián, Spain

43 **Quantum Machine Learning Integration in the High Energy Physics Pipeline**
28/05/2025
Michele Grossi
CERN, Switzerland
Towards prebiotic chemistry in the interstellar medium
30/05/2025
Izaskun Jiménez-Serra
Center of Astrobiology, INTA-CSIC, Spain

44 **DIPC Community Seminar: Black Holes in Stellar Clusters**
05/06/2025
Nate Bastian
DIPC, Donostia / San Sebastián, Spain

45 **Kimika Teorikoa Seminar: Proton Transfer in CAGE 1:2 via Neural Network-based Force Field Simulations**
06/06/2025
Mikel Loizate
UPV/EHU, Donostia / San Sebastián, Spain

46 **Searching for gravitational waves in new frequency bands**
06/06/2025
Diego Blas
The Institute for High Energy Physics of Barcelona, Spain

47 **New Aspects of Fractionalization in Chern bands**
06/06/2025
Ahmed Abouelkomsan
Massachusetts Institute of Technology, USA

48 **Flat Bands in Flatlands: Quantum Transport in 2D Superconductors and Semiconductors**
11/06/2025
Jeanie Lau
Ohio State University, USA

49 **Kimika Teorikoa Seminar: Mechanistic Insights into Ligand Photodissociation in Ru(II) Complexes for PACT Applications**
13/06/2025
Stefano Scoditti
DIPC, Donostia / San Sebastián, Spain

50 **DIPC Community Seminar: Le Tour de nonlinear optical processes**
19/06/2025
Julen Ibañez Azpiroz
CFM, Donostia / San Sebastián, Spain

51 **Enabling the first-principles modelling of electrochemical interfaces at the molecular level**
25/06/2025
Clotilde Cucinotta
Imperial College London, UK

52 **Kimika Teorikoa Seminar: rick-tracking proteins with molecular modelling**
04/07/2025
Dulce Guzmán Ocampo
DIPC, Donostia / San Sebastián, Spain

53 **Topological photonics for ultimate control of classical and quantum light**
09/07/2025
Alex Khanikaev
CREOL - University of Central Florida, USA

54 **Scanning time-resolved optical studies on Kagome superconductors**
10/07/2025
Liang Wu
University of Pennsylvania, USA

55 **Challenges to the CDM model and the AIDA-TNG simulations**
11/07/2025
Giulia Despali
University of Bologna, Italy

56 **Electromagnetic responses of Excitonic Insulators**
11/07/2025
Xi Dai
Hong Kong University of Science and Technology, China

57 **Site-specific characterization of Ho atoms on MgO**
14/07/2025
Andres Pinar Solé
Center for Quantum Nanoscience, Korea

58 **Altermagnetic materials and how you can also design them (14)**
15/07/2025
Marc Vila Tusell
Lawrence Berkeley National Laboratory, USA

59 **Science meets capital: BeAble capital and BIC Gipuzkoa - How to make technology transfer a reality**
16/07/2025
Cruz Mendigutia, Ainhoa Aizpuru
BeAble Capital, BIC Gipuzkoa, Donostia / San Sebastián, Spain

60 **Ultrafast and quantum photonics with free electrons**
16/07/2025
Javier García de Abajo
Institut de Ciencies Fotoniques, Spain

61 **Natural Orbitals: old concepts, new developments**
17/07/2025
Jerzy Cioslowski
University of Szczecin, Poland

62 **Plasmonic waveguides - a step closer to integrated nonlinear nanophotonics architectures**
18/07/2025
Stefano Palomba
University of Sydney, Australia

63 **Mid-Infrared polaritonics in two-dimensional materials**
18/07/2025
Min Seok Jang
Korea Advanced Institute of Science and Technology, South Korea

64 **The molecular origins of mechanical processes: from reactions to glass formation**
22/07/2025
Wilfred Tysoe
University of Wisconsin-Milwaukee, USA

65 **Round table on quantum technologies in the framework of the National Meeting of Physics Students (ENEF) 2025**
23/07/2025
Javier Aizpurua BasQ, Ikerbasque, DIPC & Jorge Casanova, EHU & Josu Etxezarreta, TECNUN & Eduardo Jacob, EHU, Moderated by Aran García-Lekue, Ikerbasque, DIPC, Donostia / San Sebastián, Spain

66 **Spin-orbitronics in the nanoworld: from all-electrical detection of skyrmions to kagomerization**
24/07/2025
Samir Lounis
Martin Luther University Halle-Wittenberg, Germany

67 **Raman tensor for two-dimensional massive Dirac fermions**
28/07/2025
Ion Gárate Aramberri
Université de Sherbrooke, Canada

68 **Resonant electro-optic metasurfaces and integrated photonics: Shaping light in space and time**
29/07/2025
David Barton
Northwestern University, USA

69 **Seminar-I of internship students at DIPC**
30/07/2025
Internship Students DIPC, Donostia / San Sebastián, Spain

70 **Cracking the essential coordination structure of the iron - based superconductor**
13/08/2025
Shuheng Pan
University of Houston & Institute of Physics, Chinese Academy of Sciences, USA, China

71 **1/4 is the new 1/2: emergent mottness at quarter filling in the Haldane and KM/BHZ models**
14/08/2025
Philip Phillips
University of Illinois at Urbana Champaign, USA

72 **Acoustic and optical plasmon excitations in cuprate and ruthenate "strange metals" studied by EELS, RIXS, and optical spectroscopy**
21/08/2025
Jörg Fink
Leibniz Institute for Solid State and Materials Research, Dresden, Germany

73 **Microscopic theory and applications of magnetoresistance effects in mesoscopic ferromagnets and altermagnets**
26/08/2025
Xian-Peng Zhang
Beijing Institute of Technology, China

74 **Seminar-II of internship students at DIPC**
29/08/2025
Internship Students DIPC, Donostia / San Sebastián, Spain

75 **A Physics-based Model Reveals Mechanisms of Epigenetic Memory and Reprogramming**
11/09/2025
Simone Bianco
Altos Labs - Institute of Computation, USA

76 **Long-timescale molecular simulations: from cement to supercapacitors**
17/09/2025
Romain Dupuis
LMGC, CNRS, Montpellier University, France

77 **Unifying calibration and reconstruction for optical particle detectors using differentiable Simulations**
18/09/2025
César Jesús-Valls
CERN, Switzerland

78 **Kimika Teorikoa Seminar: number of bonds in diatomic molecules from excited state potential energy** curves
19/09/2025
Ishita Bhattacharjee
DIPC, Donostia / San Sebastián, Spain

79 **Genetic takeover: my Journey with a book on the mineral origins of life**
22/09/2025
Bart Kahr
New York University, USA

80 **Multiscale modelling of liquid-liquid and liquid-solid transitions in biomolecular condensates (4)**
26/09/2025
Jorge Reñe Espinosa
Universidad Complutense de Madrid, Spain

81 **Towards understanding habitable exoplanets: where theory meets observations**
02/10/2025
Kristina Kislyakova
University of Vienna, Austria

82 **Recoil Imaging Time Projection Chamber: a versatile experimental approach for multiple physics cases application**
02/10/2025
Elisabetta Baracchini
Gran Sasso Science Institute, Italy

83 **Quantum Computing and Applications**
03/10/2025
Mikel Sanz
NQUIRE Center, UPV/EHU, Spain

84 **Mechanism of Virus Capsid Assembly and Disassembly**
06/10/2025
Uri Raviv
The Hebrew University of Jerusalem, Israel

85 **Voids as Cosmological and Astrophysical Laboratories**
07/10/2025
Dante Paz
IATE - Universidad Nacional de Córdoba – Conicet, Spain

86 **Test of the physical significance of Bell non-locality**
10/10/2025
Adan Cabello
Universidad de Sevilla, Spain

87 **Polaritonic Fourier crystals for nanophotonics and meta-polaritonics**
13/10/2025
Sergey Menabde
Korea Advanced Institute of Science and Technology, Korea

88 **Optimizing the oxidation potential of perylenes in the singlet and triplet states**
17/10/2025
Francisca J. Benítez
DIPC - UPV/EHU, Donostia / San Sebastián, Spain

89 **Inspiring Careers: Next -generation targeting has organelle-level precision**
17/10/2025
Yamuna Krishnan
Grossman Institute of Neuroscience, Quantitative Biology and Human Behavior, The University of Chicago, USA

90 **Micropattern Gaseous Detectors applied to low-energy nuclear physics**
24/10/2025
Yassid Ayyad
Universidad de Santiago de Compostela, Spain

91 **Dark energy from a wide range of cosmological probes**
28/10/2025
Carlos García-García
University of Oxford, UK

92 **DIPC Community Seminar: Topology and Geometry Beyond Perfect Crystals**
30/10/2025
Adolfo G. Grushin
DIPC, Donostia / San Sebastián, Spain

93 **Correcting DFT-based energies to enhance computational catalysis predictions**
31/10/2025
Ricardo Urrego-Ortíz
Universidad de Barcelona, Spain

94 **On the complexity of integrable eigenstates**
31/10/2025
Esperanza López
Instituto de Física Teórica, UAM-CSIC, Spain

95 **(Long-range) Magic on the Information Lattice**
04/11/2025
Jens H Bardarson
KTH Royal Institute of Technology, Sweden

96 **Modelling structural sensitivity in electrocatalysis**
05/11/2025
Federico Calle-Vallejo
Ikerbasque & UPV/EHU, Spain

97 **Wavefront microscopy for Nanophotonics**
06/11/2025
Guillaume Baffou
Institut Fresnel, CNRS, France

98 **Spintronics and Correlation Effects in Two-Dimensional Magnetic Materials: From FenGeTe2 to p-Wave Magnets**
07/11/2025
Andrea Droghetti
University of Venice, Italy

99 **Therapeutic In Vivo Synthetic Chemistry**
10/11/2025
Katsunori Tanaka
Institute of Science Tokyo & RIKEN, Japan

100 **Tracing Planetary Systems Dynamics Across Stellar Lifetime**
10/11/2025
Santiago Torres
Institute of Science and Technology Austria (ISTA), Austria

101 **Binary-Stripped Stars: from Atomic Scales to Cosmic Dawn**
11/11/2025
Ylva Gotberg
Institute of Science and Technology Austria (ISTA), Austria

102 **Nonadiabatic Dynamics: Method Development and Applications**
13/11/2025
Edison Salazar
DIPC, Donostia / San Sebastián, Spain

103 **Higher Order Weak Lensing Statistics in Euclid**
13/11/2025
Simone Vinciguerra
Laboratoire D'Astrophysique De Marseille, France

104 **Harnessing quantum back-action for time-series processing**
17/11/2025
Pere Mujal & Giacomo Franceschetto
ICFO, Spain

105 **Integrative computational microscopy: bridging cellular 3D imaging with physics-based simulations for biological discovery**
20/11/2025
Sergio Cruz León
Max Planck Institute of Biophysics, Germany

106 **Quantum optics experiments with laser-cooled atoms and optical cavities**
21/11/2025
Pau Farrera Soler
Max Planck Institute of Quantum Optics, Germany

107 **How to obtain information from crystal surfaces: state – of – the - art techniques**
25/11/2025
Katsuo Tsukamoto
Tohoku University / Nagoya University, Japan

108 **Predicting energy of the quantum system from one-and two-electron integrals using deep learning**
26/11/2025
Valerii Chuiko
McMaster University, Canada

109 **Thermochemical and electrochemical stability of ruthenium oxides: A DFT perspective**
28/11/2025
Iratxe Aguado Ruiz
University of Barcelona & UPV/EHU, Spain

110 **Chasing the biggest bangs since the big bang with atom interferometers**
02/12/2025
John Ellis
King's College London, UK

111 **Modelling photoluminescence in organic systems: exploring the impact of aggregation and mechanical effects on the molecular, electronic and optical properties**
03/12/2025
Josianne Owona
DIPC, Donostia / San Sebastián, Spain

112 **Many-body quantum simulations with long ion strings**
12/12/2025
Manoj Kumar Joshi
Institute for quantum optics and quantum information, Austria

113 **Building the next generation of computational tools for quantum many-body problems**
16/12/2025
James LeBlanc
Memorial University of Newfoundland, Canada

Colloquia

1 **Dark Matter: the elusive substance that dominates the matter budget of the Universe**
06/02/2025
Julio F. Navarro
University of Victoria, BC, Canada

2 **The Quantum way of doing computations, simulations and measurements**
08/05/2025
Rainer Blatt
Institute for Experimental Physics, University of Innsbruck, Austria

3 **Adiabaticity and quantum geometry**
20/11/2025
Raffaele Resta
CNR-IOM Istituto Officina dei Materiali, Trieste, Italy

Workshops

Other Workshops

Scientific Meetings

ELG Modelling + Mock Challenge Workshop

Feb 17-21, 2025
DIPC, Donostia / San Sebastián
https://indico.global/event/6227/

Organizing Committee
Andrew Hearin (Argonne National Lab)
Raul Angulo (DIPC, Ikerbasque)
Elisabeth Krause (University of Arizona)
Boryana Hadzhiyska (UC Berkeley)
Martin Crocce (ICE-CSIC, IEEC)

The workshop brought together leading experts in the study of emission line galaxies (ELGs). These galaxies exhibit extremely high star formation rates, making them ideal candidates for tracing the large-scale structure of the universe. During the workshop, participants discussed the observational properties of ELGs, their modelling in hydrodynamical and semi-empirical galaxy formation models, and their applications for cosmological inferences. At the end of the workshop, the participants agreed to develop a suite of mock observations to test the robustness and accuracy of various analysis methods. This was an important step toward making robust discoveries with the next generation of cosmological experiments.

Invited Speakers
Adrian Bayer (Princeton University, USA)
Andres Salcedo (University of Arizona, USA)
Annalisa Pillepich (Max Planck Institute for Astronomy, Germany)
Antoine Rocher (EPFL, Switzerland)
Boryana Hadzhiyska (UC Berkeley, USA)
ChangHoon Hahn (Princeton University, USA)
Ettienne Burtin (CEA-Paris Saclay)
Francisco Villaescusa-Navarro (Flatiron Institute, USA)
Francisco Javier Castander (ICE-CSIC, IEEC, Barcelona)
Gillian Beltz-Mohrmann (Argonne National Laboratory, USA)
Ginevra Favole (Instituto de Astrofísica de Canarias, Spain)
Hironao Miyatake (Nagoya University, Japan)
Jake Bennett (Harvard University, USA)
Ken Osato (Chiba University, USA)
Lucia Perez (Flatiron Institute, USA)
Marcos Pellejero Ibáñez (University of Edinburgh, UK)
Pauline Zarrouk (CNRS/LPNHE, France)
Sara Ortega-Martinez (DIPC, Spain)
Shadab Alam (Tata Institute of Fundamental Research, Mumbai, India)
Shivam Pandey (Johns Hopkins University, USA)
Sihan Yuan (Stanford, USA)
Sownak Bose (Durham University, UK)
Takahiro Nishimichi (Kyoto Sangyo University, Japan)
Tanveer Karim (University of Toronto, Canada)
Vincent Desjacques (Technion, Israel)
Violeta Gonzalez-Perez (Universidad Autónoma de Madrid, Spain)

3S'25 Symposium on Surface Science

March 09-15, 2025
Hotel Tuc Blanc, Baqueira Beret
https://3s25.dipc.org/

Organizing Committee
Andrés Arnau (CFM-EHU)
Daniel Sánchez Portal (CFM-CSIC)
Enrique Ortega (CFM-EHU)
Julen Ibáñez Azpiroz (CFM-EHU)
Olatz Leis (DIPC)
Pedro Echenique (DIPC)

The 3S'25 symposium covered topics including all aspects of Surface Science as:

Surface reactions
Particle-surface interactions
Epitaxial growth
Adsorption and desorption
Applications of surface science

These fields were covered by contributed oral talks and poster sessions.

Invited Speakers
Amadeo L. Vázquez de Parga (UAM and IMDEA Nanociencia, Spain)
Markus Valtiner (Institute of Applied Physics at the Technical University of Vienna, Austria)
Maria E. Messing (Lund University, Sweden)
Alexander Föhlisch (Potsdam University and Helmholtz-Zentrum Berlin, Germany)
Fabien Cheynis (CINaM, Aix-Marseille University, CNRS, France)
María Camarasa-Gómez (Materials Physics Center (MPC), Centro de Física de Materiales, Spain)
Jörg Libuda (Friedrich-Alexander-Universität, Germany)

Olaf M. Magnussen (Christian-Albrechts-Universität zu Kiel, Germany)
Pavel Jelinek (Institute of Physics of the Czech Academy of Sciences, Czech Republic)
Franz J. Giessibl (University of Regensburg, Germany)
Artem Odobesko (Julius Maximilian University of Würzburg, Germany)
Christoph Tegenkamp (Technische Universität Chemnitz, Institut für Physik, Germany)
Mateusz Rebarz (Institute of Physics of the Czech Academy of Sciences, Czech Republic)
Pavel Kocán (Charles University, Czech Republic)
Harald Brune (SCI-SB-HD EPFL, Switzerland)
Haritz Garai-Marin (University of the Basque Country (EHU), Spain)
Ulrich Höfer (Philipps-Universität Marburg, Fachbereich Physik, Germany)
Saumya Mukherjee (SPECS Surface Nano Analysis GmbH, Germany, ETH Zürich, Switzerland)
Adam Kollin (RHK Technology, Inc. University of Michigan, USA)
Hugo Dil (SCI-SB-HD EPFL, Switzerland)
Javier Sivianes (Material Physics Center, MPC, Spain)
Karina Morgenstern (Ruhr-Universitaet Bochum, Germany)
Johannes V. Barth (TU Munich, Germany)
Jan Berger (CATRIN-Czech Advanced Technology and Research Institute, Czech Republic)
Shiyong Wang (Shanghai Jiao Tong University, China)
Jon Zubeltzu (University of the Basque Country (EHU), Spain)
Antton Babaze (University of the Basque Country (EHU), Spain)
Daniel Hernangómez-Pérez (CIC Nanogune, Spain)
Fritz Aumayr (Institute of Applied Physics (IAP), TU Wien, Vienna, Austria)
Milena Majkić (University of Pristina, Faculty of Technical Sciences, Kosovska Mitrovic Republic of Serbia)
Manfred Buck (University of St Andrews, UK)
Junji Yuhara (Tokai National Higher Education and Research System, Japan)
Tomáš Šikola (Brno University of Technology, Czech Republic)
Pierre Müller (CINaM CNRS France)
Zdeněk Jakub (Brno University of Technology, Czech Republic)
Yan Yan Grisan Qiu (Forschungszentrum Jülich GmbH, Germany)
Iulia Cojocariu (Università degli Studi di Trieste, Italy)
Matteo Jugovac (Università degli studi di Trieste, Italy)

Artificial Intelligence for Advanced Materials (AI4AM2025)

April 08-10, 2025
Kursaal Congress Centre-Auditorium, Donostia / San Sebastián
https://ai4am.net/2025/index.php

Organizing Committee
Antonio Correia (Phantoms Foundation)
Konstantin S. Novoselov (NUS / Institute for Functional Intelligent Materials)
Stephan Roche (ICREA/ICN2)
Andrey Ustyuzhanin (Constructor University)
Ricardo Díez Muiño (DIPC, Ikerbasque)
Concepción Narros Hernández (Phantoms Foundation)
Joaquín Gaspar Ramón-Laca Maderal (Phantoms Foundation)
Jose Luis Roldán (Phantoms Foundation)

AI4AM2025 was a cross-disciplinary international event that brought together top experts from industry and research institutions utilizing Artificial Intelligence, including machine learning, deep learning, and neural networks. The event aimed to enhance discoveries in materials science by refining automated designs for both structural and electronic material models in engineering. It focused on improving interoperability among material databases and reverse material engineering.

This platform offers experts an opportunity to delve into the latest innovations, discuss practical challenges, and share solutions in applying AI for groundbreaking advancements in material science and engineering. It covers targeted applications in electronics, composites, energy, (bio)medicine, quantum computing, and related fields. Once again, this 2nd edition fostered networking, collaboration, and industrial partnerships.

Invited Speakers
Gerbrand Ceder (Berkeley University of California, USA)
Yousung Jung (Seoul National University, South Korea)
Kristin Persson (Berkeley Lab, USA)
Paolo Bondavalli (European Innovation Council, Belgium)
Silvana Botti (Ruhr University Bochum, Germany)
Miguel Caro (Aalto University, Finland)
Sanggyu Chong (EPFL, Switzerland)

Maria Fernandez-Serra (Stony Brook University, USA)
Janine George (CMD@BAM, Germany)
Wide Hogenhout (European Commission, Belgium)
Natalia Alexandra Konchakova (HEREON, Germany)
Florian Marquardt (FAU, Germany)
Elisa Molinari (Università degli Studi di Modena e Reggio Emilia, Italy)
Elena Novoselova (Constructor Group, Germany)
Gian-Marco Rignanese (UCLouvain, Belgium)
Andrey Ustyuzhanin (Constructor University, Germany)
Tejs Vegge (Technical University of Denmark, Denmark)
Anatole von Lilienfeld (University of Toronto, Canada)
Sonia Conesa Boj (TU Delft, The Netherlands)
Minh Tuan Dau (Université Côte d'Azur, CNRS, CRHEA, France)
Simon Dubois (UCL, Belgium)
José-Hugo Garcia (ICN2, Spain)
Romain Gautier (IMN, France)
Nicola Marzari (EPFL, Switzerland)
Antonio Rossi (IIT, Italy)
Jan-Lucas Uslu (Stanford University, USA)
Chiara Zanardi (Ca´ Foscari University of Venice , Italy)
Jordi Arbiol (Institut Català de Nanociència i Nanotecnologia ICN2, Spain)
María Carmen Asensio (Universidad de Valencia, Spain)
Irene García Camacha (Universidad de Castilla - La Mancha, Spain)
Maciej Haranczyk (IMDEA Materials, Spain)
Luis Martín-Moreno (Instituto de Nanociencia y Materiales de Aragón, Spain)
Pablo Piaggi (CIC nanoGUNE, Spain)

World Conference on Gold 2025

May 11-14, 2025
Kursaal Convention Center, Donostia / San Sebastián
https://premc.org/gold2025/

Organizing Committee
Luis Liz-Marzán (CIC biomaGUNE (BRTA))
Javier Aizpurua (DIPC, Ikerbasque)
Rubén Esteban (Centro de Física de Materiales (CSIC-UPV/EHU))
M. Concepción Gimeno (CSIC-Universidad de Zaragoza)
Marek Grzelczak (CFM (CSIC-UPV/EHU)
Dorleta Jiménez de Aberasturi (CIC biomaGUNE)
Aitziber L. Cortajarena (CIC biomaGUNE (BRTA)
Leonardo Scarabelli (Universidad de Cantabria)

Gold has generated commercial, technological, and scientific interest for centuries and this interest is far from declining. On the contrary, gold is an essential component of high-technology materials and the subject of intensive research in various fields.

Following the success of the previous tri-annual Gold conferences on the applications of gold in high-technology (Québec 2022; Paris 2018; Cardiff 2015), the Gold 2025 conference was held in San Sebastian, with the aim of attracting experts in different fields, from catalysis, biomedicine, organometallics, nanoparticle synthesis and characterization, plasmonics, optics and photonics, electronics, as well as precious metals purification and recycling. Particular emphasis was placed in the chemistry and physics around much of the current technological interest, including catalysis, nanophotonics, and biomedical applications.

At Gold 2025, prominent specialists from these different topics gathered and led the discussion of the most recent highlights and achievements within their fields. The conference provided a comprehensive overview of the different areas of gold science and technology in a lively atmosphere and a unique environment.

Invited Speakers
Sara Bals (EMAT, University of Antwerp, Belgium)
Marc-André Fortin (CR-CHUQ-Université Laval, Canada)
Teri W. Odom (Northwestern University, USA)
Vivian Wing Wah Yam (Department of Chemistry, The University of Hong Kong)
Souhir Boujday (Sorbonne Université, France)
Philippe Lalanne (LP2N, CNRS, Institut d'Optique Graduate School, Univ. Bordeaux, Talence, France)

Angela Casini (Technical University of Munich, Germany)
Qian Chen (University of Illinois, USA)
Xiaodong Chen (Nanyang Technological University, Singapore)
Emiliano Cortés (Ludwig Maximilian University of Munich, Germany)
Christy Landes (University of Illinois, USA)
Xing Yi Ling (Nanyang Technological University, Singapore)
Qiangbin Wang (Chinese Academy of Sciences, China)
Laura Na Liu (University of Stuttgart, Germany)
Dong Ha Kim (Ewha Womans University, South Korea)
Ki Tae Nam (Seoul National University, South Korea)
Junsuk Rho (Pohang University of Science and Technology (POSTECH), South Korea)
Liane Rossi (Institute of Chemistry, University of São Paulo, Brazil)
Vincent Rotello (University of Massachusetts Amherst, USA)
George C. Schatz (Northwestern University, USA)
F. Dean Toste (University of California, Bekerley, USA)
Jianfang Wang (Department of Physics, The Chinese University of Hong Kong)
Neus Bastús (Institut Català de Nanotecnologia (ICN2), Spain)
Lucas V. Besteiro (University of Vigo, Spain)
Elodie Boisselier (Université Laval, Canada)
Alexander Whittingham (National Research Council of Canada, Canada)
Jiaqi Chen (Chengdu University, China)
Laura Fabris (Politecnico di Torino, Italy)
Guillermo González-Rubio (Universidad Complutense de Madrid, Spain)
Johan Hofkens (KULeuven, Department of Chemistry & MPI Mainz, Belgium)
Shuzhou Li (Nanyang Technological University, Singapore)
Stephan Link (University of Illinois Urbana-Champaign, USA)
Alejandro Manjavacas (CSIC, Spain)
Kyoung-Duck Park (POSTECH, South Korea)
Stephane Parola (ENS Lyon, France)
Gail Vinnacombe-Willson (CIC biomaGUNE, Spain)
Anastasiia Tukova (Macquarie University, Australia)
Nerea Zabala (University of the Basque Country (EHU, Spain)
Catherine Murphy (Department of Chemistry, University of Illinois Urbana-Champaign, USA)

Current Trends in Nonlinear Photocurrents and Magnetism (CINERAMA25)

May 26-30, 2025
CFM, Donostia / San Sebastián
https://cinerama.dipc.org/

Organizing Committee
Julen Ibañez (MPC, Ikerbasque)
Daniel Hernangomez (CIC nanoGUNE)
Maria Camarasa (CFM)

This event aimed at exploring the forefront of nonlinear photocurrents and magnetism by bringing together a leading group of international researchers, in addition to students, postdocs and other participants. The workshop was extremely successful for sharing the latest contributions on cutting-edge topics including the bulk photovoltaic effect, the geometric and topological nature of magneto-optical responses, Floquet physics, van der Waals magnets, orbital and spin-orbital textures and altermagnetism.

Invited Speakers
Claudio Attaccalite (CNRS, CINaM Aix-Marseille Université, France)
Reyes Calvo (BCMaterials, Spain)
Fernando de Juan (DIPC, Spain)
Florian Dirnberger (Technische Universität München, Germany)
Hugo Dil (EPFL, Switzerland)
Paulo E. Faria Junior (University of Central Florida, USA)
Aran García Lekué (DIPC, Spain)
Luis Hueso (CIC nanoGUNE, Spain)
Christoph Kastl (Technische Universität München, Germany)
Qiong Ma (Boston College, USA)
Alejandro Molina (ICMUV - Universidad de Valencia, Spain)
Takahiro Morimoto (University of Tokyo, Japan)

Alberto Morpurgo (Université de Genève, Switzerland)
Juan José Palacios (Universidad Autónoma de Madrid, Spain)
Dmytro Pesin (University of Virginia, USA)
Ashwin Ramasubramaniam (University of Massachusetts Amherst, USA)
Helena Reichlova (Institute of Physics, Czech Academy of Sciences, Czech Republic)
Raffaele Resta (IOM-CNR, Italy)
John Sipe (University of Toronto, Canada)
Libor Šmejkal (JGU Mainz, Germany)
Inti Sodemann (Universität Leipzig, Germany)
Ivo Souza (CFM, Spain)
Andreas Stier (Technische Universität München, Germany)
Dong Sun (Peking University, People's Republic of China)
Veronika Sunko (UC Berkeley and Institute of Science and Technology Austria, USA and Austria)
Stepan Tsirkin (EPFL, Switzerland)
Miguel Ugeda (DIPC, Spain)
Yijin Zhang (University of Tokyo, Japan)

Donostia is Science - 50th anniversary of the Faculty of Chemistry of the University of the Basque Country (EHU)

May 28-30, 2025
Faculty of Education, Philosophy and Anthropology (HEFA I), EHU, Donostia / San Sebastián
https://donostiascience.dipc.org/venue

Organizing Committee
Miguel Angel Huertos (EHU, Ikerbasque)
Jon Mattin Matxain Beraza (EHU, DIPC)
Luca Salassa (DIPC, Ikerbasque)

The conference sought to foster collaboration among scientists in the Basque Country from across the chemical sciences, providing a forum to share knowledge, exchange ideas, and inspire new research directions.

Invited Speakers
Eduardo Peris (Institute of Advanced Materials, Universitat Jaume I, Spain)
Arkaitz Correa (EHU, Spain)
Christoph Weder (Adolphe Merkle Institute, Switzerland)
Fernando Vidal (POLYMAT, Spain)
Auxiliadora Prieto (Centro de Investigaciones Biológicas Margarita Salas, CIB-CSIC, Spain)
Jordi Llop (CIC BiomaGUNE, Spain)
Nacho Pascual (CIC nanoGUNE, Spain)
Magali Lingenfelder (ETH Lausanne, Switzerland)
Cyril Aymonier (Institut de Chimie de la Matière Condensée de Bordeaux, France)
Maite Alducin (Materials Physics Center, Spain)
Marisa Merino (OSI Bidasoa, Spain)
Maider San Torcuato (IIS Biogipuzkoa, Spain)
Oscar Miguel (CIDETEC Energy Storage, Spain)
Jordi Sort (ICREA, Autonomous University of Barcelona, Spain)
Izaskun Jimenez-Serra (Centro de Astrobiologia, CSIC, Spain)
Aran Garcia-Lekue (DIPC, Spain)

Quantum Algorithms in Pre-Fault Tolerant Hardware (BasQIBM25)

June 16-20, 2025
Miramar Palace, Donostia / San Sebastián
https://www.uik.eus/es/curso/quantum-algorithms-pre-fault-tolerant-hardware-basqibm25
https://basq-ibm-2025.dipc.org/

Organizing Committee
Geza Giedke (DIPC, Ikerbasque)
Enrique Rico Ortega (CERN, EHU, Ikerbasque)
Kristan Temme (IBM)

The field of quantum computing is on the brink of transformative advancements, driven by tangible progress in hardware development. As we are entering the era of pre-fault tolerant quantum devices, the potential for addressing complex quantum systems, once confined to theoretical realms, is becoming increasingly concrete. This conference aimed to foster a collaborative environment where scientists from diverse backgrounds, including large-scale quantum experiments, classical approximation methods, and quantum algorithms, could come together to explore the implications of this hardware progress. By facilitating interdisciplinary discussions and knowledge sharing, we sought to identify critical challenges and opportunities in leveraging pre-fault tolerant quantum hardware to tackle complex problems in quantum physics, chemistry, materials science, and beyond.

Invited Speakers
Dorit Aharanov (Hebrew Univ, Israel)
Mari Carmen Bañuls (MPQ, Max-Planck Inst., Germany)
Daniel Barredo (CSIC, Spain)
Rainer Blatt (UIBK & IQOQI, Austria)
Robin Blume Kohut (Sandia Nat Labs, USA)
Sophia Economou (Virginia Tech., USA)
Francesca Ferlaino (UIBK & IQOQI, Austria)
Jay Gambetta (IBM, USA)
Fernando Gonzalez-Zalba (Cambridge Univ, Nanogune, Ikerbasque, Spain)
Bill Huggins (Google, USA)
Bálint Koczor (Oxford University, UK)
Mario Motta (IBM, USA)
Frank Pollmann (TUM, Germany)
Rahul Trivedi (MPQ, Max-Planck Inst., Germany)
Zoltan Zimboras (Wigner Inst, Hungary)

Topological Photonics 2025 (Topophoto25)

June 30 - July 2, 2025
Miramar Palace, Donostia / San Sebastián
http://topophoto2025.dipc.org/

Organizing Committee
Aitzol Garcia Etxarri (DIPC, Ikerbasque)
Paloma Arroyo Huidobro (Universidad Autónoma de Madrid, IFIMAC)
Alejandro González Tudela (Instituto de Física Fundamental-CSIC)
Alberto Amo (Laboratoire PhLAM CNRS – Université de Lille)

The TopoPhoto25 workshop gathered a critical mass of people working in the vibrant area of Topological Photonics as well as topology in other wave and quantum phenomena. It continues the series of workshops "Topology meets quantum optics 2021 (online)" and "Topological Photonics 2022 (San Sebastian, Spain) and Topological Photonics 2024 (Madrid, Spain). The 2025 meeting brought together scientists exploring topics such as topological photonic crystals, topological metamaterials, non-Hermitian topology, topological light-matter interfaces, directional amplifiers, topological protection of non-classical states of light, as well as topological effects in other classical non-classical systems.

Invited Speakers
Andrea Alu (The City College of New York, USA)
Olga Smirnova (Technical University Berlin, Germany)
Päivi Törmä (Aalto University, Finland)
Shanhui Fan (Stanford University, CA, USA)
Alexander Cerjan (Sandia National Laboratory, USA)
Baile Zhang (NTU, Singapore)
Chiara Devescovi (ETH, Switzerland)
Clivia Sotomayor-Torres (International Iberian Nanotechnology Laboratory, INL, Portugal)
Dario Bercioux (DIPC, Spain)
Dmitri Basov (Columbia Universtiy, USA)
Ewold Verhagen (AMOLF, Netherlands)
Filipa R. Prudêncio (Instituto Universitário de Lisboa, ISCTE-IUL, Portugal)
Frank Scheffold (University of Fribourg, Switzerland)
Oded Zilberberg (University of Konstanz, Germany)
Sylvain Ravets (C2N, France)
Thomas Christensen (Technical University of Denmark, Denmark)
Iacopo Carusotto (INO-CNR Pitaevskii BEC Center,Trento, Italy)

Quantum Designer's Special Edition: 100 years of Quantum (QD100)

July 14-18, 2025
Miramar Palace, Donostia / San Sebastián
https://qd100.dipc.org

Organizing Committee
Daniel Loss (University of Basel)
Francisco Guinea (IMDEA Nanoscience, DIPC)
Roman Lutchyn (Microsoft Azure Quantum)
Jelena Klinovaja (University of Basel)
Vitaly Golovach (CFM-EHU, DIPC, Ikerbasque)

Quantum design is the concept of implementing interesting ideas, often expressed as theoretical 'toy models' or computational algorithms, in modern material systems with advanced functionalities. Moiré materials, quantum computing, topological states of matter, intriguing magnonic and superconducting states are just a few examples of different implementations. They provide a rich playground for basic research and applications.

This special edition of the Quantum Designer Physics Workshop offered the participants to celebrate the year of Quantum Science and Technology in a stimulating atmosphere for discussing new physics on the marvelous sites of San Sebastian. We discussed recent progress in creating ordinary and topological quantum systems with different layers of complexity, as well as some of the most exotic quantum materials based on graphene and other low dimensional materials. We updated on the progress in spin-based quantum computing, spintronics, and the quest for topologically non-trivial states in hybrid superconducting systems.

Invited Speakers
Dave Aasen (Microsoft, USA)
Shaffique Adam (Washington University, USA)
Alexander Altland (University of Cologne, Germany)
Sebastian Bergeret (CFM-CSIC, Spain)
Andrei Bernevig (Princeton, USA)
Guido Burkard (University of Konstanz, Germany)
Patrick Codd (Microsoft, USA)
Bill Coish (McGill University, Canada)
Sankar Das Sarma (University of Maryland, USA)
Fernando Gonzalez Zalba (CIC nanoGUNE, Spain)
Max Ilyn (CFM-CSIC, Spain)
Long Ju (MIT, USA)
Gijs de Lange (Microsoft, The Netherlands)
Michael Manfra (Purdue, USA)
Chetan Nayak (Microsoft, USA)
Yuval Oreg (Weizmann, Israel)
Gloria Platero (ICMM, Spain)
Elsa Prada (ICMM-CSIC, Spain)
Achim Rosch (University of Cologne, Germany)
Jay Sau (University of Maryland, USA)
Javad Shabani (New York University, USA)
Pascal Simon (University Paris Saclay, France)
Seigo Tarucha (RIKEN, Japan)
Felix von Oppen (FU Berlin, Germany)
Amir Yacoby (Harvard University, USA)
Ali Yazdani (Princeton, USA)
Dominik Zumbuhl (University of Basel, Switzerland)

Theoretical Chemistry and Computational Modelling: 25 Years Promoting Excellence in Science (25TCCM)

July 28-30, 2025
Miramar Palace, Donostia / San Sebastián
https://tccm25.dipc.org/

Organizing Committee
Inés Corral (UAM)
Manuel Alcamí (UAM)
Iñaki Tuñón (UV)
Elixabete Rezabal (EHU, DIPC)
Xabier López (EHU, DIPC)
José M. Mercero (EHU, DIPC)

The "Theoretical Chemistry and Computational Modeling (TCCM) Symposia, 25 Years Promoting Excellence in Science" brought together scientists to celebrate the success of a programme that has become a reference point in theoretical and computational chemistry. Over the past quarter of a century, the TCCM Master and Doctorate have trained generations of young researchers, many of whom now hold leading academic, industrial, and institutional positions across Europe and beyond. The symposium was not only a time to look back at objectives and achievements, but also a chance to reunite former and current students, from today's Master candidates to senior scientists, and to showcase how the TCCM community has contributed to advancing knowledge, building collaborations, and shaping careers.

Invited Speakers
Mercedes Alonso Giner (Vrije Universiteit Brussel, Belgium)
Serra Arslancan (Frontiers, Switzerland)
David Muñoz Ramo (Quantinuum, UK)
Frank Neese (Max-Planck-Institut für Kohlenforschung, Germany)
Olalla Nieto Faza (Universidade de Vigo, Spain)
Enrique Sánchez Marcos (Universidad de Sevilla, Spain)
Iñaki Silanes Cristóbal (Rindus S.L., Spain)
Nicolas Suaud (LCPQ-Fermi, Université de Toulouse, France)
Kirill Zinovjev (Universidad de Valencia, Spain)
Shirin Faraji (Heinrich Heine University Düsseldorf, Germany)

NanoNeuro 2025

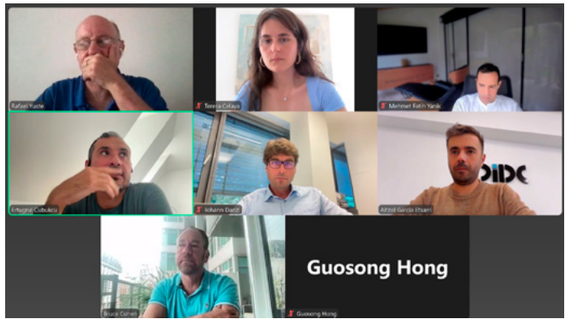
July 28, 2025
Online
https://ntc.columbia.edu/nanoneuro-2025/

Organizing Committee
Aitzol Garcia-Etxarri (DIPC, Ikerbasque)
Rafael Yuste (Columbia University)
Teresa Celaya (DIPC)

The conference aimed to help nucleate the emerging field of research at the intersection of Nanoscience and Neuroscience and provide a forum for experts from both areas to interact.

NanoNeuro2025 was an online conference, organized by the NeuroTechnology Center at Columbia University and the Donostia International Physics Center (DIPC). The Conference was organized in thematic sessions with keynote and invited talks.

The conference achieved its scientific objectives and was followed by a total 300 people, making it a great success of public as well.



Invited Speakers
Jennifer Dionne (Stanford University, USA)
Bruce Cohen (Lawrence Berkeley National Laboratory, USA)
Ertugrul Cubukcu (University of California San Diego, USA)
Johann Danzl (Institute of Science and Technology, Austria)
Guosong Hong (Stanford University, USA)
Mehmet Fatih Yanik (ETH Zurich, Switzerland)

Perspectives in Non-Hermitian Systems (PiNHS)

September 01-05, 2025
Miramar Palace, Donostia / San Sebastián
https://pinhs.dipc.org/

Organizing Committee
Dario Bercioux (DIPC, Ikerbasque)
Geza Giedke (DIPC, Ikerbasque)
Clara Wanjura (Max-Planck Institute for the Science of Light)
Emil J. Bergholtz (Stockholm University)

This five-day workshop explored foundational concepts, experimental applications and the engineering of open quantum systems in the emerging field of non-Hermitian physics. With an emphasis on photonic systems, optical resonators and quantum control mechanisms, the meeting brought together leading experts in non-Hermitian models and their interaction with the environment.

Invited Speakers
Fabio Benatti (University of Trieste, Italy)
Javier del Pino Gutiérrez (Universidad Autónoma de Madrid, Spain)
Benedetta Flebus (Boston College, USA)
Flore Kunst (Max Planck Institute for the Physics of Light, Germany)
Anja Metelmann (KIT, Germany)
Kavan Modi (SUTD, Singapore)
Hai Son Nguyen (École Centrale de Lyon, France)
Stefan Rotter (TU Wien, Austria)
Henning Schomerus (Lancaster University, UK)
Lorenza Viola (Dartmouth College, USA)
Peng Xue (Beijing Computational Science Research Center, China)
Zhong Wang (Tsinghua University, China)

Summer Course "Quantum Computing: from Fundamentals to Applications"

September 10-12, 2025
Miramar Palace, Donostia / San Sebastián
https://www.uik.eus/es/curso/quantum-computing-fundamentals-applications

Organizing Committee
Javier Aizpurua (DIPC, Ikerbasque)
Igor Campillo (Euskampus Fundazioa)
Ainara Gonzalez (Euskampus Fundazioa)
June Ozaeta (Euskampus Fundazioa)

Aimed at researchers, advanced students (in fields such as Physics, Mathematics, Engineering, and Computer Science), as well as industry professionals and academics, this course sought to provide essential tools and knowledge to understand and leverage the potential of quantum computing across various scientific and industrial domains.

The objective was to provide a comprehensive overview of the fundamentals and technological advancements in Quantum Computing, from its theoretical foundations to practical applications.

Invited Speakers
Igor Campillo (Euskampus Fundazioa, Spain)
Javier Aizpurua (DIPC, Ikerbasque, Spain)
Maialen Agirre Pinedo (Basque Government, Spain)
Juan José García-Ripoll (CSIC, Spain)
Sebastián Bergeret (MPC-CFM, Spain)
Fernando González-Zalba (CIC nanoGUNE, Spain)
Claudia Politi (ETH, Switzerland)
Carlos Antón Solanas (Universidad Autónoma de Madrid, Spain)
Aitor Moreno Fdz. de Leceta (LKS Next, Spain)
Radha Pyari Sandhir (IBM, Spain)
Sara Capponi (IBM, USA)
Miguel Rodríguez Asensio (Iberdrola, Spain)
Mitsuhisa Sato (RIKEN, Japan)

XVI International Ontology Congress: Conceptions of Nature from Ionian Thought to Contemporary Science

October 07-11, 2025
Facultad de Educación, Filosofía y Antropología, Donostia / San Sebastián
Museo Chillida-Leku, Donostia / San Sebastián
Salon D'actes de la Mairie, Saint Jean de Luz
October 23, 2025
Funcación Paideia Galiza., A Coruña
www.ontologia.info

Organizing Committee
Víctor Gómez (UAB)
Bárbara Jiménez (EHU)
Juan Ramón Macuso (Unaffiliated)
Gotzon Arrizabalaga (EHU)
Ricardo Díez (DIPC, Ikerbasque)
Albert Solé (UB)
Pedro Uribe (ESIC)

The XVI International Ontology Congress was inaugurated on October 7th, 2025, at Chillida-Leku Museum (San Sebastián), under the Honorary Presidency of Professor Artur Ekert (University of Oxford) and the patronage of UNESCO.

From October 8th to 10th, the main sessions were held at the Faculty of Education, Philosophy and Anthropology (University of the Basque Country). Over these three days, philosophers and scientists discussed the evolving conception of Physis through five thematic sections:

- From Schrödinger's Vision to the Second Quantum Revolution
- Greek Thought and Classical Polarities Concerning Physis
- Debates on Artificial Life and Artificial Intelligence
- Techné as Art, and Nature
- The Evolutionary Conception of Nature

Attendance was consistently high, with sessions drawing large audiences and stimulating extensive discussion both inside and outside the lecture halls.

The Closing Event was held on October 11th in Saint Jean de Luz (Salon d'actes de la Mairie), concluding with a piano concert by Isabel Puente (Centre Culturel Peyuco Duhart), performing works by Erik Satie, Claude Debussy, Maurice Ravel, and Isaac Albéniz.

A Special Session, The Nature of Music, was held on October 23rd at the Paideia-Galiza Foundation (A Coruña).

The 2025 edition of the International Ontology Congress was a resounding success, marked by the intellectual quality of its lectures, the diversity of disciplines represented, and the continuity of the Congress's long-standing mission: to bridge the ancient and the contemporary in a shared philosophical and scientific reflection on the meaning of Nature.

Invited Speakers
Artur Ekert (University of Oxford, UK)
Sonia Contera (University of Oxford, UK)
Mark Coeckelbergh (University of Vienna, Austria)
Silvia de Bianchi (University of Milan, Italy)
Steen Rasmussen (University of Southern Denmark, Santa Fe Institute, DIPC)
Alyssa Ney (Ludwig Maximilian University, Germany)
Tim Maudlin (New York University, USA)
Valia Allori (University of Bergamo, Italy)
Antonio Diéguez Lucena (University of Málaga, Spain)
Elena Partene (École Normale Supérieure, France)
Carl Hoefer (University of Barcelona, Spain)
Flavia Marcacci (University of Urbino, Italy)
Alberto Cordero (City University of New York, USA)
Elisabetta Cattanei (Università Cattolica del Sacro Cuore, Italy)
Paavo Pylkkänen (University of Helsinki, Finland, University of Skövde, Sweden)
Javier Echeverría (EHU / Jakiunde, Spain)
Stefano Maso (Ca' Foscari University of Venice, Italy)
Davide Spanio (Ca' Foscari University of Venice, Italy)
Francis Wolff (École Normale Supérieure, France)
Humberto Bustince (Public University of Navarre / Jakiunde, Spain)
José Mª Sánchez Verdú (University of the Arts of Berlin / Robert Schumann Hochschule Dusseldorf, Germany)
Tomás Marco (Royal Academy of Fine Arts of San Fernando, Spain)

V Encuentro Internacional sobre Ciencias y Humanidades. Cartografiando la cultura

October 14-15, 2025
DIPC / CFM, Donostia / San Sebastián
www.mestizajes.es

Organizing Committee
Gustavo Ariel Schwartz (CSIC)
Silvina Cerveny (CSIC)
Aitzol García-Etxarri (DIPC, Ikerbasque)
Paschalis Agapitos (DIPC)

The meeting addressed, from multiple perspectives, issues related to the emergence of genius, the mapping of culture, and the relevance of quantitative methods in the study of cultural problems. Topics included the relationship between genius and madness; the personal and social contingencies that give rise to the emergence of genius; and the quantitative analysis of culture within the framework of complex network formalism, among others.

From a transdisciplinary perspective, the meeting also explored questions such as: Can science help us understand culture? How much is objective and how much is subjective in the emergence of revolutionary ideas? Is it possible to predict the emergence of the next Mozart?

Invited Speakers
Carmen Ferrándiz García (Universidad de Murcia, Spain)
Ernesto Estrada (IFISC - CSIC, Spain)
Pablo Aragón (Fundación Wikimedia, Spain)
Florencia Claes (Universidad Rey Juan Carlos, Spain)
Jaume Navarro (Ikerbasque, EHU, Spain)
Tiberio Ezquerra (IEM - CSIC, Spain)
Bárbara Romero Ferrón (Universidad de Leuphana, Germany)
Gabriel Cwilich (Yeshiva University, USA)
Rosa Montero (Escritora, Spain)
Jorge Volpi (Condeduque, Spain)

Other Workshops

International Quantum Matter Conference & Expo - QUANTUMatter 2025

May 20-23, 2025
World Trade Center, Grenoble
https://www.quantumconf.eu/2025/index.php

Organizing Committee
Antonio Correia (Phantoms Foundation)
Silvano de Franceschi (CEA/UGA)
Ricardo Díez Muiño (DIPC, Ikerbasque)
Juan Jose Garcia-Ripoll (IFF-CSIC)
Stephan Roche (ICREA / ICN2)
Michele Filippone (CEA)
Adolfo G. Grushin (Institut Néel / CNRS)
Anna Minguzzi (CNRS)

The 5th edition of the Quantum Matter International Conference – QUANTUMatter 2025 (Grenoble, France) – aimed at gathering the various communities engaged in the science and technologies of quantum information and quantum matter, to foster the incubation of new ideas and collaborations at the forefront of quantum technologies, emerging quantum materials and novel generations of quantum communication protocols, quantum sensing and quantum simulation.

Quantum Information and Quantum Matter are two components of revolutionary treatments of information, which are becoming cornerstones for discovering and implementing disruptive paradigms in quantum computation and quantum technologies.

The 2025 edition was extended to 4 days with plenary sessions, industrial forum, PhD students' sessions and also several thematic parallel workshops including:

Workshop 01: Quantum materials: growth, characterization and device fabrication
Workshop 02: Quantum matter: theory and simulations
Workshop 03: Quantum information
Workshop 04: Quantum Computing
Workshop 05: Quantum sensing
Workshop 06: Topological quantum matter: electronics, spintronics, photonics and phononics
Workshop 07: Quantum simulation

Invited Speakers
Immanuel Bloch (Max-Planck Institute of Quantum Optics, Germany)
Antoine Georges (Collège de France, France)
M. Zahid Hasan (Princeton University, USA)
Yasunobu Nakamura (University of Tokyo, Japan)
Pascale Senellart-Mardon (C2N/University Paris Saclay, France)
Mete Atature (University of Cambridge, UK)
Patrice Bertet (CEA Paris-Saclay, France)
Katharina Franke (Freie Universität Berlin, Germany)
Marcel Franz (University of British Columbia, Canada)
Max Hays (MIT, USA)
Soo-Hyon Phark (Center for Quantum Nanoscience, South Korea)
Gloria Platero Coello (ICMM-CSIC, Spain)
Benjamin Sacepe (Institut Néel - CNRS, France)
Vladimir M. Shalaev (Purdue University, USA)
Lieven Vandersypen (Tudelft/QuTech, The Netherlands)
Ramon Aguado (ICMM-CSIC, Spain)
Jordi Arbiol (ICREA & ICN2, Spain)
Mario Berta (RWTH Aachen University, Germany)
Paola Cappellaro (Massachusetts Institute of Technology, UK)
Reinhold Egger (Heinrich Heine University Düsseldorf, Germany)
Pol Forn-Díaz (IFAE, Spain)
Nathan Goldman (Collège de France, Paris & International Solvay Institutes & Université Libre de Bruxelles, Belgium)
Benjamin Huard (Ecole Normale Supérieure de Lyon, France)
Ivan Kassal (University of Sydney, Australia)
Andrew King (D-Wave, USA)
Ferdinand Kuemmeth (University of Regensburg, Germany)
Romain Maurand (CEA, France)
Julia S. Meyer (CEA-Grenoble, France)
Raquel Queiroz (Columbia University in the City of New York, USA)
Mikael Rechstmann (The Pennsylvania State University, USA)
Martin Ringbauer (Universität Innsbruck, Austria)
Giordano Scappucci (Delft University of Technology, The Netherlands)
Niels B. M. Schröter (Max Planck Institute for Microstructure Physics in Halle, Germany)
Enrique Solano (Kipu Quantum, Germany)
Daniel Stilck França (École Normale Supérieure de Lyon, France)
Luca Tagliacozzo (CSIC, Spain)
Eva Weig (TUM, Germany)
Cécile Yu (TU Delft, The Netherlands)
Borja Aizpurua (Multiverse Computing, Spain)
Andreas Bengtsson (Google Inc, USA)
Yonatan Cohen (Quantum Machines, Israel)
Antonio Corcoles-Gonzalez (IBM, USA)
Florian Froning (Zurich Instruments, Switzerland)
Pau Jorba (Kiutra, Germany)
Raphael Khan (Bluefors, Finland)
Anurag Saha Roy (Qruise, Germany)
Aleksandra Soltamova (Qblox BV, The Netherlands)
Jelena Trbovic (QuantrolOx, Finland)
Maud Vinet (Quobly, France)
Eric Akkermans (Technion, Israel)
Cristiane Morais Smith (Utrecht University, The Netherlands)
Yann-Michel Niquet (CEA, France)
Xavier Waintal (CEA Grenoble, France)

15th Edition of Graphene Conference Series (Graphene2025)

June 25-28, 2025
Kursaal Congress Centre-Auditorium, Donostia / San Sebastián
https://www.grapheneconf.com/2025/index.php

Organizing Committee
Antonio Correia (Phantoms Foundation)
Francesco Bonaccorso (Bedimensional)
Jean-Christophe Charlier (Universite Catholique de Louvain)
Ricardo Díez Muiño (DIPC, Ikerbasque)
Vladimir Falko (The University of Manchester)
Xinliang Feng (Technische Universitaet Dresden)
Max Lemme (AMO GmbH / RWTH Aachen)
Stephan Roche (ICREA/ICN2)
Aran Garcia-Lekue (DIPC, EHU)
Amaia Zurutuza (Graphenea)

The 15th edition of Graphene Conference series (Graphene2025), the largest European Event in Graphene and 2D Materials, was organized in-person in San Sebastian (Spain): June 25-28, 2025. Over the past editions, the Graphene Conference strengthened its position as the main in-person meeting point of the Graphene community Worldwide.

This cutting-edge International Conference brought together world leaders, prominent researchers, and industry visionaries to explore and unlock the boundless potential of graphene and 2D Materials.

Invited Speakers
Philip Kim (Harvard University, USA)
Steven Louie (UC Berkeley, USA)
Kostya Novoselov (NUS, Singapore)
Hong-Jun Gao (Chinese Academy of Sciences, China)
Moon-Ho Jo (Pohang University of Science and Technology, South Korea)
Annick Loiseau (CNRS-ONERA, France)
Hyeon Suk Shin (Center for 2DQH, South Korea)
Dmitri N. Basov (Columbia University, USA)
Martina Corso (EHU-CSIC/CFM, Spain)
Jeehwan Kim (MIT, USA)
Steven Koester (University of Minnesota, USA)
Kostas Kostarelos (ICN2/ICREA, University of Manchester, Spain)
Tomoki Machida (University of Tokyo, Japan)
Wencai Ren (Institute of Metal Research, Chinese Academy of Sciences, China)
Elisa Riedo (NYU, USA)
Lourdes F. Vega (Khalifa University, UAE)
Aravind Vijayaraghavan (The University of Manchester, UK)
Igor Aharonovich (UTS, Australia)
Isaac Alcón (Universitat de Barcelona, Spain)
Carmela Aruta (CNR-SPIN, Italy)
Saroj Prasad Dash (Chalmers, Sweden)
Lucia Gemma Delogu (Khalifa Univ. (UAE), Univ. of Padua, Italy)
Bengt Fadeel (IMM Karolinska Institutet, Sweden)
Felix R. Fischer (University of California Berkeley, USA)
Kangkang Ge (Université Paul Sabatier, France)
Brian D. Gerardot (Heriot-Watt University, UK)
Marcos Guimaraes (University of Groningen, The Netherlands)
Luis Hueso Arroyo (CIC NanoGUNE, Spain)
Bjarke S. Jessen (Technical University of Denmark, Denmark)
Catherine Journet-Gautier (Lyon 1 Université Claude Bernard, CNRS, France)
Keun Su Kim (Yonsei University, South Korea)
Mikito Koshino (Osaka University, Japan)
Xiao Li (City University of Hong Kong, Hong Kong)
Xiaobo Lu (Peking University, China)
Mathieu Luisier (ETHZ, Switzerland)
Miguel M. Ugeda (DIPC, Spain)
Kazunari Matsuda (Kyoto University, Japan)
Florie Mesple (University of Washington, USA)
Sainathan Nagarathanam (Tata Steel Limited, India)
Hanako Okuno (CEA-Grenoble, France)
Je-Geun Park (Seoul National University, South Korea)
Nacho Pascual (CIC NanoGUNE, Spain)
Chandrani Pramanik (Tata Steel Limited, India)
Gordon Rinke (AMO GmbH, Germany)
Yarjan Abdul Samad (Khalifa University, UAE)
Paolo Samorì (Université de Strasbourg, France)
Young-Woo Son (Korea Institute for Advanced Study, South Korea)
Sergio O. Valenzuela (ICN2, Spain)
Kenji Yasuda (Cornell University, USA)
Rezal Khairi Ahmad (NanoMalaysia Berhad, Malaysia)
Pedro Alpuim (INL, Portugal)
Seema Ansari (Centre for Materials for Electronics Technology, India)
Hassan Arafat (RIC2D & Khalifa University, UAE)
Sadegh Kamaei Bahmaei (Melexis, Switzerland)
Matthew Bishop (Dickinson Corp, USA)
Sivasambu Bohm (Graph-Nova & Imperial College London, UK)
Francesco Bonaccorso (BeDimensional, Italy)
Andrea Capasso (INL, Portugal)
Alba Centeno (Graphenea, Spain)
Hyun-Jong Chung (A Barristor Company, South Korea)
Jose Manuel de la Cruz Sánchez (INBRAIN Neuroelectronics, Spain)
Andrea Ferrari (Cambridge Graphene Centre / University of Cambridge, UK)
Costas Galiotis (FORTH/ ICE-HT, University of Patras, Greece)
Kamesh Gupta (India Graphene Engineering & Innovation Centre, India)
Kari Hjelt (Chalmers Industriteknik, Sweden)
Anastasios Manikas (University of Patras, Greece)
Kazuo Muramatsu (Incubation Alliance.Inc., Japan)
Ugo Sassi (Levidian, UK)
Tom Schram (IMEC, Belgium)
Valentyn S. Volkov (XPANCEO, UAE)

Advanced School and Workshop: StatPhys in Kigali (Satellite meeting of StatPhys29)

July 07-10, 2025
East African Institute for Fundamental Research College of Science and Technology CST Campus
Nyarugenge Kiyovu University of Rwanda
Kigali (Rwanda)
https://indico.ictp.it/event/10850
https://dipc.ehu.eus/en/scientific-activities/workshops/advanced-school-and-workshop-statphys-in-kigali-satellite-meeting-of-statphys29

Organizing Committee
Fulvio Baldovin (Università di Padova)
Aran Garcia-Lekue (DIPC, Ikerbasque)
Ali Hassanali (ICTP)
Catherine A. Meriaux (ICTP - EAIFR)
Ralf Metzler (University of Potsdam)
Joseph Ntahompagaze (University of Rwanda)
Enzo Orlandini (Università di Padova)
Edgar Roldan (ICTP)
Flavio Seno (Università di Padova)
Hugo Touchette (Stellenbosch University)

The first-ever StatPhys satellite meeting hosted in Africa aimed to bridge the African and International scientific communities in statistical physics, data science, nonlinear dynamics, and related applications, and provide ground for reciprocal knowledge and cross-fertilization.

Grasping an effective understanding of the behavior of complex systems is recognized as a major strategic issue in the development of modern societies as well as an outstanding challenge to modern physics and data science applications. Different approaches germinated in statistical physics, data science, and nonlinear dynamics have proven to provide reliable models to describe a variety of complex evolutions successfully. The meeting aimed to bring together scientists from a broad range of fields who are willing to exchange their experience in dealing with both fundamental and applicative problems. A two-day intense school on complex systems forewent the main workshop to favor African students' participation.

Invited Speakers
Giorgio Parisi (University of Rome La Sapienza, Italy)
Susana A. Barbosa (INESC-TEC, Portugal)
Mulugeta Bekele (Addis Ababa University, Ethiopia)
Somendra Bhattacharjee (Ashoka University, India)
Daniel Maria Busiello (Università di Padova, Italy)
Raphael Chetrite (University of Nice Sophia Antipolis, France)
Federico Corberi (University of Salerno, Italy)
Germaine Djuidje Kenmoe (University of Yaounde, Cameroon)
Reza Ejtehadi (Sharif University, Iran)
Rosemary J. Harris (University College London, UK)
Rhoda Hawkins (AIMS Ghana, University of Sheffield, UK)
Doris Heinrich (Technische Universität of Ilmenau, Germany)
Meyer-Ortmanns Hildegard (Constructor University Bremen, Germany)
Jean Francois Joanny (Institut Curie, France)
Tanniemola Liverpool (University of Bristol, UK)
Emanuele Locatelly (Università di Padova, Italy)
Jean-Pierre Nguenang (University of Douala, Cameroon)
Innocent Nkurikiyimfura (University of Rwanda, Rwanda)
Kingsley Obodo (ICTP-EAIFR, University of Rwanda, Rwanda)
Silvina Dawson Ponce (Universidad de Buenos Aires, Argentina)
Edgar Roldan (ICTP, Italy)
Daniel Madulu Shadrack (NM-AIST, Tanzania)
Yusuf Shaidu (University of California Berkeley, USA)
Ana-Suncana Smith (FAU Erlangen-Nürnberg, Germany)
Hulda Swai (NM-AIST, Arusha, Tanzania)
Conrad Bertrand (TABI, BIUST, Botswana)
Antonio Trovato (Università di Padova, Italy)
Tatek Yergou (Addis Ababa University, Ethiopia)

30th International Conference on Low Temperature Physics (LT30)

August 07-13, 2025
BEC, Bilbao
https://www.lt30.es

Chairs
Hermann Suderow (UAM)
Fernando Luis (CSIC)
Sebastian Bergeret (CSIC, DIPC)

LT30 is a major event in Physics, where peers discuss remarkable results and achievements over the past three years in one of the most vibrant fields of low temperature physics. LT has been regularly organized since 1946 all over the world.

Low Temperature Physics has been fundamental for the development of quantum science and technology. As 2025 marked the International Year of Quantum Science and Technology, the LT30 conference provided an excellent opportunity to disseminate research findings, as well as to explore and engage in discussions on new and exciting developments in the field.

Invited Speakers
Dai Aoki (Tohoku University, Japan)
Joe Checkelsky (Massachusets Institute of Technology, USA)
Claudia Felser (Max Planck Institute, Germany)
Francesca Ferlaino (Institute of Quantum Optics and Quantum Information of the Austrian Academy of Sciences, Austria)
Pablo Jarillo-Herrero (Massachusets Institute of Technology, USA)
William Oliver (Massachusetts Institute of Technology, USA)
Jörg Schmalian (Karlsruhe Institute of Technology, Germany)
Makoto Tsubota (Osaka Metropolitan University, Japan)
Päivi Törmä (Aalto University, Finland)
Lieven Vandersypen (QuTech, TU Delft, Netherlands)
Wolfgang Wernsdorfer (Karlsruhe Institute of Technology, Germany)
Andrea Young (University of California, USA)
John P.Davis (University of Alberta Physics, Zero Point Cryogenics, Canada)
Vladimir Eltsov (Aalto University, Finland)
Wei Guo (Florida State University, USA)
Petri Heikkinen (Royal Holloway, University of London, UK)
Tom Manovitz (Harvard University, USA)
Sebastian Will (University of Columbia, New York, USA)
Erez Berg (Weizmann Institute of Science, Israel)
Paul C. Canfield (Iowa State University, USA)
Seamus, JC. Davis (University of Oxford, UK)
Francisco Guinea (IMDEA, Spain)
Elena Hassinger (Institut für Festkörper-und Materialphysik, TU Dresden, Germany)
Peter Hirschfeld (University of Florida, USA)
Jiangping Hu (Institute of Physics, CAS, China)
Beena Kalisky (Bar-Ilan University, Israel)
Eun-Ah Kim (Cornell University, New York, USA)
Naoto Nagaosa (RIKEN Fundamental Quantum Science Program, Japan)
Roser Valenti (Goethe U. Frankfurt, Germany)
Amir Yacoby (Harvard University, USA)
Meng Wang (Sun Yat-Sen University, China)
Eli Zeldov (Weizmann Institute of Science, Israel)
Long Ju, (Massachusetts Institute of Technology, USA)
Vidya Madhavan (University of Illinois Urbana-Champaign, USA)
Jose Ignacio Pascual (NanoGune, Spain)
Stuart Parkin (Max Planck Institute, Germany)
Maia G. Vergniory (DIPC, Spain)
Klaus Ensslin (ETH Zürich, Switzerland)
Shahal Ilani (Weizmann Institute of Science, Israel)
Jeanie Lau (The Ohio State University, USA)
Rebeca Ribeiro (Université Paris-Saclay, CNRS, France)
Benjamin Sacépé (Neel Institut, Grenoble, France)
Christoph Strunk (University of Regensburg, Germany)
Javad Shabani (New York University, USA)
Ramón Aguado (ICMM-CSIC, Spain)
Natalia Ares (University of Oxford, UK)
Dafei Jin (University of Notre Dame, France)
Daniel Loss (University of Basel, Switzerland)
Mikko Möttönen (Aalto University, VTT, Finland)
Seigo Tarucha (RIKEN, Japan)
Yong-Hamb Kim (Institute for Basic Science, South Korea)
Jukka Pekola (Aalto University, Finland)

Synthetic Topological Matter (SYNTOM)

August 31 - September 6, 2025
Benasque Science Center, Benasque
https://benasque.org/2025stm/

Organizing Committee
Tobias Grass (DIPC, Ikerbasque)
Christof Weitenberg (TU Dortmund)
Bruno Juliá Díaz (U. Barcelona)
Leticia Tarruell (ICFO)
Selim Jochim (U. Heidelberg)

The workshop explored different methods to create topological phases of matter in atomic, photonic, and electronic platforms. In this context, a variety of quantum-optical techniques were discussed (optical driving, optical optical tweezers, optical lattices, optical driving, ring resonators). A lot of attention was also paid to quantum-optical tools that can probe the topological aspects of a quantum system, such as quantum gas microscopy, quantum phase microscopy, linear optical response, high harmonic generation. This discussion was complemented by an in-depth exchange on theoretical concepts that can be used to describe topological properties, including non-local order parameters, quantum metric, dynamical behavior.

Invited Speakers
Luca Asteria (Kyoto University, Japan)
Christoph Braun (LMU, Germany)
Alessio Celi (UAB, Spain)
Nigel Cooper (Cambridge, UK)
Olesia Dmytruk (École Polytechnique Palaiseau, France)
André Eckhardt (TU Berlin, Germany)
Nathan Goldman (LKB, France)
Mohammad Hafezi (JQI, USA)
Joyce Kwan (Harvard, USA)
Maciej Lewenstein (ICFO, Spain)
Diego Porras (IFF, CSIC Madrid, Spain)
Tomoki Ozawa (Riken, Japan)
Cécile Repellin (Grenoble, France)
Rodrigo Rosa-Medina (TU Wien, Austria)

Nanophotonics of 2D materials (N2D 2025)

October 06-09, 2025
Institute of Physics of the Nicolaus Copernicus University in Toruń, Poland
https://n2d-2025.faj.org.pl

Organizing Committee
Alexey Nikitin (DIPC, Ikerbasque)
Tony Low (University of Minnesota)
Luis Martín-Moreno (INMA, CSIC-UNIZAR)
Karolina Słowik (NCU)
Marta Pelc (NCU)
Sebastian Maćkowski (NCU)

Over the past decade, research on light-matter interactions in atomically thin materials—such as graphene, topological insulators, ultrathin polar and semiconducting layers, and other van der Waals materials & heterostructures—has seen remarkable growth. Nanophotonics of 2D Materials (N2D) is dedicated to exploring the optical phenomena of these materials while fostering interdisciplinary collaboration across a wide range of fields, including classical and quantum optics, condensed matter science, plasmonics, far- and near-field spectroscopies, many-body optical physics, and topological photonics. By bringing together researchers from diverse domains, N2D serves as a dynamic platform where unifying concepts take shape, novel ideas are sparked, and new frontiers in theoretical and experimental research on 2D materials nanophotonics emerge.

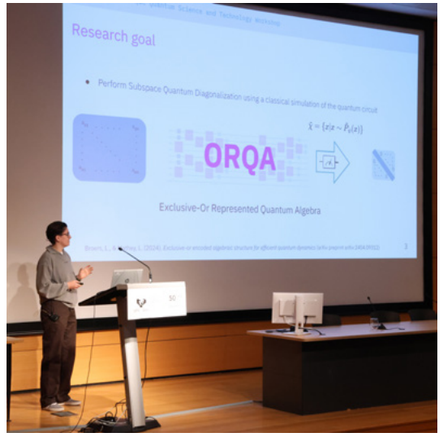
Invited Speakers
Pablo Alonso (Universidad de Oviedo, Spain)
Eva Andrei (Rutgers University, USA)
Andrés Ayuela (CFM, Spain)
Stéphane Berciaud (Université de Strasbourg, France)
Joel Cox (POLIMA, SDU, Denmark)
Stefano Dal Conte (Politecnico di Milano, Italy)
Gregory Fiete (Northeastern University, USA)
Kin Chung Fong (Northeastern University, USA)
Rainer Hillenbrand (CIC NanoGUNE, Spain)
Mun Seok Jeong (Hanyang University, South Korea)
Frank Koppens (ICFO, Spain)
Amos Martinez (Nature Materials, UK)
Sergey Menabde (Korea Advanced Institute of Science and Technology, South Korea)
Barbara Piętka (University of Warsaw, Poland)
Paulina Płochocka (Wrocław University of Technology, Poland)
Talat Rahman (University of Central Florida, USA)
Tatiana Rappoport (Federal University of Rio de Janeiro, Brazil)
Miriam Serena Vitiello (CNR Istituto Nanoscienze, Italy)
Andrzej Wysmołek (University of Warsaw, Poland)

8th Basque Quantum Science and Technology Workshop / 4th BasQ/IKUR Quantum Science and Technology Workshop

October 17, 2025
Paraninfo, EHU, Leioa
https://giedke.dipc.org/eusqutech25.html

Organizing Committee
Enrique Rico (CERN, EHU, Ikerbasque)
Geza Giedke (DIPC, Ikerbasque)

The meeting brought together researchers from various research institutions of the Basque Country (BCAM, CFM, DIPC, Tecnalia, Tecnun, EHU) and the University of Bordeaux that work in the (broadly defined) field of quantum science and technology. It served as a platform to present recent results and enter into scientific exchange with colleagues, especially during the 2,5h poster session. In total, 15 talks and more than 30 posters were presented, meaning that almost two-thirds of all participants contributed to the program.



Invited Speakers
Pablo Acedo (EHU, Ikerbasque, Spain)
Iñigo Arrazola (EHU Quantum Center, Bilbao, Spain)
Matthieu Saubanère (Laboratoire Ondes et Matière d'Aquitaine (LOMA), CNRS Bordeaux, France)
Ruben Pellicer (CFM, Donostia, Spain)

Scientific Meetings

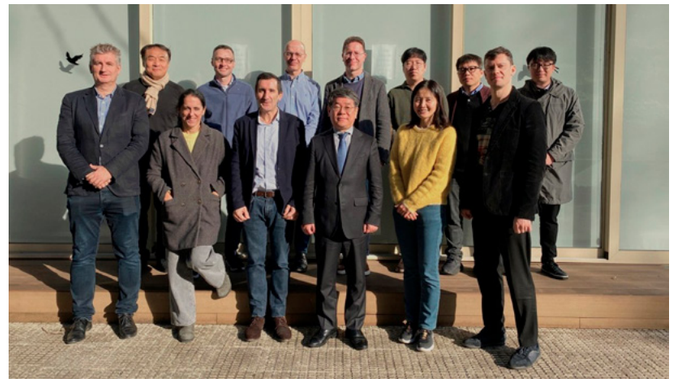
DIPC-KPS meeting

February 06, 2025
DIPC, Donostia / San Sebastián

A delegation from the Korean Physical Society (KPS) visited DIPC and participated in a joint workshop to explore potential collaborative programs between both institutions.

The president of the KPS and member of the Sejong University, Suklyun Hong, opened the session with an overview of the scientific structure in Korea and the theoretical study of two-dimensional van der Waals heterostructures, followed by the director of DIPC, Ricardo Diez Muiño, who introduced the scientific research at DIPC.

The event included short scientific presentations delivered by DIPC and KPS researchers during the morning, and a roundtable for the speakers in the early afternoon.



Meeting attendants
Suklyun Hong (Sejong University, South Korea)
Ricardo Díez Muiño (DIPC, Spain)
Keun Soo Kim (Sejong University, South Korea)
Aran Garcia-Lekue (DIPC, Spain)
Sang-Hee Shin (Sejong University, South Korea)
Javier Aizpurua (DIPC, Spain)
Bongjin Simon Mun (Gwangju Institute of Science and Technology, South Korea)
Deung-Jang Choi (DIPC, Spain)
Nicolas Lorente Palacios (DIPC, Spain)
Alexey Nikitin (DIPC, Spain)

Joint DIPC-Oxford Cosmology Workshop (COSMOS'25)

November 03-05, 2025
DIPC and Miramar Palace, Donostia / San Sebastián

The Oxford–DIPC workshop on large-scale structure brought together researchers from both institutions for an intensive three-day meeting aimed at fostering collaboration and developing new joint projects.

During the first day, participants gave brief presentations showcasing their current work, allowing everyone to get a clear overview of each group's expertise. On the second day, we held brainstorming sessions to identify common interests and draft a set of promising joint project ideas. On the last day, small teams met to kick-start these projects, outline initial tasks, and set up communication channels for continued collaboration.

Meeting attendants
David Alonso (Oxford University, UK)
Alex Roskill (Oxford University, UK)
Kevin Wolz (Oxford University, UK)
Adrien LaPosta (Oxford University, UK)
Lea Harscouet (Oxford University, UK)
Amy Wayland (Oxford University, UK)
Sara Maleubre (Oxford University, UK)
Jose Luis Bernal (IFCA, Spain)
Arianna Rizzieri (Oxford University, UK)
Raul Angulo (DIPC, Ikerbasque, Spain)
Tamara Richardson (DIPC, Spain)
Moritz Fischer (DIPC, Spain)
Mathilde Pinon (DIPC, Spain)
Ainhoa Zubiaur (DIPC, Spain)
Irati Lizaso (DIPC, Spain)
Sara Ortega-Martinez (DIPC, Spain)
Diego Villalba (UNAM, México)
Jens Stucker (Vienna University, Austria)

Higher Education

Topological Matter School 2025 (TMS25)

August 18-22, 2025
Miramar Palace, Donostia / San Sebastián
https://tms.dipc.org/

Organizing Committee
Maia G. Vergniory (DIPC, Max Planck for Chemical Physics of Solids)
Reyes Calvo (Universidad de Alicante)
Santiago Blanco-Canosa (DIPC, Ikerbasque)
Adolfo Grushin (Institut NEEL – CNRS)
Alexander Altland (University of Cologne)
Julen Ibañez-Azpiroz (Materials Physics Center, Ikerbasque)

This year, we focused on advancing our understanding of elementary excitations and their role in shaping the fundamental electronic and optical properties of crystalline solids. Excitations are central to the emergence of many novel quantum phenomena and can even lead to states of matter without equilibrium counterparts.

At the single-layer limit, we explored how quantum confinement and enhanced many-body interactions give rise to exotic correlated behavior. In particular, we investigated single-layer semiconductors that host tightly bound excitons with exceptionally large binding energies—remarkably stable even at room temperature.

In parallel, we extended our studies to bilayer and few-layer systems, where the relative twist angle between layers introduces an additional degree of freedom and tunability. This moiré engineering enables the realization of strongly correlated electronic states, adjustable band gaps, and novel optical and magnetic responses. These systems also provide a fertile platform for correlated topological phases, including the spin Hall and fractional quantum Hall effects.

Invited Speakers

Andrei Bernevig (Princeton University, USA)
Leni Bascones (CSIC, Spain)
Hoi Chun Po (Hong-Kong University, China)
Frank Pollmann (Technical University of Munich, Germany)
Johannes Hauschild (Technical University of Munich, Germany)
Xiaodong Xu (University of Washington, USA)
Raquel Queiroz (Columbia University, USA)
Ady Stern (Weizmann Institute, Israel)
Manuel dos Santos Dias (STFC Daresbury Laboratory, UK)
Roser Valentí (Frankfurt University, Germany)
Miguel Ugeda (DIPC, Spain)
Pablo Jarillo-Herrero (MIT, USA)

DIPC Courses

Fundamentals of Atomistic Machine Learning

May 6, 13, 20, 27 and June 3, 10, 2025
DIPC Seminar Room, Donostia / San Sebastián

Pablo M. Piaggi
CIC nanoGUNE, Donostia / San Sebastián, Spain

This course was aimed at graduate students in physics, chemistry, or engineering, as well as researchers in related disciplines. It covered the most important aspects of atomistic machine learning, i.e., the application of machine learning tools to predict properties of atomistic systems (molecules or condensed matter). Particular emphasis was made on learning properties derived from ab initio electronic structure calculations, as well as on the application of these tools to perform and analyze atomistic simulations.

The course was designed to be accessible to beginners in the field, while progressively introducing more advanced and state-of-the-art topics.

It consisted of six lectures (1.5 hours each), delivered on the blackboard, and four hands-on assignments based on Jupyter Notebooks. The hands-on assignments could be completed as homework, and additional time was allocated for questions.

LECTURE 1 - **Machine learning (ML) in the Natural Sciences:** A change of paradigm. Why did the AI revolution happen? Artificial neural networks as a universal function approximator and a tool to overcome the curse of dimensionality. Example applications in chemistry, materials science, biology, and condensed matter physics.

LECTURE 2 - **Basics of ML:** Supervised and unsupervised learning. Common tasks such as regression and classification. Generative models. Loss function. Mini-batch gradient descent. Deep neural networks, kernel regression, and other algorithms.

LECTURE 3 - **Atomistic ML:** Representation of local and global physical quantities. Equivariance and invariance. Permutation, rotation, and translation symmetry. Nearsightedness of matter. Concept of descriptors.

LECTURE 4 - **Descriptors:** Behler-Parrinello descriptors. SOAP descriptors. DeePMD learned descriptors. Using descriptors for dimensional reduction and characterization of atomic environments (fingerprints). Message passing graph neural networks.

LECTURE 5 - **ML models for interatomic interactions:** Classical and ab initio molecular dynamics. Limitations of semi-empirical and ab initio models. Short-range machine learning models for the interatomic interactions. System specific models. Active learning. Large atomic (foundation) models.

LECTURE 6 - **Long-range interactions:** ¿When and why are they needed? First principles electrostatics based on Wannier centers. Connection to modern theory of polarization. Other formalisms for treating long-range interactions and problems with charge conservation.

Transferable Skills Courses

Equipping researchers with skills beyond the purely scientific is a challenge that institutions are increasingly addressing through what are known as “transferable skills” training programs. Organized by Claire Tonnelé (DIPC, Ikerbasque) and Paula Malo de Molina (CFM), DIPC offers a program of courses and workshops addressing key aspects of researchers’ professional development, including research communication, data and publishing practices, as well as topics such as stress management, time and career management, and leadership. In 2025, 81 researchers took part in these courses.

An example of Open Access: BERC BCAM

June 4, 2025
DIPC Josebe Olarra Auditorium, Donostia / San Sebastián

Miguel Angel Benítez Lozano
Basque Center for Applied Mathematics (BCAM)

We introduced what open access in publishing is like in a BERC centre: BCAM, how we have adapted our centre to European and national mandates and what the process of change has been like. We focused on the importance of the preprint, talk about quantitative indicators and the DORA and COARA declarations.

First and Second Editions: Scientific Writing Workshop

September 16-18, November 10, 12 and 14, 2025
CFM Auditorium & DIPC Josebe Olarra Auditorium, Donostia / San Sebastián

Sofía Facal
Skills for Science

This workshop was designed for PhD students and early-career postdocs who wish to strengthen one of the most critical skills for success in science: scientific writing. Writing is not only the primary vehicle to communicate scientific results, it is also one of the key factors that will determine both impact and progression in a scientific career. Unfortunately, it is a skill that is rarely taught at university and is not always easy to master.

Unlike other forms of writing, scientific writing has its own structure, logic, and style. This workshop will guide participants through the key elements of scientific writing, from planning and drafting to publication, while also offering practical tools to communicate complex ideas clearly and effectively.

This year, we were pleased to announce a special session with Professor Javier Aizpurua, who has been among the most highly cited researchers for several consecutive years and has served as an editor of Nanophotonics. He shared his insights on the editorial process, peer review, and what editors look for in a manuscript. The special guest of the second edition of the workshop was Professor Haritz Sardon.

We also included a peer review exercise, where participants engaged in reviewing each other's work to gain hands-on experience with the peer review process.

SESSION 1 **Developing a Scientific Writing Mindset**
- Scientific Writing: impact, visibility, and scientific progress
- Overcoming common writing barriers
- Scientific writing as a process: tools, routines, and habits
- Differences between papers, thesis, and grant proposals
- Planning your paper: mind maps, figures-first strategy, and organizing content
- Tools to support your writing

SESSION 2 **Developing the Structure**
- Finding your story: problem-solution-impact
- Paper structure in detail: Title, Abstract, Introduction, Methods, Results, Discussion, Conclusions
- Visual communication: designing figures, tables, and captions
- Enhancing coherence and cohesion across sections

SESSION 3 **Publishing & Peer Review**
- Tips for writing abstracts and introductions
- Grammar: sentence structure and guidelines
- The peer-review process: how it works and how to navigate it
- Common mistakes and how to avoid them
- Writing effective cover letters and responding to reviewers
- Ethics and integrity in scientific writing (including AI use)

Curiosity and Creativity in Art and Science

October 13, 2025
DIPC Josebe Olarra Auditorium, Donostia / San Sebastián

Melissa Pierce Murray

In this talk, Melissa Pierce Murray explored curiosity and creativity in science and art, sharing examples from her own interdisciplinary practice. She discussed artistic and scientific methodologies, sensing and perception, and the role of metaphor in meaning creation and communication. The talk was followed by a hands-on workshop exploring perception through drawing.

About the speaker

Melissa Pierce Murray's practice considers how engagement, interactions, objects and materials can facilitate and deepen awareness of our place in the world. Often interactive or participatory, her sculptural works use an aesthetic driven approach to interweave materials, emotion and narrative, creating a tactile allure and unnerving edginess. With a background in science, literature, art and teaching, she draws on broad knowledge and inspiration to create innovative encounters between sculptural objects and diverse audiences.

Theses

Atomistic simulations of electronic structure and coherent transport in 1D & 2D carbon-based nanoarchitectures.
Xabier Díaz de Cerio
28/02/2025
Supervisor: Arantzazu García Lekue

Theoretical description of femtosecond laser-induced desorption dynamics using AB initio and machine learning methods: pure CO and mixed CO+O adlayers on Pd(111).
Alfredo Serrano Jiménez
28/03/2025
Supervisors: Maite Alducin Ochoa & Iñaki Juaristi Oliden

Quantum magnetism in systems with SU(N) symmetry and magnetic impurities in superconductors.
Chen How Huang
09/04/2025
Supervisor: Miguel Ángel Cazalilla Gutiérrez

Ab initio study of chemically designed 2D carbon-based networks.
Sara Lois Cerdeira
14/04/2025
Supervisors: Aran García-Lekue & Ane Sarasola

Quantum adventures from analog to digital: gauge, scars and laughlin.
Barbara Andrade dos Santos
07/05/2025
Supervisors: Tobias Grass & Maciej Lewenstein

Electronic structure and ordering in quantum materials.
Antonio David Subires Santana
23/05/2025
Supervisors: Santiago Blanco Canosa & Luis Hueso Arroyo

Spin-dependent phenomena in superconductor hybrid structures.
Tim Kokkeler
03/06/2025
Supervisors: Sebastian Bergeret & Hans Hilgenkamp

Quantum electronic properties of low-dimensional transition-metal systems: modeling, simulation and characterization.
Irián Sánchez Ramírez
20/06/2025
Supervisors: Maia García Vergniory & Fernando de Juan Sanz

Topological features in magnetically-ordered and correlated crystals.
Mikel García Díez
27/06/2025
Supervisors: Maia García Vergniory & Juan Luis Mañes Palacios

The assembly of nuclear star clusters.
Nils Hoyer
02/07/2025
Supervisors: Silvia Bonoli & Nadine Neumayer

Simulating structure formation in the universe.
Lurdes Ondaro Mallea
04/07/2025
Supervisor: Raúl Angulo de la Fuente

Photon statistics and entanglement from two interacting quantum emitters.
Adrian Juan Delgado
28/07/2025
Supervisors: Javier Aizpurua Iriazabal & Rubén Esteban Llorente

Aluminium modulation of the dynamics of short disordered peptides.
David Silva Brea
24/07/2025
Supervisors: Xabier López Pestaña & David de Sancho Sánchez

Atomistic ab initio study of optical excitations in nanoplasmonic systems as probed by light and fast electrons.
Bruno Candelas Peñalba
05/09/2025
Supervisors: Nerea Zabala Unzalu & Javier Aizpurua Iriazabal

Modeling cosmological observables beyond the perturbative regime.
Francisco Germano Maion
10/09/2025
Supervisor: Raúl Angulo de la Fuente

Polaritons in anisotropic van der Waals crystals.
Kirill Voronin
12/09/2025
Supervisor: Alexey Nikitin

Properties of magnetic molecules on superconducting and normal metal substrates.
Divya Jyoti
30/09/2025
Supervisors: Nicolás Lorente Palacio & Deung-Jang Choi
State-interaction approaches to the molecular g-matrix: implementation, analysis and applications.
Antonio Cebreiro Gallardo
03/10/2025
Supervisor: David Casanova Casas

Theoretical study of high-pressure effect on cycloaddition and cycloreversion reactions.
Mohammed Loukili
06/10/2025
Supervisor: Bo Chen

Towards high-pressure noble gaseous detectors for coherent elastic neutrino-nucleus scattering.
Leire Larizgoitia Arcocha
13/10/2025
Supervisor: Francesc Monrabal Capilla

Growth and electronic properties of rare–earth–noble metal surface compounds grown on curved single crystals and their protection by 2D materials.
Alaa Mohammed Idris Bakhit
17/10/2025
Supervisor: Frederik M. Schiller

Electrons in surface acoustic waves as spin qubits.
Mikel Olano Aranburu
30/10/2025
Supervisor: Geza Giedke

The disruption of stars from massive black holes in a cosmological context.
Markos Polkas
03/12/2025
Supervisor: Silvia Bonoli

Toward controlling the topology of branched cyclic polyglycerol: from the monomer approach to the hypergrafting of cyclic polyglycidol.
Carlo Andrea Pagnacco
05/12/2025
Supervisor: Fabienne Barroso Bujans

Chaotic and relativistic dynamics of magnetic textures: topology and applications in reservoir computing.
Javier Antonio Vélez Simanca
05/12/2025
Supervisor: Rubén M. Otxoa & Kostyantyn Gusliyenko

Modelling photoluminescence in organic systems: exploring the impact of aggregation and mechanical effects on the molecular, electronic and optical properties.
Josianne Owona
11/12/2025
Supervisors: Claire Tonnelé & Frédéric Castet

Quantum theory of photon emission in current-driven single-molecule tunnel junctions.
Andrés Bejarano
12/12/2025
Supervisors: Thomas Frederiksen, Fabio Pistolesi, & Rémi Avriller

Anomalous wave phenomena in 2D materials.
Kateryna Domina
12/12/2025
Supervisor: Alexey Nikitin

Characterization methods based on mie scattering.
Martín Molezuelas Ferreras
18/12/2025
Supervisor: Gabriel Molina Terriza

Construction and operation of the NEXT-100 detector.
Miryam Martínez Vara
19/12/2025
Supervisors: Michel Sorel, Justo Martín Albo & Juan José Gómez Cadenas

From electronic coupling to exciton dynamics: modeling photophysical processes in rubrene solids.
Aitor Díaz Andrés
19/12/2025
Supervisor: David Casanova

Credits

CREATIVE DIRECTION AND DESIGN
Julen Cano | info@julencano.com

TEXT COORDINATION
Marta Vega de Seoane | marta.vegadeseoane@dipc.org

PRINTING
Editorial MIC | mic@editorialmic.com

https://**dipc**.ehu.eus

Manuel Lardizabal 4 E-20018 Donostia / San Sebastián