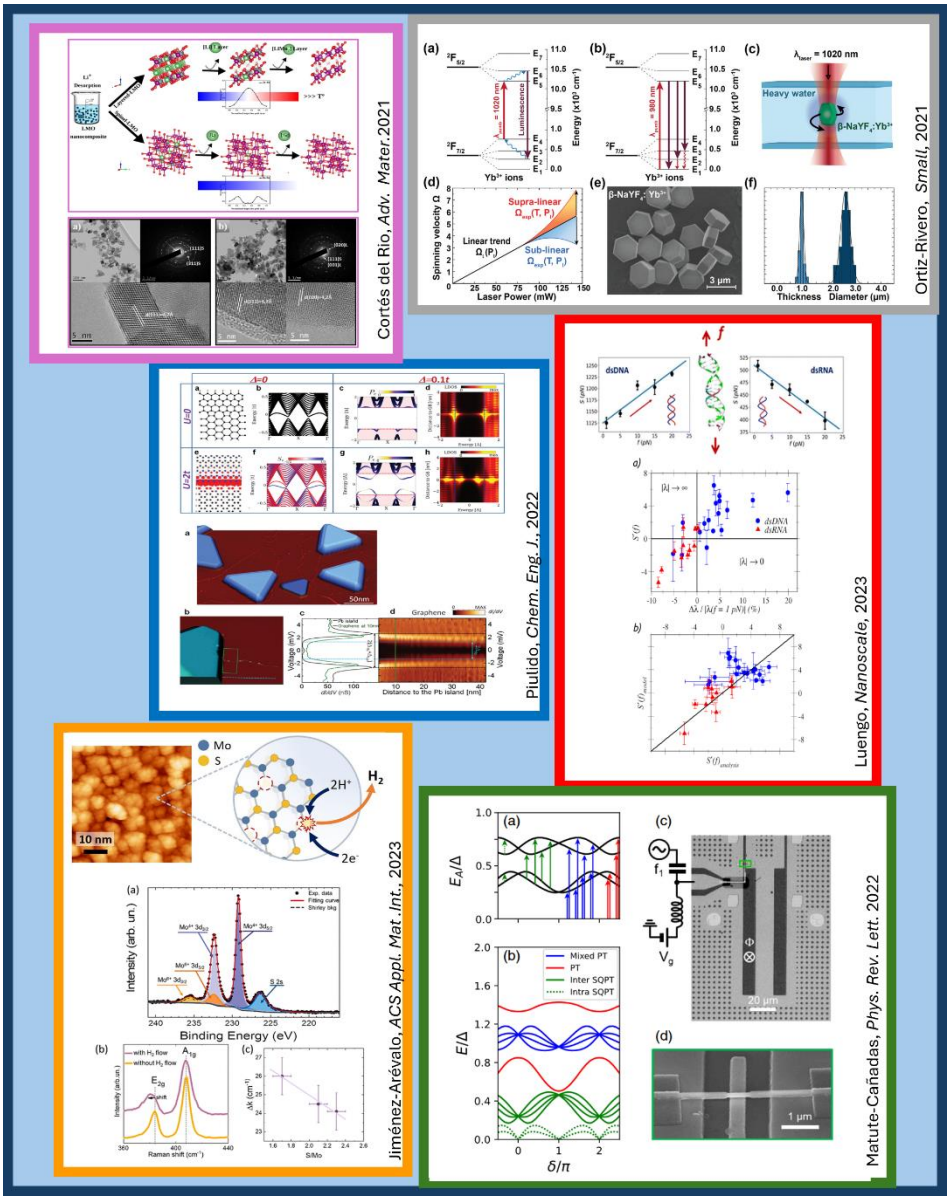
Nicolás Cabrera
University Institute
of Materials Science



Activity report 2023

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Cover image:
Figures selected from the articles awarded in the three calls of the
"Chema Gómez-Rodríguez" Awards to young researchers.

Nicolás Cabrera
University Institute of Materials Science

ACTIVITY REPORT 2023

Edited by Isabel J. Ferrer in March, 2024

UAM | Instituto Nicolás Cabrera

CONTENT

Foreword

Dear members of the INC,

It is a pleasure and an honor to present, for the fourth consecutive year, the annual activity report of the Nicolás Cabrera Institute, corresponding to the year 2023. It has been a challenging year for the institute in some respects, but also very positive in others.

On the negative side, it's important to note that we have been without a manager at the institute for over twelve months. Once the three-year temporary contracts for various support positions within institutes, departments, etc., expired, the university stated that it could no longer finance these essential positions. Recent legislative changes have not helped find a solution, but we trust to have it resolved very soon, in any case, before the next Summer School. It must be said that this problem was not tragic in the 2023 edition because the school was mostly managed by the European Magnetic Association, but it is crucial to solve this problem.

Specifically, the XXIX International Summer School Nicolás Cabrera had the theme of "Nanomagnetism for Emerging Technologies," as detailed in this report. Another negative aspect of this year was that the main organizer of this school, Prof. Julio Camarero, has been dealing with serious health problems since July and could not participate in the September School. We take this opportunity to wish him a soon recovery.

Similar to the INC Summer School, we also had the financial support of the BBVA Foundation this year to hold two more colloquia in the "Frontiers in Materials Science" series, given by professors Joel E. Moore and Jacob Linder.

Another highlight of the institute's activities was once again the traditional Young Scientists' Meeting in December, which celebrated its 26th edition with around 100 attendees, the vast majority of them young researchers associated with the INC, again surpassing the attendance limit established at La Cristalera residence. As described throughout this report, among the participants were the twelve Physics students awarded for conducting a small research project, as well as the two young researchers from the institute who received one of the "Chema Gómez-Rodríguez Awards" in its third edition.

I would like to remind once again that the list of research papers published by the members of the Institute, listed in this Annual Activities Report of the INC and used by the Vice-Rectorate for Scientific Policy of the UAM to evaluate the activity and functioning of institutes and research centers, only includes publications explicitly affiliated with the INC. In 2023, we have already slightly exceeded 100 articles, but surely there could be more. Do not forget to include the reference to the "Nicolás Cabrera" Institute in the affiliations of your articles, as otherwise they do not count as publications by INC members.

In the last Institute Council meeting held in February 2024, the enrollment of 8 new members of the Institute was ratified, but this year there was also a meticulous effort to account for departures, typically due to retirements and doctoral and postdoctoral researchers whose contracts had ended. Currently, the Nicolás Cabrera Institute consists of 142 members, 84 of whom are permanent members according to UAM regulations (see complete list in the last part of this report).

I began this preface by recalling that it is the fourth consecutive year that I present the annual activity report of the INC. This is equivalent to acknowledging that this year 2024 (just like in half the planet, without comparing!) is also an election year for the institute's leadership. Elections must be called for this summer. Perhaps it is still too early to take stock of these four years, although I can already say that it has been quite an experience, exciting and rewarding many times, overwhelming and very responsible at others, but always moving forward thanks to the enthusiastic support of the team and the INC management committee, as well as the departments that make up the institute. I only hope that whoever becomes the new director of "Nicolás Cabrera" after the summer puts in as much effort as we have, and if they are even more successful, then all the better.

Miguel Ángel Ramos, INC Director

"Nicolás Cabrera" International Summer School"

The **XXIX International Summer School of the Nicolás Cabrera Institute (INC)** was held the week of September 11-15, 2023, at the residence "La Cristalera" in Miraflores de la Sierra, under the title: **"Nanomagnetism for Emerging Technologies"**. In the present edition, the School was developed in collaboration with the European Magnetic Association as part of the European School of Magnetism and organized by Julio Camarero (UAM) and Lucas Perez (UCM).

In this edition, the School focused on Nanomagnetism, particularly its impact on emerging technologies. Nanomagnetism is the scientific field within magnetism, dedicated to studying materials in which at least one of their dimensions is at the nanoscale. This field has experienced growing activity in recent decades, driven mainly by two aspects associated with the effect produced by the reduced size. On the one hand, it allows interaction with living matter, giving rise to the fascinating field of nanomedicine. On the other hand, new physical phenomena appear at the nanoscale that would enable, for example, new ways of manipulating a flow of electrons while reducing energy losses, which has led to the emergence of the field of spintronics or the development of novel multifunctional nanomaterials. Nanomagnetics-based solutions address current and future societal challenges, giving rise to a new generation of disruptive technologies for use in many aspects of our daily lives, covering areas as different as data storage and sensing, energy harvesting and conversion, and biomedicine.

The School was organized in a hybrid format, with 89 students participating in La Cristalera in person and 50 attending *online*. All sessions were *streamed*, including the possibility to actively participate for *online* participants, to ensure the online experience was as fruitful as possible. Specific workshops were also organized. Most students who participated in person were PhD students from European countries (Spain, Germany, France, Italy, Sweden, Greece, Iceland, etc.) Among the *online* participants, in addition to Europeans, there were also Asian (China and India) and American (Colombia) students. Between lectures and workshops, 16 scientists participated from the world's best research centers in nanomagnetism (Max Planck Institute for Chemical Physics of Solids and Helmholtz-Zentrum Dresden-Rossendorf in Germany, SPINTEC and Aix-Marseille University in France, University of Liège in Belgium, Czech Academy of Sciences or the National Institute of Standards and Technology in the USA) as well as Spanish researchers from the Complutense University of Madrid, the University of Salamanca, IMDEA Nanoscience and CSIC.

It is worth highlighting the synergy established with the European Magnetism Association, reflected in the attendance and active participation throughout the school of the EMA's president, Prof. Olivier Fruchart, and the Director of the European School of Magnetism, Prof. Bertrand Dupé.

Group picture of the 2023 International Summer School at the Miraflores de la Sierra site.

The list of speakers who participated in the School (lectures, workshops and special sessions) and their affiliations is as follows:

- ✓ Bernard Dieny (SPINTEC, France).
- ✓ Denys Makarov (Helmholtz-Zentrum Dresden-Rossendorf, Germany).
- ✓ Nicolas Jaouen (Soleil Synchrotron, France).
- ✓ Jacobo Santamaría (Universidad Complutense de Madrid, Spain).
- ✓ Joerg Wunderlich (Czech Academy of Science e Hitachi Cambridge Laboratory).
- ✓ Alberto Bollero (IMDEA Nanociencia, Spain).
- ✓ Puerto Morales (ICMM-CSIC, Spain)
- ✓ Lucas Pérez García (Universidad Complutense de Madrid e IMDEA Nanociencia, Spain).
- ✓ Felipe García Sánchez (Universidad de Salamanca, Spain)
- ✓ Pablo Olleros (IMDEA Nanociencia, Spain).
- ✓ Bertrand Dupé (Lieja University, Belgium)
- ✓ Sandra Ruiz Gómez (Max Planck Institute for Chemical Physics of Solids, Germany).
- ✓ José Luis Fernández Cuñado (Universidad Autónoma de Madrid, Spain).
- ✓ Aurelien Manchon (Aix-Marseille University, France).
- ✓ Ron Golfard. (National Institute of Standards and Technology, EEUU).
- ✓ Montse Rivas, (Universidad de Oviedo, Spain).
- ✓ Jeff Childress, (Crocus Technology, France).
- ✓ Claire Donnelly (Max Planck Institute for Chemical Physics of Solids, Germany).
- ✓ Olivier Fruchart (SPINTEC-France, EMA president and former director of the ESM).

The "Nicolás Cabrera" International Summer School has been celebrated annually since 1994 and the Fundación BBVA has supported its organization since 2002.

Fundación BBVA

Colloquia

In 2023, two conferences were given as part of the series of colloquiums called "**Frontiers in Materials Science**" dedicated to Professor Nicolás Cabrera in collaboration with the BBVA Foundation. In this edition, Professors **Joel E. Moore,** (UC Berkeley, Lawrence Berkeley National Laboratory USA), who gave the lecture **"Searching for topological phases of matter and their electromagnetic signatures** on October 23 and **Jacob Linder,** (Department of Physics, Norwegian University of Science and Technology NTNU, Norway) with the lecture entitled **"Utilizing spin and orbital angular momenta with superconductors"** given on November 28, 2023.

The colloquia were imparted in English and took place in the Grade Room and Conference Room of the Science Faculty at the UAM, respectively. A broad group of professors, researchers, and Ph.D. students attended both colloquia.

During their brief stay at UAM, Professors Moore and Linder visited some research laboratories of related groups to foster new scientific collaborations.

The colloquium series "*Frontiers in Materials Science*" is held annually starting in 2022, following the previous colloquium series "*Frontiers in Condensed Matter Physics*" held annually between 2013 and 2020. Both series are being supported by the BBVA Foundation's "Frontiers in Science and Technology" program since its inception in 2013.

Fundación **BBVA**

Awards for Undergraduate Physics students

The Nicolás Cabrera Institute awarded 12 prizes funded by the Departments of Theoretical Condensed Matter Physics, Condensed Matter Physics, Applied Physics and Materials Physics, the Condensed Matter Physics Center, IFIMAC and the Nicolás Cabrera Institute itself (two prizes each except for the Materials Physics Department which funded three prizes and the Nicolás Cabrera Institute which funded one). These awards aim to attract physics students towards the research groups and to promote the scientific work of the Institute.

The following is the list of the awarded students, together with the titles of their presentations at the XXVI Young Researchers Meeting, which correspond to the research topics in which they participated:

- **Unai Cuevas Gómez**, "*Study of the localized surface plasmon resonance (LSPR) and electrical near field using classical electrodynamic calculations"*
- **Marcos Esteban Hernández**, "*Molecular adsorption of ClAlPc on h-BN/Rh(110)*"
- **Lucía Guerrero Muñoz**, "*Growth and characterization of ferromagnetic-superconductor systems with spin-orbit coupling*"
- **César Hernando de la Fuente,** *" Ferroelectrically driven SHG spatial modulation in monolayer MoS_2-$LiNbO_3$ heterostructures"*
- **Diego Marni Sobrino,** "*Mach-Zender Interferometer for the measurement of the HONG-OU-MANDEL Effect"*
- **César Montero Robles,** *"Theory and simulation of moiré patterns in graphene-type rotated bilayers and bidimensional systems"*
- **Lucía Romero Sánchez, "***Development of an efficiently UHV modulable system, to atomically characterize and clean 2D flakes"*
- **Abel Rosado Peinado,** *"Computational simulation of bioinspired materials: peptide nanotubes"*
- **Eduardo Sánchez Sáez,** "*Nonlinear vibration-phonon interactions in molecular crystals"*
- **Carlos Sánchez Cruz,** *"Artificial neuron based on reversible control of the Bloch-Point Domain Wall in Ferromagnetic Nanowires"*
- **Tomás M. Sintes Pineda,** "*Theory of Electron Spin Resonance in Scanning Tunneling Microscopy"*
- **Yi An Xia,** *"Enhancement of exciton recombination in MoS_2 deposited on a substrate undergoing a ferro- to paraelectric transition"*

Photograph of the winners with the director of the Institute during the delivery of diplomas.

"Chema Gómez-Rodríguez" Awards for young researchers

The Nicolás Cabrera Institute convened the Third Edition of the "Chema Gómez-Rodríguez" Awards, so named in memory of Professor José María Gómez Rodríguez and financed by the Department of Condensed Matter Physics, to promote the excellent work of the young scientists of the INC recognizing their contributions in high-impact publications during the year 2023. In this call, 11 applications were submitted, among which the commission made the following selection of students and their article published in 2023:

Forst Prize, Juan LUENGO MARQUEZ for his publication **"*Force-dependent elasticity of nucleic acids",*** Nanoscale 15, 6738 (2023).

This theoretical work proposes a novel fluctuations-based approach to address the mechanical properties of nucleic acids, going beyond a linear theory of Elasticity. The authors are able to extract the dependence of the elastic parameters on the applied stress, which they attribute to microscopic structural changes of the chains. They apply the approach to short double stranded DNA and RNA. They reach clear and well-supported conclusions and predictions that await for experimental test and could have a strong impact in the field. Juan LUENGO MARQUEZ contributed to all parts of the work, developed by himself a toy-model to describe the modification of the twist modulus by the applied force, and wrote the manuscript.

Second Prize, Nuria JIMÉNEZ AREVALO for her publication **"*MoS_2 Photoelectrodes for Hydrogen Production: Tuning the S-Vacancy Content in Highly Homogeneous Ultrathin Nanocrystals*"**, ACS Appl. Mater. Interfaces 15, 33514 (2023).

The authors use salt-assisted CDV to grow 2D-MoS_2 nanoflakes and optimize their photo-electrochemical properties. The technique allows to tune the S/Mo ratio and to obtain flakes with a high density of active sites. The authors thoroughly characterized the grown samples and measured the electrocatalytic activity for the hydrogen evolution reaction (HER). Excellent Faradaic efficiency and stability were obtained. The results have potential for important impact in the field of "green hydrogen". The work of the student is impressive; both by the synthesis of the material and by the number of techniques used to characterize them. She was deeply involved in all aspects of the work.

The INC's external Scientific Advisory Committee, formed by Alicia de Miguel (ICMM – CSIC, Spain), Akhlesh Lakhtakia (Pennsylvania State University, USA), Herre Van der Zant (TU Delft, Netherlands) and Cristian Urbina (CEA – Saclay, CNRS, France) selected the awarded papers.

Photograph of the winners with Dr. Alicia de Andrés, member of the Scientific Advisory Committee and the director of the Institute in the delivery of diplomas.

Young Researchers Meeting

Picture of the Invited Speaker, Elsa Prada, during her talk

The **XXVI "Nicolás Cabrera" Young Researchers Meeting** occurred on December 15, 2023, at the "La Cristalera" Residence of the UAM in Miraflores de la Sierra. This year, the participation has been restricted to doctoral students and recent doctors whose thesis supervisor was a member of the INC due to space limitations and the growing interest in participating in this journey by UAM PhD students. Finally, there were 59 poster contributions, 13 oral communications and two seminars given by the award-winning "Chema Gómez-Rodríguez" in addition to the invited conference. The event was a success in terms of attendance, with around 100 attendees, including some senior members of the Institute who wanted to be present.

The **program of the journey** was the following:

The inauguration was carried out by the director of the Institute, Miguel Ángel Ramos.

The first session was moderated by Dr. Fabrice Leardini.

The invited conference entitled: **"Searching for Majorana bound states in superconductor-semiconductor nanostructures"** was given by **Dr Elsa Prada**, Researcher at the Materials Science Institute, CSIC, who received the dissemination award from the American Society of Physics (APS) in 2014 and was awarded the "Royal Academy of Sciences Foundation for Young Female Talent" award in the "Physics and Chemistry" category for her scientific career in 2021**.**

Next, the students with the "Chema Gómez-Rodríguez" award for the best research works published this year by predoctoral students received their diplomas and presented their research work as a small seminar:

- **Juan Luengo Márquez,** "Force-dependent elasticity of nucleic acids"
- **Nuria Jiménez Arévalo,** "MoS_2 photoelectrodes for hydrogen production: tuning the S-vacancy content in highly homogeneous ultrathin nanocrystals "

Later, the Research Awards ceremony for Physics students took place.

Subsequently, the coffee break occurred during the first poster session, in which the young researchers presented their communications, including some of the award-winning Physics students who presented the results of their prize-associated research in this format.

In the second session, moderated by Dr Emma Martín, a selection of communications was presented by young researchers in the following order:

- **Leyre Aldaz Caballero,** "Bringing together lanthanide and chromium ions for brighter emission"
- **Manuel Fernández López,** "Emergent spinons in the Weyl-Mott metal-insulator transition"
- **David Palma,** "Wide band gap Cu2ZnGe(S,Se)4 thin-film semi-transparent solar cells"
- **Ángel Ibabe,** "Joule heating effects in superconducting InAs nanowire islands"

The first activity of the afternoon, moderated by Dr Salvattore Assenza, consisted of a new selection of communications presented by young researchers in the following order::

- **María Jesús Rodriguez Espinosa,** "Mechanical disassembly of human picobirnavirus like particles indicates that cargo retention is tuned by the RNA–coat protein interaction"
- **Javier Fernández Martínez,** "Strain effects and quasi-particle conversion in monolayer MoS2 deposited on chains of metallic nanoparticles"
- **Miguel Ángel Martínez García,** "Coherent electron-vibron interactions in surface-enhanced Raman"

During the afternoon coffee break, the second poster session was held, in which the young researchers, including the awarded Physics students, participated. Finally, in the last session, moderated by Dr Diego Cano, three talks were presented by different students in the following order:

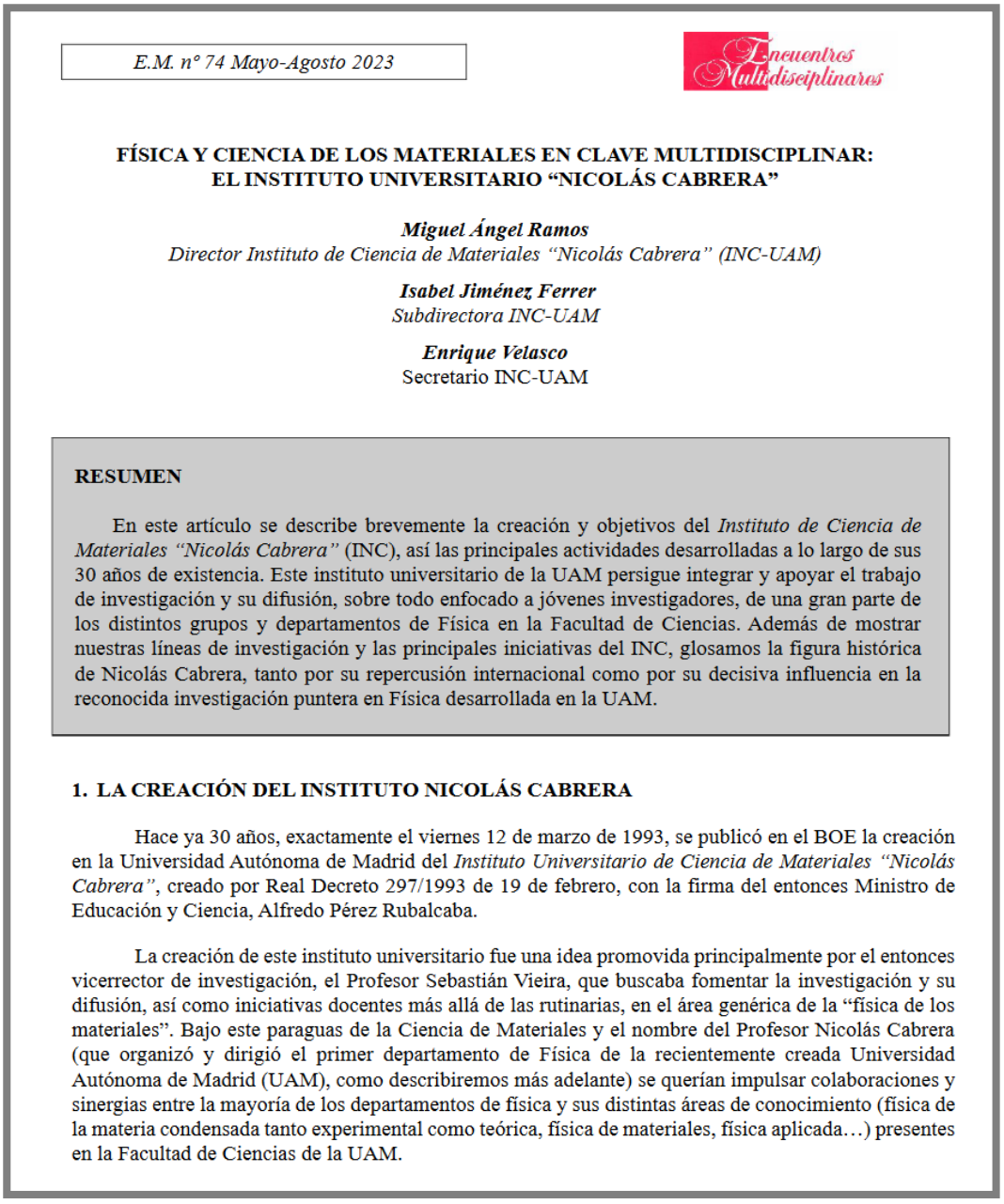
- **Fengchan Zhang,** "A stable ratiometric thermo-induced fluorochromatic probe for temperature sensing in living cells"
- **Jaime Abad,** "Spontaneous symmetry breaking in diffraction"
- **Miguel Cantero,** "Mechanical tomography of an archaeal lemon-shaped virus reveals membrane-like fluidity of the capsid and liquid nucleoprotein cargo"

Women presented 30% of the selected communications and 25% of the posters.

Some pictures of the poster session.

Invited Article

This year, coinciding with the **thirtieth anniversary** of the foundation of the Nicolás Cabrera Institute, the Institute's management has published an article in the magazine ***Encuentros Multidisciplinares*** at the invitation of its editor and director, Jesús Lizcano, as a contribution to a series of articles dedicated to describing the research centers and institutes of the Autonomous University. Below is an image of part of the first page:



E.M. nº 74 Mayo-Agosto 2023

Encuentros Multidisciplinares

FÍSICA Y CIENCIA DE LOS MATERIALES EN CLAVE MULTIDISCIPLINAR: EL INSTITUTO UNIVERSITARIO "NICOLÁS CABRERA"

Miguel Ángel Ramos
Director Instituto de Ciencia de Materiales "Nicolás Cabrera" (INC-UAM)

Isabel Jiménez Ferrer
Subdirectora INC-UAM

Enrique Velasco
Secretario INC-UAM

RESUMEN

En este artículo se describe brevemente la creación y objetivos del *Instituto de Ciencia de Materiales "Nicolás Cabrera"* (INC), así las principales actividades desarrolladas a lo largo de sus 30 años de existencia. Este instituto universitario de la UAM persigue integrar y apoyar el trabajo de investigación y su difusión, sobre todo enfocado a jóvenes investigadores, de una gran parte de los distintos grupos y departamentos de Física en la Facultad de Ciencias. Además de mostrar nuestras líneas de investigación y las principales iniciativas del INC, glosamos la figura histórica de Nicolás Cabrera, tanto por su repercusión internacional como por su decisiva influencia en la reconocida investigación puntera en Física desarrollada en la UAM.

1. LA CREACIÓN DEL INSTITUTO NICOLÁS CABRERA

Hace ya 30 años, exactamente el viernes 12 de marzo de 1993, se publicó en el BOE la creación en la Universidad Autónoma de Madrid del *Instituto Universitario de Ciencia de Materiales "Nicolás Cabrera"*, creado por Real Decreto 297/1993 de 19 de febrero, con la firma del entonces Ministro de Educación y Ciencia, Alfredo Pérez Rubalcaba.

La creación de este instituto universitario fue una idea promovida principalmente por el entonces vicerrector de investigación, el Profesor Sebastián Vieira, que buscaba fomentar la investigación y su difusión, así como iniciativas docentes más allá de las rutinarias, en el área genérica de la "física de los materiales". Bajo este paraguas de la Ciencia de Materiales y el nombre del Profesor Nicolás Cabrera (que organizó y dirigió el primer departamento de Física de la recientemente creada Universidad Autónoma de Madrid (UAM), como describiremos más adelante) se querían impulsar colaboraciones y sinergias entre la mayoría de los departamentos de física y sus distintas áreas de conocimiento (física de la materia condensada tanto experimental como teórica, física de materiales, física aplicada…) presentes en la Facultad de Ciencias de la UAM.

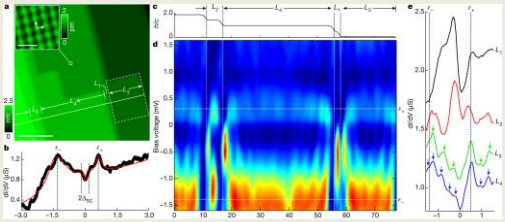
Encuentros Multidisciplinares is a digital and open-access magazine edited by UAM Ediciones. It was born with the purpose of serving as a channel to bring closer and connect several scientific disciplines, as well as to disseminate and debate topics analyzed from different disciplines or fields of science and knowledge, trying to give a multidisciplinary vision of the scientific world and the current society.

Science at INC

The articles published in 2023, whose affiliations the INC expressly appears, are listed in the publications section of this report in reverse chronological order of their online publication. This section shows those published in journals with a high impact index, representing 33% of the total. The presence of journals with a very high impact index such as Nature (64.8), Advanced Materials (29.4) and Advanced Energy Materials (27.8) stands out. Significantly, 15% of the articles are published in journals of the American Physical Society (Physical Review Journals), and 7% are published in journals edited by Nature.

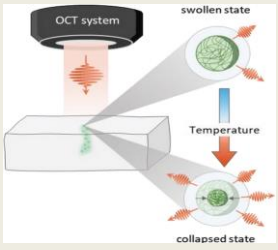
Quantum-well states at the surface of a heavy-fermion superconductor, **Herrera, E., Guillamón, I**; Barrena, V; Herrera, WJ; Galvis, J.A; **Levy Yeyati, A;** Rusz, J; Oppeneer, PM; Knebel, G; Brison, JP; Flouquet, J; Aoki, D; **Suderow, H;** et al. **Nature 616**, 465-469 (Mar 2023).

Two-dimensional electronic states at surfaces are often observed in simple wide-band metals such as Cu or Ag. Confinement by closed geometries at the nanometre scale, such as surface terraces, leads to quantized energy levels formed from the surface band, in stark contrast to the continuous energy dependence of bulk electron bands. Their energy-level separation is typically hundreds of meV. In a distinct class of materials, strong electronic correlations lead to so-called heavy fermions with a strongly reduced bandwidth and exotic bulk ground states.Quantum-well states in two-dimensional heavy fermions (2DHFs) remain, however, notoriously difficult to observe because of their tiny energy separation.



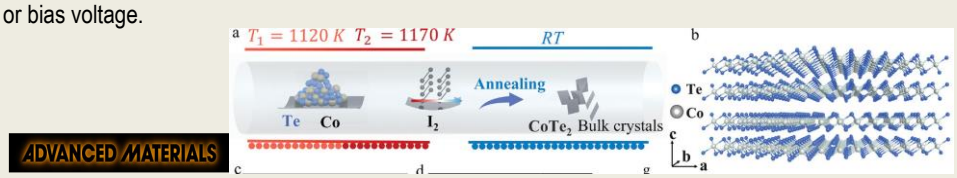
3D Optical Coherence Thermometry Using Polymeric Nanogels. Muñoz-Ortiz, T; Alayeto, I; Lifante, J; **Ortgies, DH; Marin, R; Martín, E;** Iglesias de la Cruz, MC; **Lifante-Pedrola G;** Rubio-Retama, J; **Jaque, D:** **Adv. Mater**. **35,** 2301819 (Jun 2023).

In nanothermometry, the use of nanoparticles as thermal probes enables remote and minimally invasive sensing. Despite the strides of this technology in preclinical settings, nanothermometry is not mature enough to be translated to the bedside. This work simultaneously overcomes its limitations by proposing the technology of optical coherence thermometry (OCTh). This is achieved by combining thermoresponsive polymeric nanogels and optical coherence tomography (OCT)—a 3D imaging technology routinely used in clinical practice.



Terahertz Nonlinear Hall Rectifiers Based on Spin-Polarized Topological Electronic States in 1T-CoTe2. Hu, Z; Zhang, L; Chakraborty,A; D'Olimpio, G; Fujii, J; Ge, A; Zhou, Y; Liu, Ch; Agarwal, A; Vobornik, I; **Farias, D;** et al. **Adv. Mater**. **35,** 2209557 (Jan 2023).

The nonlinear photoresponse generated by the NLHE at room temperature can be useful for numerous applications in communication, sensing, and photodetection across a high bandwidth. In this study, observations of the second-order NLHE in type-II Dirac semimetal CoTe2 under time-reversal symmetry are reported. This is determined by the disorder-induced extrinsic contribution on the broken-inversion-symmetry surface and room-temperature terahertz rectification without the need for semiconductor junctions or bias voltage.

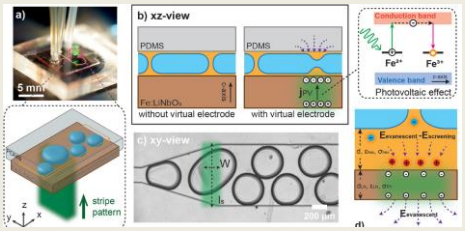


Morphology Matters: 0D/2D WO3 Nanoparticle-Ruthenium Oxide Nanosheet Composites for Enhanced Photocatalytic Oxygen Evolution Reaction Rates. Vignolo-González, H; Gouder, A; Laha, S; Duppel, V; **Carretero-Palacios, S** et al.: **Advanced Energy Materials**, 2203315 (11) (Dec 2022).

In the field of artificial photosynthesis with semiconductor light harvesters, the default cocatalyst morphologies are isotropic, 0D nanoparticles. Herein, the use of highly anisotropic 2D ruthenium oxide nanosheet (RONS) cocatalysts as an approach to enhance photocatalytic oxygen evolution (OER) rates on commercial WO3 nanoparticles (0D light harvester) is presented.

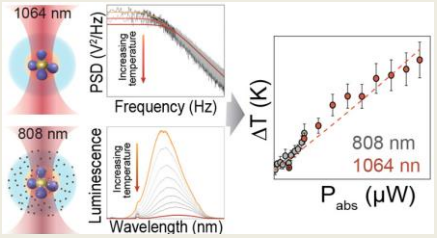
Light-Induced Virtual Electrodes for Microfluidic Droplet Electro-Coalescence. Zamboni, R; **Sebastián-Vicente, C;** Denz, C; Imbrock, J; **Adv. Funct. Mater**. **35,** 2305286 (Dec 2023).

Electro-coalescence is the fusion phenomenon between a pair or more microfluidic droplets that are immersed in an immiscible medium under an electric field. This technique is frequently used to merge confined droplets in surfactant-stabilized microfluidic emulsions using local electric fields. Despite the necessity of miniaturized electrodes, this method has proven highly successful in microfluidics and lab-on-a-chip applications.



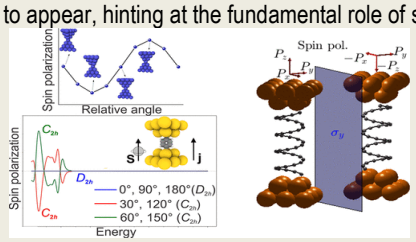
Light-to-Heat Conversion of Optically Trapped Hot Brownian Particles. **Ortiz-Rivero, E;** Orozco-Barrera, S; Chatterjee, H; González-Gómez, CD; Caro, C; García-Martín ML; **Haro González, P;** et al. **ACS Nano** 17, 24961-24971 (Dec 2023).

Anisotropic hybrid nanostructures stand out as promising therapeutic agents in photothermal conversion-based treatments. Accordingly, understanding local heat generation mediated by light-to-heat conversion of absorbing multicomponent nanoparticles at the single-particle level has forthwith become a subject of broad and current interest. Nonetheless, evaluating reliable temperature profiles around a single trapped nanoparticle is challenging from all of the experimental, computational, and fundamental viewpoints.



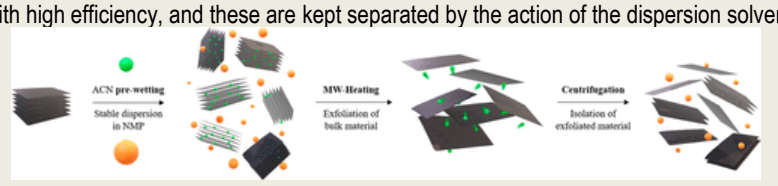
A Group-Theoretic Approach to the Origin of Chirality-Induced Spin-Selectivity in Nonmagnetic Molecular Junctions. Dednam, W; García-Blázquez, MA; **Zotti, LA**; Lombardi, EB; Sabater, C; Pakdel, S; **Palacios, JJ.** **ACS Nano, 17,** 6452–6465 (Mar 2023).

Spin–orbit coupling gives rise to a range of spin-charge interconversion phenomena in nonmagnetic systems where certain spatial symmetries are reduced or absent. Chirality-induced spin-selectivity (CISS), a term that generically refers to a spin-dependent electron transfer in nonmagnetic chiral systems, is one such case, appearing in a variety of seemingly unrelated situations ranging from inorganic materials to molecular devices. In particular, the origin of CISS in molecular junctions is a matter of an intense current debate. Here, we derive a set of geometrical conditions for this effect to appear, hinting at the fundamental role of symmetries beyond otherwise relevant quantitative issues.



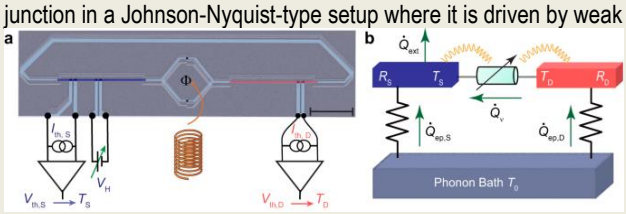
Microwave-Driven Exfoliation of Bulk 2H-MoS2 after Acetonitrile Prewetting Produces Large-Area Ultrathin Flakes with Exceptionally High Yield. Quirós-Ovies, R; Laborda, M; Martín Sabanés, N; Martín-Pérez, L; Moreno-Da Silva, S; **Burzurí, E;** et al. **ACS Nano, 17,** 5984 (Mar 2023).

2D materials display exciting properties in numerous fields, but the development of applications is hindered by the low yields, high processing times, and impaired quality of current exfoliation methods. In this work we have used the excellent MW absorption properties of MoS2 to induce a fast heating that produces the near-instantaneous evaporation of an adsorbed, low boiling point solvent. The sudden evaporation creates an internal pressure that separates the MoS2 layers with high efficiency, and these are kept separated by the action of the dispersion solvent.



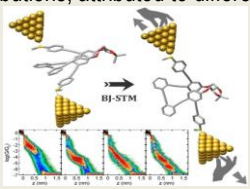
[Bolometric detection of Josephson inductance in a highly resistive environments.](#) Subero, D; Maillet, O; Golubev, DS; Thomas, G; Peltonen, JT; Karimi, B; Marín-Suárez, M; **Levy Yeyati, A; Sánchez, R**; Park, S; Pekola, FP. **Nature Commun. 14**, 7924 (Dec 2023).

The Josephson junction is a building block of quantum circuits. Its behavior, well understood when treated as an isolated entity, is strongly affected by coupling to an electromagnetic environment. In 1983, Schmid predicted that a Josephson junction shunted by a resistance exceeding the resistance quantum $R_Q = h/4e^2 \approx 6.45$ kΩ for Co oper pairs would become insulating since the phase fluctuations would destroy the coherent Josephson coupling. However, recent microwave measurements have questioned this interpretation. Here, we insert a small Josephson junction in a Johnson-Nyquist-type setup where it is driven by weak current noise arising from thermal fluctuations.



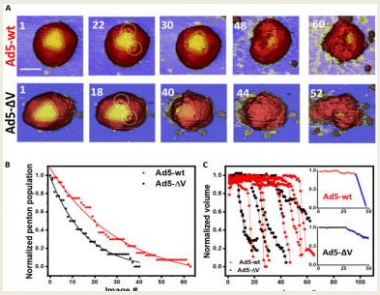
[Chiral Single-Molecule Potentiometers Based on Stapled ortho-Oligo(phenylene)ethynylenes ound absorption in glasses.](#) Ortuño, A; Reiné, P; Álvarez de Cienfuegos, L; Márquez, IR; Dednam, W; Lombardi, EB; **Palacios, JJ;** Leary, E; Longhi, G; Mujica, V; Millán, A; González, MT; **Zotti, LA**; et al. **Angew. Chem. Int. Ed., 62,** e202218640 (Feb 2023).

We report on the chemical design of chiral molecular junctions with stress-dependent conductance, whose helicity is maintained during the stretching of a single molecule junction due to the stapling of both ends of the inner helix. In the reported compounds, different conductive pathways are observed, with clearly different conductance values and plateau-length distributions, attributed to different conformations of the helical structures.



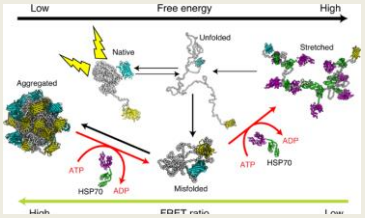
[Adenovirus core protein V reinforces the capsid and enhances genome release from disrupted particles.](#) Martín-González, N; Gómez-González, A; , **Hernando-Pérez, M;** Bauer, M; Greber, UF; San Martín, C; **de Pablo, PJ;** **Sci. Adv. ,9,** eade9910 (Apr 2023).

Out of the three core proteins in human adenovirus, protein V is believed to connect the inner capsid surface to the outer genome layer. Here, we explored mechanical properties and in vitro disassembly of particles lacking protein V (Ad5-ΔV). Ad5-ΔV particles were softer and less brittle than the wild-type ones (Ad5-wt), but they were more prone to release pentons under mechanical fatigue.



A fluorescent multi-domain protein reveals the unfolding mechanism of Hsp70. Tiwari, S; Fauvet, B; **Assenza, S** et al. **Nature Chemical Biology 19,** pages198–205 (Oct 2022).

Bound states in superconductors are expected to exhibit a spatially resolved electron-hole asymmetry which is the hallmark of their quantum nature. This asymmetry manifests as oscillations at the Fermi wavelength, which is usually tiny and thus washed out by thermal broadening or by scattering at defects. Here we demonstrate theoretically and confirm experimentally that, when coupled to magnetic impurities, bound states in a vortex core exhibit an emergent axial electron-hole asymmetry on a much longer scale, set by the coherence length.



Author Correction: A fluorescent multi-domain protein reveals the unfolding mechanism of Hsp70. Tiwari, S; Fauvet, B; **Assenza, S** et al. **Nature Chemical Biology 19,** 529 (Feb 2023).

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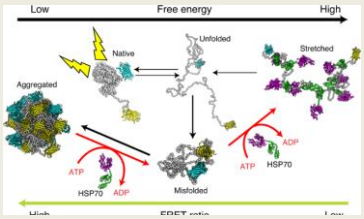
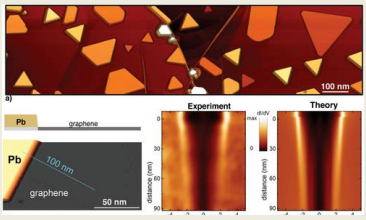


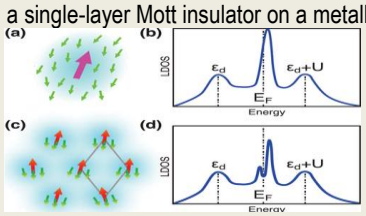
Shaping Graphene Superconductivity with Nanometer Precision. Cortés-del Río, E; Trivini, S; Pascual, JI; Cherkez, V; Mallet, P; Veuillen, J-Y; **Cuevas, JC; Brihuega, I. Small 19,** 2308439 (Dec 2023).

Graphene holds great potential for superconductivity due to its pure 2D nature, the ability to tune its carrier density through electrostatic gating, and its unique, relativistic-like electronic properties. At present, still far from controlling and understanding graphene superconductivity, mainly because the selective introduction of superconducting properties to graphene is experimentally very challenging. Here, a method is developed that enables shaping at will graphene superconductivity through a precise control of graphene-superconductor junctions.



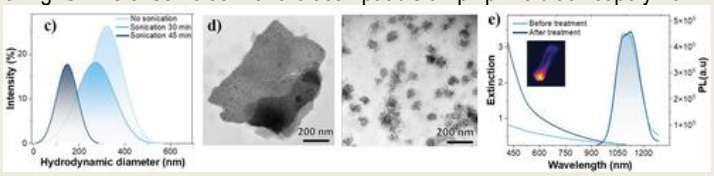
Probing the Phase Transition to a Coherent 2D Kondo Lattice. G. Ayani, C; Pisarra, M; Ibarburu, IM; Garnica, M; **Miranda, R;** Calleja, F; Martín, F; **Vázquez de Parga, AL**. **Small 20,** 2303275 (Oct 2023)

Kondo lattices are systems with unusual electronic properties that stem from strong electron correlation, typically studied in intermetallic 3D compounds containing lanthanides or actinides. Lowering the dimensionality of the system enhances the role of electron correlations providing a new tuning knob for the search of novel properties in strongly correlated quantum matter. The realization of a 2D Kondo lattice by stacking a single-layer Mott insulator on a metallic surface is reported.



Ag2S Biocompatible Ensembles as Dual OCT Contrast Agents and NIR Ocular Imaging Probes. Coro, A; Herrero Ruiz, A; Pazo-González, M; Sánchez-Cruz, A; Busch, T; Hernández Medel, A; Ximendes, EC; **Ortgies, DH;** López-Méndez, R; Espinosa, A; Jiménez de Aberasturi, D; **Jaque, D;** Fernández Monsalve, N; J. de la Rosa, E; Hernández-Sánchez, C; **Martín Rodríguez, E**; Juárez, BH. **Small 19,** 2305026 (Aug 2023).

Ag2S nanoparticles (NPs) emerge as a unique system that simultaneously features in vivo near-infrared (NIR) imaging, remote heating, and low toxicity thermal sensing. In this work, their capabilities are extended into the fields of optical coherence tomography (OCT), as contrast agents, and NIR probes in both ex vivo and in vivo experiments in eyeballs. The new dual property for ocular imaging is obtained by the preparation of Ag2S NPs ensembles with a biocompatible amphiphilic block copolymer.

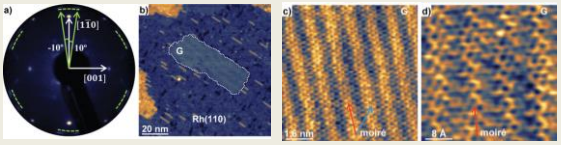


Fano-Like Resonance from Disorder Correlation in Vacancy-Doped Photonic Crystals. Pariente, JA; Bayat, F; Blanco, A; García-Martín, A; Pecharromán, C; **Marqués, MI;** López, C. **Small 19,** 2302355 (June 2023).

By preparing colloidal crystals with random missing scatterers, crystals are created where disorder is embodied as vacancies in an otherwise perfect lattice. In this special system, there is a critical defect concentration where light propagation undergoes a transition from an all but perfect reflector (for the spectral range defined by the Bragg condition), to a metamaterial exhibiting an enhanced transmission phenomenon. It is shown that this behavior can be phenomenologically described in terms of Fano-like resonances.

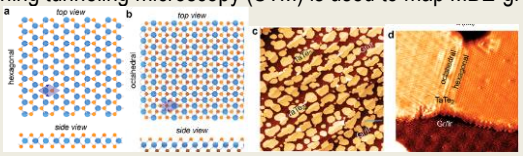
Lateral Heterostructures of Graphene and h-BN with Atomic Lattice Coherence and Tunable Rotational Order. Guo, H; Garro-Hernandorena, A; **Martínez-Galera, AJ;** Gómez-Rodríguez, JM. **Small 19,** 2207217 (Jun 2023).

In-plane heterostructures of graphene and hexagonal boron nitride (h-BN) exhibit exceptional properties, which are highly sensitive to the structure of the alternating domains. Nevertheless, achieving accurate control over their structural properties, while keeping a high perfection at the graphene-h-BN boundaries, still remain a challenge. Here, the growth of lateral heterostructures of graphene and h-BN on Rh(110) surfaces is reported.



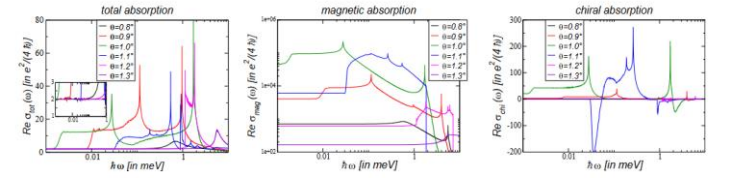
Metastable Polymorphic Phases in Monolayer TaTe2. Di Bernardo, I; Ripoll-Sau, J; Silva-Guillén, JA; Calleja, F; Ayani, CG; **Miranda, R;** Canadell, E; Garnica, M; **Vázquez de Parga, AL**. **Small 19,** 2300262 (Apr 2023).

Polymorphic phases and collective phenomena—such as charge density waves (CDWs)—in transition metal dichalcogenides (TMDs) dictate the physical and electronic properties of the material. Most TMDs naturally occur in a single given phase, but the fine-tuning of growth conditions via methods such as molecular beam epitaxy (MBE) allows to unlock otherwise inaccessible polymorphic structures. Exploring and understanding the morphological and electronic properties of new phases of TMDs is an essential step to enable their exploitation in technological applications. Here, scanning tunneling microscopy (STM) is used to map MBE-grown monolayer (ML) TaTe2.



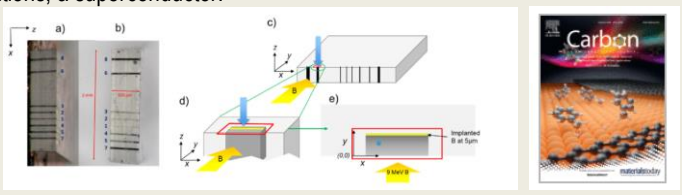
Neutral Magic-Angle Bilayer Graphene: Condon Instability and Chiral Resonances. Stauber, T; Wackerl, M; Wenk, P; Margetis, D; González, J; **Gómez-Santos, G**; Schliemann, J. **Small Science 3,** 2200080 (Apr 2023).

The full optical response of twisted bilayer graphene at the neutrality point close to the magic angle within the continuum model (CM) is discussed. First, three different channels consistent with the underlying symmetry are identified, yielding the total, magnetic, and chiral response. Second, the full optical response in the immediate vicinity of the magic angle is numerically calculated, which provides a direct mapping of the CM onto an effective two-band model.



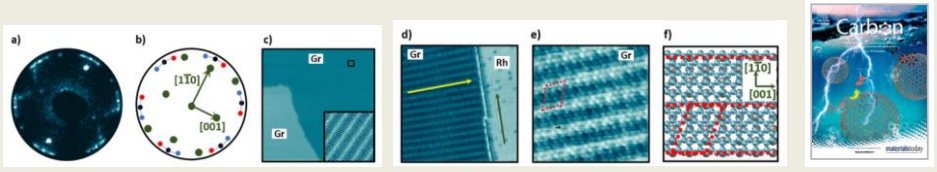
Boron-doped diamond by 9 MeV microbeam implantation: Damage and recovery. Jiménez-Rioboó RJ; **Gordillo, N;** de Andrés, A; **Redondo-Cubero A; Moratalla, M; Ramos, MA;** Ynsa, MD. **Carbon 208,** 421-431 (Apr. 2023).

Diamond properties can be tuned by doping and ion-beam irradiation is one of the most powerful techniques to do it in a controlled way, but it also produces damage and other aftereffects. Of particular interest is boron doping which, in moderate concentrations, causes diamond to become a p-type semiconductor and, at higher boron concentrations, a superconductor.



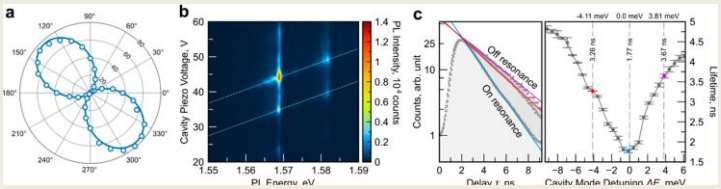
Dirac cones in graphene grown on a half-filled 4d-band transition metal. **Martínez-Galera, AJ;** Guo, H; Jiménez-Sánchez, MD; **García-Michel, E; Gómez-Rodríguez, JM;** **Carbon 205,** 294-301 (Mar 2023).

ew opportunities for structural and electronic properties engineering of graphene can be achieved by tuning the interfacial interaction, which is ruled by the interplay between d-band filling and geometry of the support. Here, is demonstrated the growth of graphene, featuring Dirac cones around the Fermi level, on the rectangular (110) surfaces of Rh, a half-filled 4d-band transition metal element..



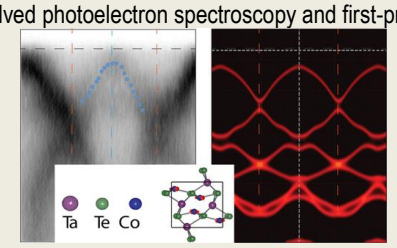
Monolayer-Based Single-Photon Source in a Liquid-Helium-Free Open Cavity Featuring 65% Brightness and Quantum Coherence. Drawer, JC; Mitryakhin, VN; Shan, H; Stephan, S; Gittinger, M; Lackner, L; Han, B; Leibeling, G; Eilenberger, F; Banerjee, R; Tongay, S; Watanabe, K; Taniguchi, T; Lienau, C; Silies, M; **Anton-Solanas, C;** Esmann, M; Schneider, C. **Nano Lett. 23,** 8683-8689 (Sep 2023).

Solid-state single-photon sources are central building blocks in quantum information processing. Atomically thin crystals have emerged as sources of nonclassical light; however, they perform below the state-of-the-art devices based on volume crystals. Here, we implement a bright single-photon source based on an atomically thin sheet of WSe2 coupled to a tunable optical cavity in a liquid-helium-free cryostat without the further need for active stabilization.



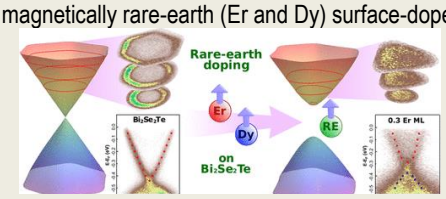
Discovery of a Magnetic Dirac System with a Large Intrinsic Nonlinear Hall Effect.. Mazzola, F; Ghosh, B; Fujii, J; Acharya,G; Mondal, D; Rossi, G; Bansil, A; **Farias, D;** Hu, J; Agarwal, A; Politano, A; Vobornik, I. **Nano Lett.** 23, 902-907 (Jan 2023).

Magnetic materials exhibiting topological Dirac fermions are attracting significant attention for their promising technological potential in spintronics. In these systems, the combined effect of the spin–orbit coupling and magnetic order enables the realization of novel topological phases with exotic transport properties, including the anomalous Hall effect and magneto-chiral phenomena. Herein, we report experimental signature of topological Dirac antiferromagnetism in TaCoTe2 via angle-resolved photoelectron spectroscopy and first-principles density functional theory calculations.



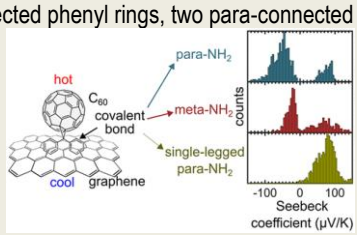
Experimental Demonstration of a Magnetically Induced Warping Transition in a Topological Insulator Mediated by Rare-Earth Surface Dopants. Muñiz Cano, B; Ferreiros, Y; Pantaleón,PA; Dai, J; Tallarida, M; Figueroa, AI; Marinova, V; García-Díez, K; Mugarza, A; Valenzuela, SO; **Miranda, R; Camarero, J;** Guinea, F; Silva-Guillén, JA; Valbuena, MA. **Nano Lett. 23**, 6249 (May 2023).

Magnetic topological insulators constitute a novel class of materials whose topological surface states (TSSs) coexist with long-range ferromagnetic order, eventually breaking time-reversal symmetry. The subsequent bandgap opening is predicted to co-occur with a distortion of the TSS warped shape from hexagonal to trigonal. We demonstrate such a transition by means of angle-resolved photoemission spectroscopy on the magnetically rare-earth (Er and Dy) surface-doped topological insulator Bi2Se2Te



Enhanced Thermoelectricity in Metal–[60]Fullerene–Graphene Molecular Junctions. Svatek, SA; Sacchetti, V; Rodríguez-Pérez, L;. Illescas, BM; Rincón-García, L; **Rubio-Bollinger, G**; González, MT; Bailey, S; Lambert, CL; Martín, N; **Agrait, N**. **Nano Lett. 23,** 2726-2732 (Mar 2023).

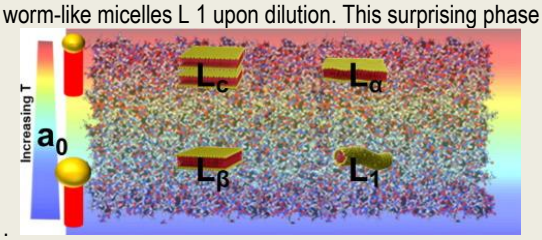
The thermoelectric properties of molecular junctions consisting of a metal Pt electrode contacting [60]fullerene derivatives covalently bound to a graphene electrode have been studied by using a conducting-probe atomic force microscope (c-AFM). The [60]fullerene derivatives are covalently linked to the graphene via two meta-connected phenyl rings, two para-connected phenyl rings, or a single phenyl ring.



Unusual phosphatidylcholine lipid phase behavior in the ionic liquid ethylammonium nitrate. Manni, LS; Davies, C; Wood, K; **Assenza, S**; Atkin, R; Warr, GG.**J. Colloid & Int. Sci, 643,** 276-281 (Apr 2023).

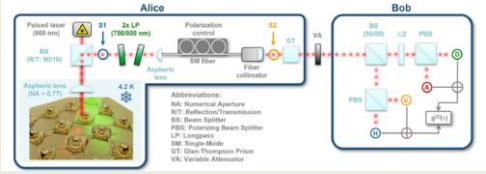
Hypothesis: The forces that govern lipid self-assembly ionic liquids are similar to water, but their different balance can result in unexpected behaviour.

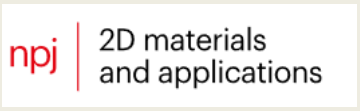
Findings: Both lipids form unusual self-assembly structures and show complex and unexpected phase behaviour unlike that seen in water; DSPC undergoes a gel Lb to crystalline Lc phase transition on warming, while POPC forms worm-like micelles L 1 upon dilution. This surprising phase behaviour is attributed.



Atomically-thin single-photon sources for quantum communications. Gao, T; von Helversen, M; **Antón-Solanas , C;** Schneider, C; Heindel , T. **npj 2D Mat & Appl. 7**, art 4 (Jan 2023)

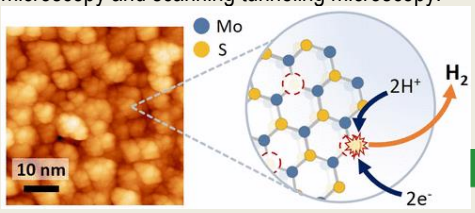
To date, quantum communication widely relies on attenuated lasers for secret key generation. In future quantum networks, fundamental limitations resulting from their probabilistic photon distribution must be overcome by using deterministic quantum light sources. Confined excitons in monolayers of transition metal dichalcogenides (TMDCs) constitute an emerging type of emitter for quantum light generation. These atomically thin solid-state sources show appealing prospects for large-scale and low-cost device integration, meeting the demands of quantum information technologies. Here, we pioneer the practical suitability of TMDC devices in quantum communication..





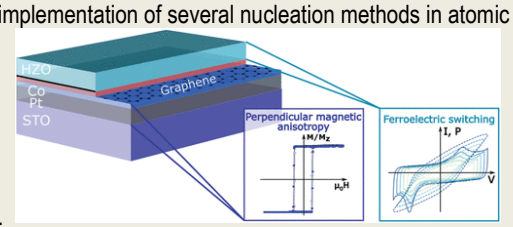
MoS_2 Photoelectrodes for Hydrogen Production: Tuning the S-Vacancy Content in Highly Homogeneous Ultrathin Nanocrystals. **Jiménez-Arévalo, N;** Al Shuhaib, JN; Bautista Pacheco, R; Marchiani, D; Abdelnabi, MMS; Frisenda, R; Sbroscia, M; Betti, MG; Mariani, C; Manzanares-Negro,Y; **Gómez Navarro, C; Martínez-Galera, AJ;** Ares, JR; **Ferrer, IJ; Leardini, F**: **ACS Appl. Mat. & Int. 15**, 33514-33524 (Jul 2023).

Tuning the electrocatalytic properties of MoS2 layers can be achieved through different paths, such as reducing their thickness, creating edges in the MoS2 flakes, and introducing S-vacancies. We combine these three approaches by growing MoS2 electrodes by using a special salt-assisted chemical vapor deposition (CVD) method. This procedure allows the growth of ultrathin MoS2 nanocrystals (1–3 layers thick and a few nanometers wide), as evidenced by atomic force microscopy and scanning tunneling microscopy.



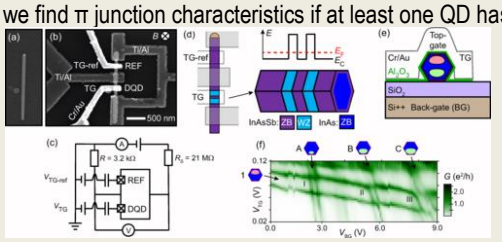
Toward Nonvolatile Spin-Orbit Devices: Deposition of Ferroelectric Hafnia on Monolayer Graphene/Co/HM Stacks. Lancaster, S; Arnay, I; Guerrero, R; Gudín, A; Guedeja-Marrón, A; **Diez, JM;** Gärtner, J; Anadón, A; Varela, M; **Camarero, J**; Mikolajick, T; Perna, P; Slesazeck, S. **ACS Appl. Mat. & Int. 15,** 16963-16974 (Mar 2023).

While technologically challenging, the integration of ferroelectric thin films with graphene spintronics potentially allows the realization of highly efficient, electrically tunable, nonvolatile memories through control of the interfacial spin–orbit driven interaction occurring at graphene/Co interfaces deposited on heavy metal supports. Here, the integration of ferroelectric Hf0.5Zr0.5O2 on graphene/Co/heavy metal epitaxial stacks is investigated via the implementation of several nucleation methods in atomic layer deposition.



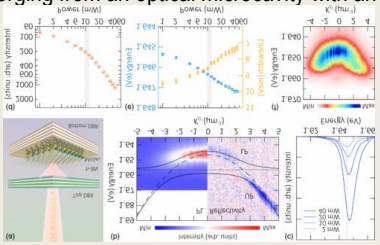
Josephson Junction π−0 Transition Induced by Orbital Hybridization in a Double Quantum Dot.Debbarma, R; Tsintzis, A; Aspegren, M; **Seoane Souto, R**; Lehmann, S; Dick, K; Leijnse, M; Thelander, C. **Phys. Rev. Lett. 131,** 256001 (Dec 2023).

In this Letter, we manipulate the phase shift of a Josephson junction using a parallel double quantum dot (QD). By employing a superconducting quantum interference device, we determine how orbital hybridization and detuning affect the current-phase relation in the Coulomb blockade regime. For weak hybridization between the QDs, we find π junction characteristics if at least one QD has an unpaired electron.



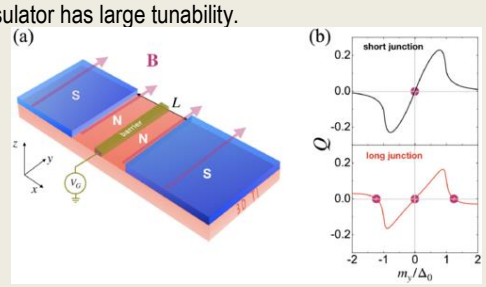
Second-Order Temporal Coherence of Polariton Lasers Based on an Atomically Thin Crystal in a Microcavity. Shan, H; Drawer, JC; Sun,M; **Anton-Solanas, C**; Esmann, M; Yumigeta, K; Watanabe, K; Taniguchi, T; Tongay, S; Höfling, S; Savenko, I; Schneider, C. **Phys. Rev. Lett. 131,** 206901 (Nov 2023).

Bosonic condensation and lasing of exciton polaritons in microcavities is a fascinating solid-state phenomenon. It provides a versatile platform to study out-of-equilibrium many-body physics and has recently appeared at the forefront of quantum technologies. Here, we study the photon statistics via the second-order temporal correlation function of polariton lasing emerging from an optical microcavity with an embedded atomically thin MoSe2 crystal.



Tunable Josephson Diode Effect on the Surface of Topological Insulators. Lu, B; Ikegaya, S; **Burset, P;** Tanaka, Y; Nagaosa, N. **Phys. Rev. Lett. 131,** 096001 (Aug 2023).

The Josephson rectification effect, where the resistance is finite in one direction while zero in the other, has been recently realized experimentally. The resulting Josephson diode has many potential applications on superconducting devices, including quantum computers. Here, we theoretically show that a superconductor-normal metal-superconductor Josephson junction diode on the two-dimensional surface of a topological insulator has large tunability.



Physical Review Letters
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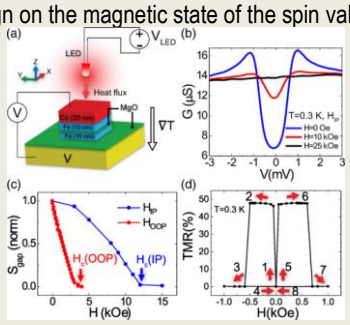
Observation of Magnetic State Dependent Thermoelectricity in Superconducting Spin Valves. González-Ruano, C; Caso, D; Ouassou, JA; Tiusan,C; Lu, Y; Linder, J. **Aliev, FG. Phys. Rev. Lett. 130,** 237001 (Jan 2023).

Superconductor-ferromagnet tunnel junctions demonstrate giant thermoelectric effects that are being exploited to engineer ultrasensitive terahertz radiation detectors. Here, we experimentally observe the recently predicted complete magnetic control over thermoelectric effects in a superconducting spin valve, including the dependence of its sign on the magnetic state of the spin valve.



Physical Review Letters
moving physics

Publications

Ortiz-Rivero, E., Orozco-Barrera, S., Chatterjee, H., et al.: *Light-to-Heat Conversion of Optically Trapped Hot Brownian Particles.* **ACS Nano, 17, 24961** (Dec 2023).

Debbarma, R., Tsintzis, A., Aspegren, M., et al.: *Josephson Junction π-0 Transition Induced by Orbital Hybridization in a Double Quantum Dot.* **Physical Review Letters 131, 256001** (Dec 2023).

Aguirre, J., Guantes, R.: *Virus-host protein co-expression networks reveal temporal organization and strategies of viral infection.* **iScience, 26, 108475** (Dec 2023).

Santos, A.C., Schneider, C., Bachelard, R., et al.: *Multipartite entanglement encoded in the photon-number basis by sequential excitation of a three-level system.* **Optics Letters 48, 6332** (Dec 2023).

Subero, D., Maillet, O., Golubev, D.S., et al.: *Bolometric detection of Josephson inductance in a highly resistive environment.* **Nature Communications, 14, 7924** (Dec 2023).

Taleb, A.A., Schiller, F., Vyalikh, D.V., et al: *Simulating high-pressure surface reactions with molecular beams.* **Physical Chemistry Chemical Physics 26, 1770** (Dec 2023).

Gudín, A., Anadón, A., Arnay, I., et al: *Isotropic spin and inverse spin Hall effect in epitaxial (111)-oriented Pt/Co bilayers.* **Physical Review Materials 7, 124412** (Dec 2023).

Cortés-del Río, E., Trivini, S., Pascual, J.I., et al.: *Shaping Graphene Superconductivity with Nanometer Precision.* **Small, 2308439** (Dec. 2023).

Zamboni, R., Sebastián-Vicente, C., Denz, C., et al.: *Light-Induced Virtual Electrodes for Microfluidic Droplet Electro-Coalescence.* **Advanced Functional Materials, 2305286** (Dec. 2023).

Garcia, V.G., Batista, N.N., Aldave, D.A., et al.: *Unlocking the Potential of Nanoribbon-Based Sb2S3/Sb2Se3 van-der-Waals Heterostructure for Solar-Energy-Conversion and Optoelectronics Applications.* **ACS Applied Materials and Interfaces, 15, 54786** (Nov. 2023).

Ibrahim, M., Camarero, P., Ming, L., et al.: *Wet chemical synthesis of TGA capped Ag2S nanoparticles and their use for fluorescence imaging and temperature sensing in living cells.* **RSC Advances 13, 35065** (Nov 2023.

Krivchikov, A.I., Horbatnko, Y.V., Korolyuk, O.A., et al.: *Exponential approximation of the coherence contribution to the thermal conductivity of complex clathrate-type crystals.* **Materialia 32, 101944** (Nov 2023).

Naveas, N., Pulido, R., Marini, C., et al: *First-Principles Calculations of Magnetite (Fe3O4) above the Verwey Temperature by Using Self-Consistent DFT + U + V.* **Journal of Chemical Theory and Computation 19, 8610** (Nov 2023).

Shan, H., Drawer, J.-C., Sun, M., et al.: *Second-Order Temporal Coherence of Polariton Lasers Based on an Atomically Thin Crystal in a Microcavity.* **Physical Review Letters, 131, 206901** (Nov 2023).

Boström, M., Li, Y., Brevik, I., et al.: *van der Waals induced ice growth on partially melted ice nuclei in mist and fog.* **Physical Chemistry Chemical Physics, 25, 32709** (Nov 2023).

Ben Saddik, K., Fernández-Garrido, S., Volkov, R., et al.: *Growth modes and chemical-phase separation in GaP1−xNx layers grown by chemical beam epitaxy on GaP/Si(001).* **Journal of Applied Physics, 134, 175703** (Nov 2023).

Rodríguez-Tapiador, M.I., Jiménez-Suárez, A., Lama, A., et al.: *Effects of Deposition Temperature and*

Working Pressure on the Thermal and Nanomechanical Performances of Stoichiometric Cu3N: An Adaptable Material for Photovoltaic Applications.
Nanomaterials, 13, 2950 (Nov 2023).

Shuhaib, J.H.A., Fernández, J.F., Bodega, J., et al.:
Synthesis, optical band gap and thermoelectric properties of Sr1+xTiS3-y chalcogenide perovskites.
Materials Research Bulletin, 167, 112405 (Nov 2023).

Souto, R.S., Tsintzis, A., Leijnse, M., et al.:
Probing Majorana localization in minimal Kitaev chains through a quantum dot.
Physical Review Research, 5, 043182 (Nov 2023).

Aguilar-Saavedra, J.A.
Postdecay quantum entanglement in top pair production
Physical Review D, 108, 076025 (Oct 2023).

Ayani, C.G., Pisarra, M., Ibarburu, I.M., et al.:
Probing the Phase Transition to a Coherent 2D Kondo Lattice.
Small, 20, 2303275 (Oct. 2023).

París Ogáyar, M., Mendez-Gonzalez, D., Zabala Gutierrez, I., et al.:
Ion-induced bias in Ag2S luminescent nanothermometers.
Nanoscale, 15, 17956 (Oct 2023).

Ramírez, R., Tarazona, P., Chacón, E., et al.:
Crystalline membranes under stress: A Monte Carlo study based on the Nelson-Peliti Hamiltonian.
Physical Review B, 108, 165417 (Oct 2023).

Calderón, J.A., Terán, C.L., Quiroz, H.P., et al.:
Ion migration in GaSb/Mn multilayers for memories applications: Study of Mn diffusion into the GaSb layers.
Journal of Alloys and Compounds, 960, 170587 (Oct 2023).

Drawer, J.-C., Mitryakhin, V.N., Shan, H., et al.:
Monolayer-Based Single-Photon Source in a Liquid-Helium-Free Open Cavity Featuring 65% Brightness and Quantum Coherence.
Nano Letters, 23, 8683 (Sep 2023).

Spilsbury, M.J., Feito, A., Delgado, A., et al.:
Enantiosensitive growth dynamics of chiral molecules on ferromagnetic substrates and the origin of the CISS effect.
Journal of Chemical Physics, 159, 114706 (Sep 2023).

Boström, M., Kuthe, S., Carretero-Palacios, S., et al.:
Understanding ice and water film formation on soil particles by combining density functional theory and Casimir-Lifshitz forces.
Physical Review B, 108, 125434 (Sep 2023).

Rodriguez, C., Torres-Costa, V., Bittner, A.M., et al.:
Electron microscopy approach to the wetting dynamics of single organosilanized mesopores.
iScience, 26, 107981 (Sep 2023).

Moratalla, M., Rodríguez-López, M., Rodríguez-Tinoco, C., et al.:
Depletion of two-level systems in highly stable glasses with different molecular ordering.
Communications Physics, 6, 274 (Sep 2023).

Alvarado, M., Burset, P., Yeyati, A.L.
Intrinsic nonmagnetic φ0 Josephson junctions in twisted bilayer graphene.
Physical Review Research, 5, L032033 (Sep 2023).

Escobar, K., Carrera, I., Naveas, N., et al.:
Functionalization of breast implants by cyclodextrin in-situ polymerization: a local drug delivery system for augmentation mammaplasty.
Frontiers in Bioengineering and Biotechnology, 11, 1254299 (Sep 2023).

Guo, H., Jiménez-Sánchez, M.D., Michel, E.G., et al.:
Aperiodic Modulation of Graphene Driven by Oxygen-Induced Reconstruction of Rh(110).
Journal of Physical Chemistry C, 127, 17930 (Aug 2023).

Lu, B., Ikegaya, S., Burset, P., et al.:
Tunable Josephson Diode Effect on the Surface of Topological Insulators.
Physical Review Letters, 131, 096001 (Aug 2023).

Coro, A., Herrero Ruiz, A., Pazo-González, M., et al.:

Ag2S Biocompatible Ensembles as Dual OCT Contrast Agents and NIR Ocular Imaging Probes. **Small 19,** 2305026 (Aug 2023).

López-Méndez, R., Reguera, J., Fromain, A., et al.: *X-Ray Nanothermometry of Nanoparticles in Tumor-Mimicking Tissues under Photothermia.* **Advanced Healthcare Materials 12,** 2301863 (Jul 2023)

Tinao, B., Aragones, J.L., Arriaga, L.R. *Aqueous Two-Phase Systems within Selectively Permeable Vesicles.* **ACS Macro Letters, 12, 1132** (Jul 2023).

González, H.I., Cinacchi, G. *Dense Disordered Jammed Packings of Hard Spherocylinders with a Low Aspect Ratio: A Characterization of Their Structure.* **Journal of Physical Chemistry B, 127, 6814** (Jul 2023).

Fernández-Alonso, F.J., Hernández, Z., Torres-Costa, V. *A Cost-Effective Portable Multiband Spectrophotometer for Precision Agriculture.* **Agriculture 13, 1467** (Jul 2023).

Yang, X., Burset, P., Lu, B. *Phase-tunable multiple Andreev reflections in a quantum spin Hall strip.* **Superconductor Science and Technology, 36, 085012** (Jul 2023).

Ramírez González, J.P., Cinacchi, G. *Densest-known packings and phase behavior of hard spherical capsids.* **Journal of Chemical Physics, 159, 044903** (Jul 2023).

Salthouse, R.J., Hurtado-Gallego, J., Grace, I.M., el al.: *Electronic Conductance and Thermopower of Cross-Conjugated and Skipped-Conjugated Molecules in Single-Molecule Junctions.* **Journal of Physical Chemistry C, 127, 13751** (Jul 2023).

Jiménez-Arévalo, N., Al Shuhaib, J.H., Pacheco, R.B., el at.: *MoS2 Photoelectrodes for Hydrogen Production: Tuning the S-Vacancy Content in Highly Homogeneous Ultrathin Nanocrystals.* **ACS Applied Materials and Interfaces, 15, 33514** (Jul 2023).

Gruñeiro, L., Alvarado, M., Yeyati, A.L., et al.: *Transport features of a topological superconducting nanowire with a quantum dot: Conductance and noise.* **Physical Review B, 108, 045418** (Jul 2023).

Arribas, D., Villalobos-Vilda, V., Tosi, E., et al.: *In situ observation of the on-surface thermal dehydrogenation of n-octane on Pt(111).* **Nanoscale, 15, 14458** (Jul 2023).

Velasco, E., Martínez-Ratón, Y. **Prediction of the liquid-***crystal phase behavior of hard right triangles from fourth-virial density-functional theories.* **Physical Review E, 108, 014603** (Jul 2023).

Pariente, J.A., Bayat, F., Blanco, A., et al.: *Fano-Like Resonance from Disorder Correlation in Vacancy-Doped Photonic Crystals.* **Small, 19, 2302355** (Jun 2023).

Muñoz-Ortiz, T., Alayeto, I., Lifante, J., et al.: *3D Optical Coherence Thermometry Using Polymeric Nanogels.* **Advanced Materials, 35, 2301819** (Jun 2023).

Camarero, P., Haro-González, P., Quintanilla, M. *Near infrared laser irradiation on single multicellular spheroids.* **Optical Materials, 142, 114055** (Jun 2023).

Caso, D., Tuero, P., García, J., Guslienko, K.J., Aliev, F.K.: *Dynamics and Reversible Control of the Bloch-Point Vortex Domain Wall in Short Cylindrical Magnetic Nanowires.* **Phys. Rev. Applied 19, 064030** (Jun 2023).

Ming, L., Zabala-Gutierrez, I., Calderon, O.G., et al.: *A brighter era for silver chalcogenide*

semiconductor nanocrystals.
Optical Materials, 141, 113940 (Jun 2023).

González-Ruano, C., Caso, D., Ouassou, J.A., et al.:
Observation of Magnetic State Dependent Thermoelectricity in Superconducting Spin Valves.
Physical Review Letters, 130, 237001 (Jun 2023).

Ackermann, N., Zazunov, A., Park, S., et al.:
Dynamical parity selection in superconducting weak links.
Physical Review B, 107, 214515 (Jun 2023).

Guo, H., Garro-Hernandorena, A., Martínez-Galera, A.J., et al.:
Lateral Heterostructures of Graphene and h-BN with Atomic Lattice Coherence and Tunable Rotational Order.
Small, 19, 2207217 (Jun 2023).

Muñiz Cano, B., Ferreiros, Y., Pantaleón, P.A., et al.:
Experimental Demonstration of a Magnetically Induced Warping Transition in a Topological Insulator Mediated by Rare-Earth Surface Dopants.
Nano Letters, 23, 6249 (May 2023).

Guo, H., Martínez-Galera, A.J., Gómez-Rodríguez, J.M.
Molecular properties of PTCDA on graphene grown on a rectangular symmetry substrate.
Applied Surface Science, 620, 156777 (May 2023.)

Noah, A., Zur, Y., Fridman, N., et al.:
Nano-Patterned Magnetic Edges in CrGeTe3for Quasi 1-D Spintronic Devices.
ACS Applied Nano Materials, 6, 8627(May 2023).

Szewczyk, D., Krivchikov, A.I., Barabashko, M.S., et al.:
Universal behavior of low-temperature heat capacity of acrylonitrile-butadiene-styrene thermoplastic polymer and its composite with graphene oxide.
Low Temperature Physics, 49, 593 (May 2023).

Szewczyk, D., Krivchikov, A.I., Barabashko, M.S., et al.:
Universal behavior of low-temperature heat capacity of acrylonitrile-butadiene-styrene thermoplastic polymer and its composite with graphene oxide.
Fizika Nizkikh Temperatur, 49, 649 (May 2023).

Martínez-Ratón, Y., Velasco, E.
Exotic liquid crystalline phases in monolayers of vertically vibrated granular particles
Liquid Crystals, 50,1261 (May 2023).

Lohof, F., Michl, J., Steinhoff, A., et al.:
Confined-state physics and signs of fermionization of moiré excitons in WSe2/MoSe2 heterobilayers.
2D Materials, 10, 034001 (May 2023).

Aldave, D.A., Lopez-Polin, G., Moreno, C., et al.:
All-Dry Deterministic Transfer of Thin Gold Nanowires for Electrical Connectivity.
Advanced Electronic Materials, 9, 2300107 (May 2023).

López, A., Tornos, J., Peralta, A., et al.:
Electrolyte Gated Synaptic Transistor based on an Ultra-Thin Film of La0.7Sr0.3MnO3.
Advanced Electronic Materials, 9, 2300007 (Apr 2023).

Salvati Manni, L., Davies, C., Wood, K., et al.:
Unusual phosphatidylcholine lipid phase behavior in the ionic liquid ethylammonium nitrate.
Journal of Colloid and Interface Science, 643, 276 (Apr 2023).

Di Bernardo, I., Ripoll-Sau, J., Silva-Guillén, J.A., et al:
Metastable Polymorphic Phases in Monolayer TaTe2.
Small, 19, 2300262 (Apr 2023).

Stauber, T., Wackerl, M., Wenk, P., et al.:
Neutral Magic-Angle Bilayer Graphene: Condon Instability and Chiral Resonances.

Small Science, 3, 2200080 (Apr 2023).

Guo, H., Martínez-Galera, A.J., Gómez-Rodríguez, J.M.
Self-Guided Growth of Electronically Decoupled C60 on Graphene on Rh(110).
Advanced Materials Interfaces, 10, 2202483 (Apr 2023).

Jiménez-Riobóo, R.J., Gordillo, N., de Andrés, A., et al.:
Boron-doped diamond by 9 MeV microbeam implantation: Damage and recovery.
Carbon, 208, 421 (Apr 2023).

Volpe, G., Maragò, O.M., Rubinsztein-Dunlop, H.,et al.:
Roadmap for optical tweezers.
J. Phys. Photonics, 5, 022501 (Apr 2023).

Martín-González, N., Gómez-González, A., Hernando-Pérez, M., el al.:
Adenovirus core protein V reinforces the capsid and enhances genome release from disrupted particles.
Sci. Adv., 9, eade9910 (Apr 2023).

Machín, A., Cotto, M., Duconge, J., et al.:
Sensitive and Reversible Ammonia Gas Sensor Based on Single-Walled Carbon Nanotubes.
Chemosensors, 11, 247 (Apr 2023).

Herrera, E., Guillamón, I., Barrena, V., et al.:
Quantum-well states at the surface of a heavy-fermion superconductor.
Nature, 616. 465 (Mar 2023).

Svatek, S.A., Sacchetti, V., Rodríguez-Pérez, L., et al:
Enhanced Thermoelectricity in Metal-[60]Fullerene-Graphene Molecular Junctions.
Nano Letters, 23, 2726 (Mar 2023).

Dednam, W., García-Blázquez, M.A., Zotti, L.A., et al.:
A Group-Theoretic Approach to the Origin of Chirality-Induced Spin-Selectivity in Nonmagnetic Molecular Junctions.
ACS Nano, 17, 6452–6465 (Mar 2023).

Lancaster, S., Arnay, I., Guerrero, R., et al.:
Toward Nonvolatile Spin-Orbit Devices: Deposition of Ferroelectric Hafnia on Monolayer Graphene/Co/HM Stacks.
ACS Applied Materials and Interfaces, 15,16963 (Mar 2023).

Manzanares-Negro, Y., Quan, J., Rassekh, M., et al.:
Low resistance electrical contacts to few-layered MoS2 by local pressurization.
2D Materials, 10, 021003 (Mar 2023).

Rollano, V., de Ory, M.C., Gomez, A., et al.:
Enhancement of vortex liquid phase and reentrant behavior in NiBi3 single crystals.
Superconductor Science and Technology, 36, 045012 (Mar 2023).

Quirós-Ovies, R., Laborda, M., Sabanés, N.M., et al.:
Microwave-Driven Exfoliation of Bulk 2H-MoS2 after Acetonitrile Prewetting Produces Large-Area Ultrathin Flakes with Exceptionally High Yield.
ACS Nano, 17, 5984 (Mar 2023).

Burzurí, E., Martínez-Pérez, M.J., Martí-Gastaldo, C., et al.:
A quantum spin liquid candidate isolated in a two-dimensional CoIIRhIII bimetallic oxalate network.
Chemical Science, 14, 3899–3906 (Mar 2023).

Luengo-Márquez, J., Zalvide-Pombo, J., Pérez, R., el at.:
Force-dependent elasticity of nucleic acids.
Nanoscale, 15, 6738 (Mar 2023).

Martínez-Galera, A.J., Guo, H., Jiménez-Sánchez, M.D., et al.:
Dirac cones in graphene grown on a half-filled 4d-band transition metal.
Carbon, 205, 294 (Mar 2023).

Machín, A., Soto-Vázquez, L., García, D., et al.:
Photodegradation of Ciprofloxacin and Levofloxacin by Au@ZnONPs-MoS2-rGO Nanocomposites.

Catalysts, 13, 538 (Mar 2023).

Ramadan, R., Martín-Palma, R.J.
Precise Calculation of the Optical Constants of Self-standing Nanoporous Silicon Layers.
Silicon, 15. 4391–4395 (Feb 2023).

Ortuño, A.M., Reiné, P., Álvarez de Cienfuegos, L., et al.:
Chiral Single-Molecule Potentiometers Based on Stapled ortho-Oligo (phenylene)ethynylenes.
Angew. Chem. Int. Ed., 62, e202218640 (Feb 2023).

Tiwari, S., Fauvet, B., Assenza, S., et al.:
Author Correction: A fluorescent multi-domain protein reveals the unfolding mechanism of Hsp70 (Nature Chemical Biology, (2023), 19, 2, (198-205).
Nature Chemical Biology, 19, 529 (Feb 2023).

Bosch, A.M., Assenza, S.
I*nterplay of Hydropathy and Heterogeneous Diffusion in the Molecular Transport within Lamellar Lipid Mesophases.*
Pharmaceutics, 15, 573 (Feb 2023)**.**

Sanz Calderón, A., Cantero, M., Pérez, U., et al.:
Surface characterization of alkane viral anchoring films prepared by titanate-assisted organosilanization
Colloids and Surfaces B: Biointerfaces, 222, 113136 (Feb 2023).

Naveas, N., Pulido, R., Marini, C., et al.:
First-principles calculations of hematite (α-Fe2O3) by self-consistent DFT+U+V.
iScience, 26, 106033 (Feb 2023).

Guo, H., Jiménez-Sánchez, M.D., Martínez-Galera, A.J., et al.:
Growth of 1D ClAlPc molecular chains mediated by graphene moiré patterns
Nanoscale, 15, 5083 (Feb 2023).

Herrera, E., Wu, B., O'Leary, E., et al.:
Band structure, superconductivity, and polytypism in AuSn4.
Physical Review Materials, 7, 024804 (Feb 2023).

Gao, T., von Helversen, M., Antón-Solanas, et al.:
Atomically-thin single-photon sources for quantum communication.
npj 2D Materials and Applications, 7, 4 (Jan 2023).

Calderón, J.A., Quiroz, H.P., Terán, C.L., et al.:
Exchange bias coupling and bipolar resistive switching at room temperature on GaSb/Mn multilayers for resistive memories applications.
Scientific Reports, 13, 722 (Jan 2023).

Hu, Z., Zhang, L., Chakraborty, A., elt al.:
Terahertz Nonlinear Hall Rectifiers Based on Spin-Polarized Topological Electronic States in 1T-CoTe2.
Advanced Materials, 35, 2209557 (Jan 2023).

Mazzola, F., Ghosh, B., Fujii, J., et al.:
Discovery of a Magnetic Dirac System with a Large Intrinsic Nonlinear Hall Effect.
Nano Letters, 23, 902 (Jan 2023).

Vera, A., Martínez, I., Enger, L.G., et al.
High-Performance Implantable Sensors based on Anisotropic Magnetoresistive La0.67Sr0.33MnO3 for Biomedical Applications.
ACS Biomaterials Science and Engineering, 9, 1020 (Jan 2023).

Vignolo-González, H.A., Gouder, A., Laha, S. et al.:
Morphology Matters: 0D/2D WO3 Nanoparticle-Ruthenium Oxide Nanosheet Composites for Enhanced Photocatalytic Oxygen Evolution Reaction Rates.
Advanced Energy Materials, 16, 2203315 (Jan 2023).

Tiwari, S., Fauvet, B., Assenza, S., el al.:
A fluorescent multi-domain protein reveals the unfolding mechanism of Hsp70
Nature Chemical Biology, 19, 198 (Jan 2023)

Li, Y., Corkery, R.W., Carretero-Palacios, S., et al.:
Origin of anomalously stabilizing ice layers on

methane gas hydrates near rock surface.
Physical Chemistry Chemical Physics, 25, 6636 (Jan 2023).

Cistaro, G., Malakhov, M., Esteve-Paredes, J.J., et al.:
Theoretical Approach for Electron Dynamics and Ultrafast Spectroscopy (EDUS).
Journal of Chemical Theory and Computation, 19, 333 (Jan 2023).

Esteve-Paredes, J.J., Palacios, J.J.
A comprehensive study of the velocity, momentum and position matrix elements for Bloch states: Application to a local orbital basis.
SciPost Physics Core, 6, 002 (Jan 2023).

Escobar, K., Garrido-Miranda, K.A., Pulido, R., et al.:
Coatings of Cyclodextrin/Citric-Acid Biopolymer as Drug Delivery Systems: A Review.
Pharmaceutics, 15, 296 (Jan 2023).

Fontánez, K., García, D., Ortiz, D., et al.:
Biomimetic Catalysts Based on Au@TiO2-MoS2-CeO2 Composites for the Production of Hydrogen by Water Splitting.
Int. J. Molecular Sciences, 24, 363 (Jan 2023).

Muñoz-Cortés, E., Ibryaeva, O.L., Manso Silvan, M. et al.:
Tribochemically driven dehydrogenation of undoped sodium alanate under room temperature.
Physical Chemistry Chemical Physics, 25, 494 (Jan 2023).

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17	De Miguel Llorente, Juan José	FÍSICA DE LA MATERIA CONDENSADA
18	De Pablo Gomez, Pedro José	FÍSICA DE LA MATERIA CONDENSADA
19	Delgado Buscalioni, Rafael	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
20	Díaz Palacios, Raquel	FÍSICA APLICADA
21	Farias Tejerina, Daniel	FÍSICA DE LA MATERIA CONDENSADA
22	Feist, Johannes	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
23	Fernández Dominguez, Antonio I.	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
24	García Cabañes, Angel	FÍSICA DE MATERIALES
25	García Carretero, Basilio Javier	FÍSICA APLICADA
26	García Michel, Enrique	FÍSICA DE LA MATERIA CONDENSADA
27	García Solé, José	FÍSICA DE MATERIALES
28	García Vidal, Francisco José	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
29	Garrido Salas, Javier	TECNOLOGÍA ELECTRÓNICA Y DE LAS COMUNICACIONES
30	Gómez Herrero, Julio	FÍSICA DE LA MATERIA CONDENSADA
31	Gómez Santos, Guillermo	FÍSICA DE LA MATERIA CONDENSADA
32	Gómez-Navarro González, Cristina	FÍSICA DE LA MATERIA CONDENSADA
33	Gordillo García, Nuria	FÍSICA APLICADA
34	Guantes Navacerrada, Raúl	FÍSICA DE LA MATERIA CONDENSADA
35	Guillamón Gómez, Isabel	FÍSICA DE LA MATERIA CONDENSADA
36	Gutiérrez Delgado, Alejandro	FÍSICA APLICADA
37	Haro González, Patricia	FÍSICA DE MATERIALES
38	Hernández Muñoz, María Jesús	FÍSICA APLICADA
39	Jaque García, Daniel	FÍSICA DE MATERIALES
40	Jiménez Ferrer, Isabel	FÍSICA DE MATERIALES

41	Lazic, Snezana	FÍSICA DE MATERIALES
42	Leardini, Fabrice	FÍSICA DE MATERIALES
43	Lee, Eduardo Jian Hua	FÍSICA DE LA MATERIA CONDENSADA
44	Levy Yeyati Mizrahi, Alfredo	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
45	Lifante Pedrola, Ginés	FÍSICA DE MATERIALES
46	López Vázquez de Parga, Amadeo	FÍSICA DE LA MATERIA CONDENSADA
47	Manso Silván, Miguel	FÍSICA APLICADA
48	Marchetti, Francesca	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
49	Marqués Ponce, Manuel Ignacio	FÍSICA DE MATERIALES
50	Martín Fernández, María Dolores	FÍSICA DE MATERIALES
51	Martín Palma, Raúl José	FÍSICA APLICADA
52	Martín Rodríguez, Emma	FÍSICA APLICADA
53	Merino Álvarez, José Manuel	FÍSICA APLICADA
54	Merino Troncoso, Jaime	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
55	Miguez Gómez, David	FÍSICA DE LA MATERIA CONDENSADA
56	Molina de Pablo, Pablo	FÍSICA DE MATERIALES
57	Monreal Vélez, Rosa	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
58	Morant Zacares, Carmen	FÍSICA APLICADA
59	Ortega Mateo, José	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
60	Palacios Burgos, Juan José	FÍSICA DE LA MATERIA CONDENSADA
61	Pau Vizcaíno, José Luis	FÍSICA APLICADA
62	Pérez Casero, Rafael	FÍSICA APLICADA
63	Pérez Pérez, Rubén	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
64	Pernas Martino, Pablo Luis	FÍSICA APLICADA
65	Plaza Canga-Argüelles, José Luis	FÍSICA DE MATERIALES
66	Polop Jordá, Celia	FÍSICA DE LA MATERIA CONDENSADA
67	Prieto Recio, Mª del Pilar	FÍSICA APLICADA
68	Quintanilla Morales, Marta	FÍSICA DE MATERIALES
69	Ramirez Herrero, María de la O	FÍSICA DE MATERIALES
70	Ramos Ruiz, Miguel Angel	FÍSICA DE LA MATERIA CONDENSADA
71	Redondo Cubero, Andrés	FÍSICA APLICADA
72	Rodrigo Rodríguez, José Gabriel	FÍSICA DE LA MATERIA CONDENSADA
73	Rubio Bollinger, Gabino	FÍSICA DE LA MATERIA CONDENSADA
74	Sánchez Rodrigo, Rafael	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
75	Segovia Cabrero, Pilar	FÍSICA DE LA MATERIA CONDENSADA
76	Seijo Loché, Luis Ignacio	QUÍMICA
77	Soler Torroja, José Mª	FÍSICA DE LA MATERIA CONDENSADA
78	Soriano de Arpe, Leonardo	FÍSICA APLICADA
79	Suderow Rodriguez, Hermann	FÍSICA DE LA MATERIA CONDENSADA
80	Tarazona Lafarga, Pedro	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
81	Torres Costa, Vicente	FÍSICA APLICADA
82	Van der Meulen, Herko	FÍSICA DE MATERIALES
83	Velasco Caravaca, Enrique	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
84	Viña Liste, Luis	FÍSICA DE MATERIALES

25% of the INC's permanent members are women.

Non Permanent Members

DOCTORES

	PROFESOR-INVESTIGADOR	DEPARTAMENTO
1	Agulló López, Fernando	FÍSICA DE MATERIALES
2	Antón Solanas, Carlos	FÍSICA DE MATERIALES
3	Aragó López, Carmen	FÍSICA DE MATERIALES
4	Aragonés Gómez, Juan L.	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
5	Ares García, Pablo	FÍSICA DE LA MATERIA CONDENSADA
6	Assenza, Salvatore	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
7	Benayas Hernández, Antonio	FÍSICA DE MATERIALES
8	Burset Atienza, Pablo	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
9	Burzurí Linares, Enrique	FÍSICA DE LA MATERIA CONDENSADA
10	Chacón Fuertes, Enrique	ICMM-CSIC
11	Fernández Cuñado, José Luis	FÍSICA DE LA MATERIA CONDENSADA
12	Galán Estella, Luis	FÍSICA APLICADA
13	Garnica Alonso, Manuela	IMDEA Nanociencia
14	González Herrero, Héctor	FÍSICA DE LA MATERIA CONDENSADA
15	Hernández Pinilla, David	FÍSICA DE MATERIALES
16	Hernando Pérez, Mercedes	FÍSICA DE MATERIALES
17	Herrera Vasco, Edwin	FÍSICA DE LA MATERIA CONDENSADA
18	Marin, Riccardo	FÍSICA DE MATERIALES
19	Martín Cano, Diego	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
20	Martínez Galera, Antonio Javier	FÍSICA DE MATERIALES
21	Miranda Soriano, Rodolfo	FÍSICA DE LA MATERIA CONDENSADA
22	Nistor, Valentín	FÍSICA APLICADA
23	Ortgies, Dirk	FÍSICA DE MATERIALES
24	Pampillón Arce, María Ángela	FÍSICA APLICADA
25	Prins, Ferry	FÍSICA DE LA MATERIA CONDENSADA
26	Pulido Venegas, Ruth Noemí	FÍSICA APLICADA
27	Rodríguez Arriaga, Laura	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
28	Salagre Rubio, Elena	FÍSICA DE LA MATERIA CONDENSADA
29	Sánchez López, Carlos	FÍSICA DE MATERIALES
30	Sánchez Muñoz, Carlos	FÍSICA DE LA MATERIA CONDENSADA-IFIMAC
31	Sanz García, Juan Antonio	FÍSICA DE MATERIALES
32	Tabares Jiménez, Gema	FÍSICA APLICADA
33	Tejedor de Paz, Carlos	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
34	Tiene, Antonio	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
35	Vélez Centoral, Saül	FÍSICA DE LA MATERIA CONDENSADA
36	Vélez Tirado, Marisela	BIOCATALISIS
37	Vieira Díaz, Sebastián	FÍSICA DE LA MATERIA CONDENSADA

	PROFESOR-INVESTIGADOR	DEPARTAMENTO
38	Yndurain Muñoz, Félix	FÍSICA DE LA MATERIA CONDENSADA
39	Zotti, Linda Angela	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA

26% of the INC's non-permanent DOCTORS members are women.

NO DOCTORES

	PROFESOR-INVESTIGADOR	DEPARTAMENTO
1	Andrino Gómez, Alberto	FÍSICA DE LA MATERIA CONDENSADA
2	Calvo Membibre, Rodrigo	FÍSICA APLICADA
3	Camarero Linares, Pablo	FÍSICA DE MATERIALES
4	Campusano Cortés, Richard A.	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
5	Díaz Sánchez, Jesús	FÍSICA DE LA MATERIA CONDENSADA
6	Escobar Ortiz, Arin	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
7	Fernández Alonso, Francisco Javier	FÍSICA APLICADA
8	Fernández García, Alejandro	FÍSICA APLICADA
9	Fernández Martínez, Javier	FÍSICA DE MATERIALES
10	Geva, Galor	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
11	González Sánchez, Celia	FÍSICA DE LA MATERIA CONDENSADA
12	Jiménez Arévalo, Nuria	FÍSICA DE MATERIALES
13	Luengo Márquez, Juan	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
14	Magrinyá Aguiló, Paula	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
15	Ortiz Rivero, Elisa	FÍSICA DE MATERIALES
16	Ramírez Peral, Mª Jesús	FÍSICA DE LA MATERIA CONDENSADA
17	Sebastian Vicente, Carlos	FÍSICA DE MATERIALES
18	Tinao Nieto, Berta	FÍSICA TEÓRICA DE LA MATERIA CONDENSADA
19	Zhang, Fengchan	FÍSICA DE MATERIALES

36% of the INC's NON DOCTORS members are women.

Instituto Nicolás Cabrera

Board:

Director: Miguel Angel Ramos Ruiz
Deputy director: Isabel Jiménez Ferrer
Secretary: Enrique Velasco Caravaca

Steering Committee:

Carmen Morant Zacarés, Mª Dolores Martín Fernández, Iván Brihuega Álvarez, Jaime Merino Troncoso.

Scientific Advisory Committee:

Alicia de Andrés Miguel, Akhlesh Lakhtakia, Herre Van der Zant, Cristian Urbina

Responsible for website: Enrique Velasco
Twitter Manager: Andrés Redondo Cubero
Infrastructure Manager: Hermann Suderow

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