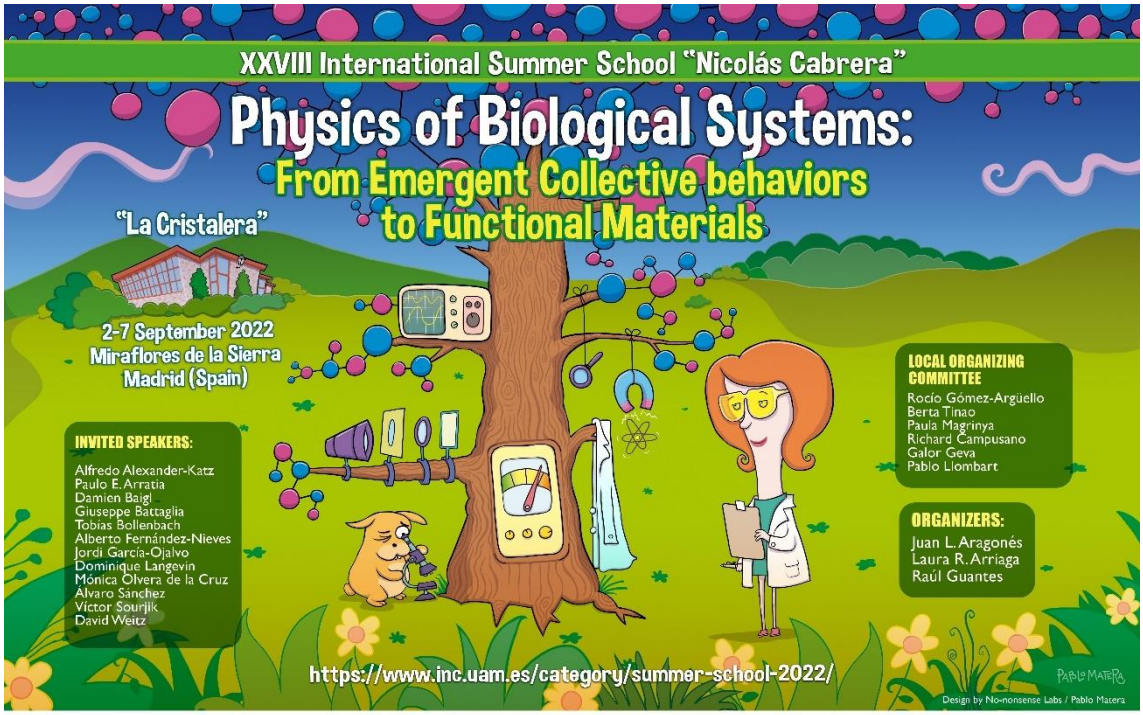
Nicolás Cabrera University Institute of Materials Science



UAM Universidad Autónoma de Madrid | Instituto Nicolás Cabrera

Fundación BBVA

Activity report 2022

UAM | Instituto Nicolás Cabrera

excelencia Campus Internacional UAM CSIC+

FACULTAD DE CIENCIAS

www.inc.uam.es

Cover image:
Advertising poster of the XXVIII International Summer
School "Nicolás Cabrera" held in 2022

Nicolás Cabrera
University Institute of Materials Science

ACTIVITY REPORT 2022

Edited by Isabel J. Ferrer in March 2023

UAM | Instituto Nicolás Cabrera

CONTENT

Foreword

Dear INC members,

We present you a new edition of the annual activity report of the "Nicolás Cabrera" Institute: the one corresponding to 2022.

During this past year, the Institute's main activities have been consolidated in face-to-face format, such as the INC-BBVA International Summer School in September, under the title of Physics of Biological Systems, as well as the traditional meeting for young scientists in December, whose appeal and attendance success begin to be a problem for their organization and selection. The main novelty has been the recovery this year of the INC-BBVA Colloquium on "Frontiers in Materials Science", with the holding of three colloquia by distinguished guests.

Within the aforementioned Young Researchers Meeting before Christmas, the awarded physics students presented their research work in poster format. It should be noted this year that, thanks to the generous contribution of the Departments of Materials Physics, Applied Physics, Condensed Matter Physics and Theoretical Condensed Matter Physics, as well as IFIMAC, this year up to 11 prizes were awarded, almost twice as much as in previous editions. The second edition of the "Chema Gómez-Rodríguez Awards" was also held, awarded to the two best articles published by young INC researchers, selected by our Scientific Advisory Committee and financed by the Department of Condensed Matter Physics, to whom we are very grateful for its selfless help. In addition, in this second edition we had the pleasure of having the presence of Almudena, the widow of our beloved Chema, who already showed us her gratitude for the initiative last year and that on this occasion she was able to attend and participate in the delivery of the diplomas.

A fundamental part of this Annual Report of INC activities, which is mandatory to submit to the Rectorate of the UAM, is the list of research papers published by members of the Institute, or to be exact, only of those in which the INC affiliation appears explicitly: we have registered about 100 articles in 2022, but surely there could be more. For this reason, we insist that you must include in the affiliations of your articles the reference to the "Nicolás Cabrera" Institute, since otherwise they will not be counted in the credit of the INC nor will they appear on the INC website.

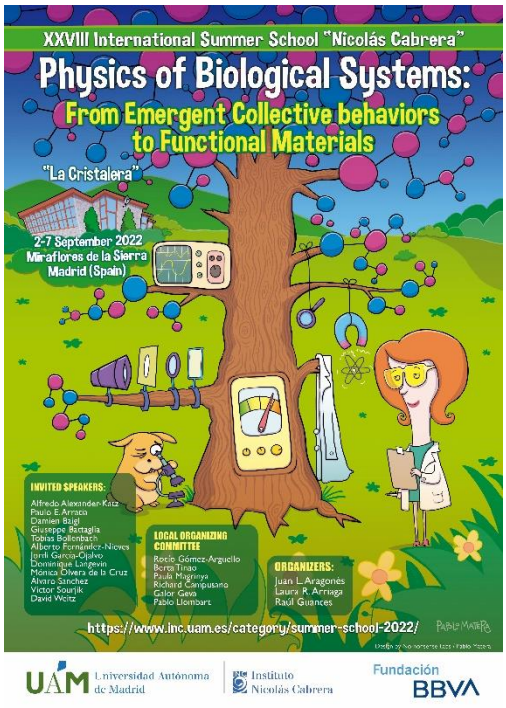
In the last Council of the Institute, the registrations of 21 new members of the Institute were ratified, which implies that we are now a total of 153 registered researchers (83 of them permanent members, according to the regulations of the UAM).

Just 30 years ago, exactly on Friday, March 12, 1993, the creation at the Autonomous University of Madrid of the "Nicolás Cabrera" Institute of Materials Science was published in the BOE, with the signature of the then Minister of Education and Science, Alfredo Pérez Rubalcaba. With its successes and with its difficulties, I believe that the trip has been worth –and still is worth it. The main reason for I believe it, is to see the enthusiasm and continuous support, especially in difficult times, of so many members of the INC, both those of us who have been involved in it for the 30 years of its history and the constant new additions, that rejuvenate the spirit of our Institute, that revive that scientific spirit of Don Nicolás of which many of us want to be heirs.

Miguel Ángel Ramos
INC Director

"Nicolás Cabrera" International Summer School

The "Nicolás Cabrera" International Summer School led by Juan I. Aragonés, Laura Rodríguez Arriaga and Raúl Guantes, held its XXVIII edition from September 2 to 7, 2022, at the "La Cristalera" residence in Miraflores de la Sierra, under the title: **"Physics of Biological Systems: From Emergent Collective behaviors to Functional Materials"**.



The topic dealt with in this School was the Physics of Biological Systems in a broad and interdisciplinary sense, ranging from the behaviour of soft matter and active matter, self-organization, the design of microrobots and bio-inspired materials to collective behaviours and the appearance of emergent properties in cell populations.

Natural selection has engineered sophisticated nano- and microscopic machines capable of performing vital and complex biological processes such as targeted transport of molecules, energy storage, tissue remodeling, and immune response. To carry out these processes, active systems transform energy into mechanical forces, thus operating out of equilibrium. The out-of-balance nature of biological systems gives rise to fascinating behaviours, ranging from self-propulsion to collective behaviours and pattern formation.

However, the organization, dynamic behavior, and response properties of out-of-equilibrium biological systems are highly dependent on their interactions with the environment. Therefore, unraveling the physical principles that determine these interactions is crucial both, to understand their collective properties and take advantage of biological complexity, to design new materials and artificial nanomachines: from artificial organs and completely compatible with the immune system to nano-robots that can perform programmed tasks within our body.

The School brought together 59 participants from 12 countries (24 women and 35 men). Of these, 44 were young researchers (PhD. students, postdocs, and one CSIC researcher), 12 guest speakers from the US, France, the UK, Germany and Spain, and three organizing researchers from the School.

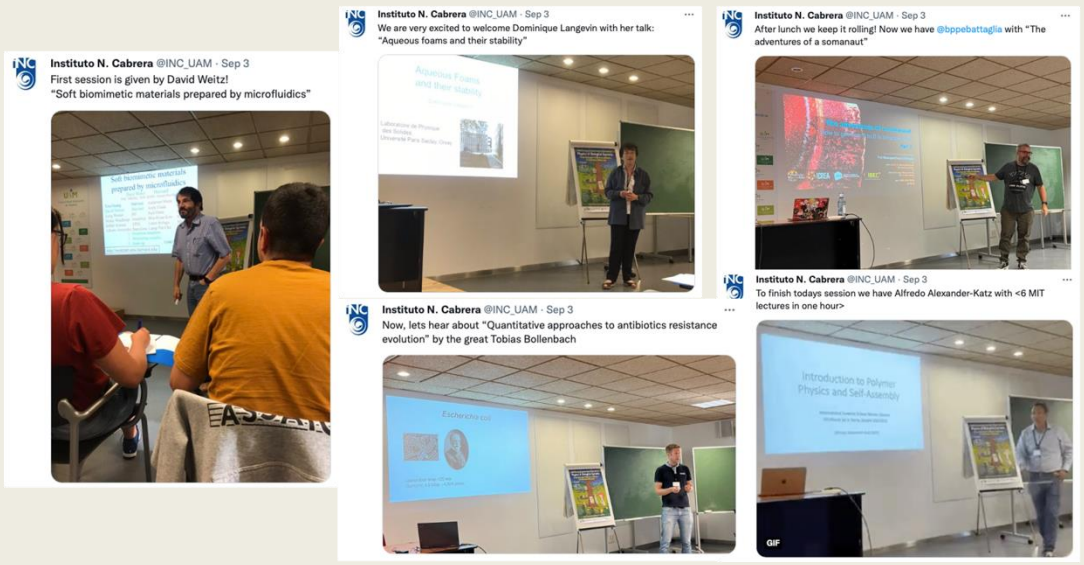
Group picture of the 2022 International Summer School at the Miraflores de la Sierra site.

The list of speakers who participated in the School and their affiliations is as follows:

- ✓ Jordi García-Ojalvo. Universidad Pompeu Fabra (Spain)
- ✓ Terry Hwa. University of California San Diego (USA)
- ✓ Álvaro Sanchez. Yale University (USA)
- ✓ Tobias Bollenbach. Koln Universitat (Germany)
- ✓ Damien Baigl. Ecole Normale Superieure (France)
- ✓ Dominique Langevin. Université Paris Sud and CNRS (France)
- ✓ Giuseppe Battaglia. University College London (UK)
- ✓ Alberto Fernández-Nieves. Georgia Tech (USA)
- ✓ David Weitz. MIT, Harvard (USA)
- ✓ Alfredo Alexander-Katz. MIT, Harvard (USA)
- ✓ Paulo E. Arratia, University of Pennsylvania (USA)
- ✓ Mónica Olvera de la Cruz. Northwestern University (USA)

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

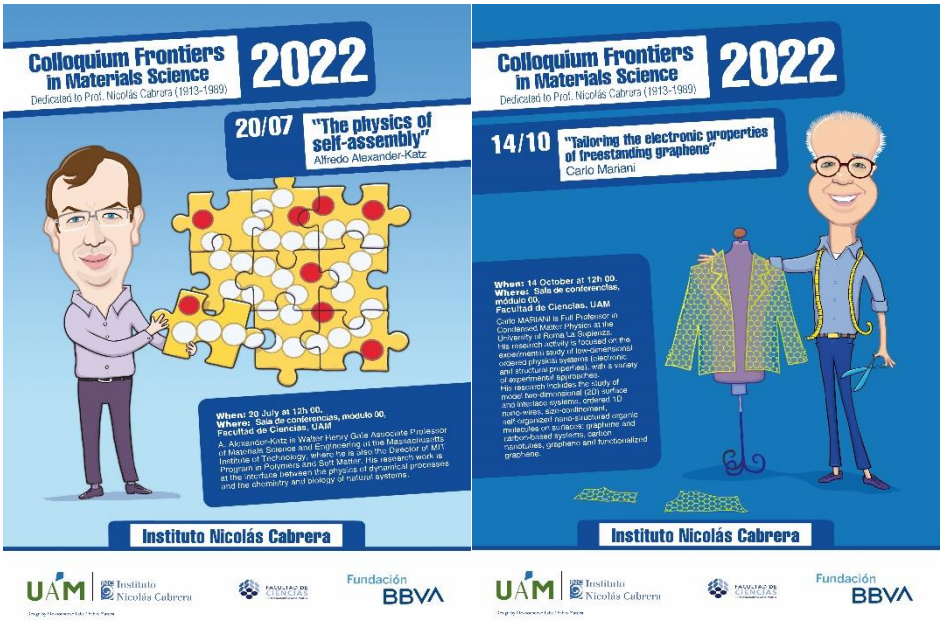
Fundación BBVA



Photographs published on Twitter (@INC_UAM) during the first day of school

Colloquia

In 2022 we resumed the cycle of conferences "Frontiers in Materials Science" dedicated to Professor Nicolás Cabrera in collaboration with the BBVA Foundation. On this occasion, Professor **Alfredo Alexander-Katz** (MIT, USA) participated giving the conference entitled "The Physics of Self-Assembly", Professor **Carlo Mariani** (Univ. Roma La Sapienza, Italy) with the title "Tailoring the electronic properties of freestanding graphene" and Professor **Pablo Esquinazi** (Univ. Leipzig, Germany), who spoke about "Room temperature superconductivity: State of the Art".



The colloquia, developed in English, took place in the Conference Room of the Science Faculty at the UAM.

Awards for undergraduate Physics students

The Nicolás Cabrera Institute convened 11 prizes awarded by the CONDENSED MATTER PHYSICS, THEORETICAL CONDENSED MATTER PHYSICS, MATERIALS PHYSICS, APPLIED PHYSICS departments and the CONDENSED MATTER PHYSICS IFIMAC Center (two prizes each, except the MATERIALS PHYSICS department which subsidized three), to appeal to undergraduate Physics students to research groups and to promote the scientific work of the Institute.

The winners and the research topics in which they participated are the following:

- **Alejandro Blanco Peces**: "*Developing atomically tailored networks of quasi-zero dimensional alloys"*
- **Sergio Garcia Herreros:** "*Neural networks for simultaneous quantum parameter estimation*"
- **Asier García González:**: "*Efecto de la integración de nanoparticulas magnéticas en electrodos de baterías de ion litio*"
- **Jorge García García:** *" Optical interferometry as an efficient tool to characterize STM head vibrations"*
- **Julia Inglés Cerrillo**: "*Study of the plasmonic resonance of nanoparticles based on liquid metals with a high degree of ordering"*
- **Elena Köhler Ruiz:** *"Growth and characterization of* $Sr_{1+X}TiS_{3-Y}$ *perovskite thin films"*
- **Joan Javier Ronquillo Tutiven:** "*Electrostatic doping of monolayer MoS2 deposited on hexagonal ferroelectric domains"*
- **Andrés I. Tamargo Bracho**: *"Two-dimensional Fermi polarons,same problem different realisations :doped TMD monolayers & ultracold atomic Fermi gases"*
- **Jaime Vida García**: "*Study of coloidal systems in lattice obstacles"*
- **Youhuang Yang**: "*Study of Two-Mode Interference in Quantum Light-Matter Interactions"*
- **Senlin Yue**:*Inverse Design applied to Schrödinger Equation: Tailored Potential Wells for Exciton Trapping"*

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 2 "Chema Gómez-Rodríguez" awards, in memorial to 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 2022.

The selected students and publications were the following:

1. Ruth Pulido Venegas, for her article: ***"Experimental and density functional theory study ofthe Li+ desorption in spinel/layered lithium manganese oxide nanocompositesusing HCl.",*** Chem. Eng. J. 441, 136019 (2022).

   Ruth Pulido Venegas investigated the desorption of lithium from lithium manganese oxides (LMO) used to make lithium-ion sieves (LIS). The results showed that lithium-rich LMOs require higher temperatures for desorption, which is a key finding of great relevance for batteries. She conceptualized and designed the study, synthesized LMO compounds, characterized LMO and LIS compounds, and performed DFT and other calculations. She is the first author.

2. Francisco J. Matute-Cañadas, for his article: "***Signatures of Interactions in the Andreev Spectrum of Nanowire Josephson Junctions",*** Phys. Rev. Lett. 128, 197702 (2022).

   In this case, the role of Francisco Matute-Cañadas in understanding the physics underlying the observation of unexpected additional lines in microwave spectroscopy of the Josephson junction of nanowires is especially valued. He has developed a procedure to address the complex calculations required to manage a multichannel superconducting system in the presence of Coulomb and spin-orbit interactions. He is the first author.

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 Almudena Iznart, widow of the Prof. Gómez-Rodríguez, and the director of the Institute, in the delivery of diplomas

Young researchers meeting

Some Meeting pictures

The **XXV conference of young researchers "Nicolás Cabrera"** was held on December 16, 2022, in Miraflores de la Sierra, with the participation of numerous doctoral students and other young researchers associated with the Institute. The journey was a success of assistance congregating close to 90 assistants.

The **program** for the day was as follows:

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

The **invited conference** was given by Dr. Andrés Castellanos Gómez, Researcher at the Institute of Materials Science of the CSIC, National Award for Young Researchers (Ministry of Science) and Miguel Catalán Award modality sub-40 (Community of Madrid), both awarded in 2022. The title of his presentation was: **"Integrating van der Waals materials on paper-electronics."**

Next, the authors of the best research papers published this year by pre-doctoral researchers received the "Chema Gómez-Rodríguez" awards, and the winners gave a short talk:

- **Ruth Pulido Venegas,** "Experimental and DFT study of the Li+ desorption in spinel/layered lithium manganese oxide nanocomposites using HCl"
- **Francisco J. Matute-Cañadas,** "Signatures of Interactions in the Andreev Spectrum of Nanowire Josephson Junctions",

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

During the coffee break, the first poster session was held, in which 28 young researchers participated including some of the awarded Physics students who showed the results of their research regarding the award in this format..

Subsequently, a selection of communications was presented by young researchers in the following order::

- **Francisco J. Fernández Alonso,** "High precision low – cost spectrophotometer for agricultural applications"
- **Elena Salagre Rubio,** "Electronic Band Structure of Li_xCoO_2 during the Insulator to Metal transition"
- **Jinan Hussein Al Shuaib,** "Sensitized lanthanide emission in doped $BaZrS_3$ perovskite semiconductor"
- **Alejandro Vivas Viaña,** "Two-photon dressing of quantum emitters for cavity-assisted generation of steady-state entanglement"

In the first activity of the afternoon, a new selection of communications by young researchers was presented in the following order:

- **Klara Strobl Bardo,** "Tuning the microenvironment of crowded proteins inside viral capsids"
- **Cosme González Ayani,** "Kondo lattice development in a TaS_2 van der Waals heterostructure"
- **Juan José García Esteban,** "Tunable thermal emission of subwavelength silica ribbons"

During the afternoon coffee break, the second poster session was held, in which 28 young researchers participated, including the rest of the awarded Physics students.

Finally, in the last session, three other talks were presented by different students:

- **Tamara Muñoz Ortiz,** "Plasmonic nanoparticles for inflammation targeting in atherosclerosis"
- **Paula Magrinya,** "Tribological motion of rotating vesicles"
- **Lucía Martín Pérez** "Direct magnetic evidence, functionalization and low-temperature magneto-electron transport in liquid-phase exfoliated $FePS_3$"

Women presented 60% of the selected communications and 38% of the posters.

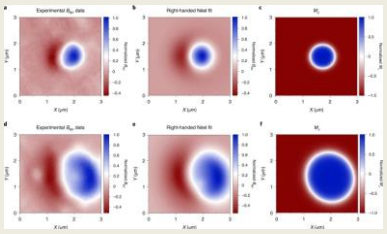
Some assistant photographs in the poster sesion.

Science at INC

The articles published in 2022, whose affiliations mention INC expressly, can be found on the Institute's website and are listed in the publications section of this report in reverse chronological order. In this section appears those published in journals with an impact factor higher than 9, which account for 17% of the total. The presence of journals with an esteemed impact factor, such as Nature Nanotechnology (40.5), Advanced Materials (32.1), and Advanced Energy Materials (29.7), stands out. It is relevant to mention that 21% of the articles were published in journals of the American Physical Society (Physical Review Journals), of which 67% are articles from Physical Review B. It should also be noted that 7% of the published articles belong to journals edited by Nature.

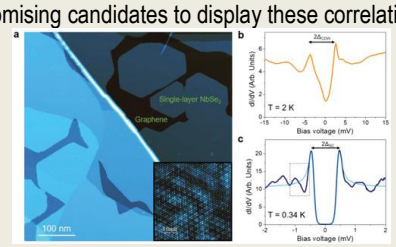
Current-driven dynamics and ratchet effect of skyrmion bubbles in a ferrimagnetic insulator. **Velez, S;** Ruiz-Gomez, S; Schaab, J et al. **Nature Nanotechnology 17**, 834-841 (Jul 2022).

Magnetic skyrmions are compact chiral spin textures that exhibit a rich variety of topological phenomena and hold potential for the development of high-density memory devices and novel computing schemes driven by spin currents. Here, we demonstrate the room-temperature interfacial stabilization and current-driven control of skyrmion bubbles in the ferrimagnetic insulator Tm3Fe5O12 coupled to Pt, showing the current-induced motion of individual skyrmion bubbles.



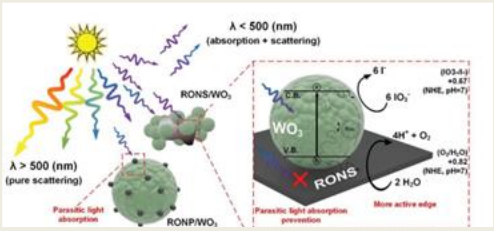
Observation of Superconducting Collective Modes from Competing Pairing Instabilities in Single-Layer $NbSe_2$. Wan, W; Dreher, P; Muñoz-Segovia, D; Harsh, R; Guo, H, **Martínez-Galera, AJ** et al.: **Adv. Mater**. **34,** 2206078 (9) (Oct 2022).

In certain unconventional superconductors with sizable electronic correlations, the availability of closely competing pairing channels leads to characteristic soft collective fluctuations of the order parameters, which leave fingerprints in many observables and allow the phase competition to be scrutinized. Superconducting layered materials, where electron–electron interactions are enhanced with decreasing thickness, are promising candidates to display these correlation effects.



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).

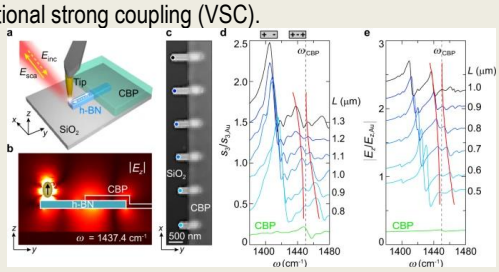
In the field of artificial photosynthesis with semiconductor light harvesters, the default cocatalyst morphologies are isotropic, 0D nanoparticles. Herein, the use of highly anisotropic 2D ruthenium oxide nanosheet (RONS) cocatalysts as an approach to enhance photocatalytic oxygen evolution (OER) rates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



ADVANCED ENERGY MATERIALS

Remote near-field spectroscopy of vibrational strong coupling between organic molecules and phononic nanoresonators. Dolado I, Maciel-Escudero C, Nikulina E; Modin, E; Calavalle, F; Chen, S; Bylinkin, A; Alfaro-Mozaz, FJ; Li, J; Edgar, JH; Casanova, F; **Vélez, S** et al. **Nature Commun. 13**, 6850 (9) (Nov 2022).

Phonon polariton (PhP) nanoresonators can dramatically enhance the coupling of molecular vibrations and infrared light, enabling ultrasensitive spectroscopies and strong coupling with minute amounts of matter. So far, this coupling and the resulting localized hybrid polariton modes have been studied only by far-field spectroscopy, preventing access to modal near-field patterns and dark modes, which could further our fundamental understanding of nanoscale vibrational strong coupling (VSC).

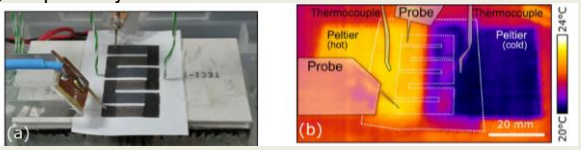


nature COMMUNICATIONS

Low-cost and biodegradable thermoelectric devices based on van der Waals semiconductors on paper substrates. Ersu, G; Munuera, C; Mompean, FJ; Vaquero, D; Quereda, J; Rodrigues, JEFS; Alonso, JA; Flores, E; Ares, JR; **Ferrer, IJ** et al. **Energy and Environ. Mat.** (Aug 2022).

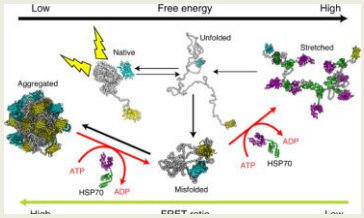
We present a method to fabricate handcrafted thermoelectric devices on standard office paper substrates. The devices are based on thin films of WS2, Te, and BP (P-type semiconductors) and TiS3 and TiS2 (N-type semiconductors), deposited by simply rubbing powder of these materials against paper. The thermoelectric properties of these semiconducting f ilms revealed maximum Seebeck coefficients of (+1.32 ± 0.27) mV/K and (-0.82 ± 0.15) mV/K for WS2 and TiS3, respectively.

Energy & Environmental Materials



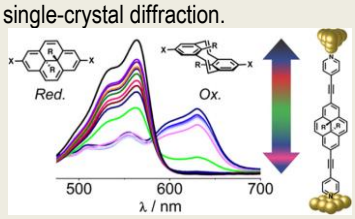
A fluorescent multi-domain protein reveals the unfolding mechanism of Hsp70. Tiwari, S; Fauvet, B; **Assenza, S** et al. **Nature Chemical Biology 19,** pages198–205 (Oct 2022).

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.



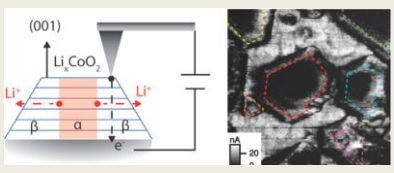
2,7- and 4,9-Dialkynyldihydropyrene Molecular Switches: Syntheses, Properties, and Charge Transport in Single-Molecule Junctions. Roemer, M; Gillespie, A; Jago, D; Costa-Milan, D; Alqahtani, J; **Hurtado-Gallego, J;** Sadeghi, H; Lambert, CJ; Spackman, PR; Sobolev, AN; Skelton, BW; Grosjean, A; Walkey, M.; Kampmann, S; Vezzoli, A; Simpson, PV; Massi, M; Planje, I; **Rubio-Bollinger, G; Agraït, N** et al. **Journal of the American Chemical Society 144**, 12698–12714 (Jul 2022).

This paper describes the syntheses of several functionalized dihydropyrene (DHP) molecular switches with different substitution patterns. Regioselective nucleophilic alkylation of a 5-substituted dimethyl isophthalate allowed the development of a workable synthetic protocol for the preparation of 2,7-alkyne-functionalized DHPs. Synthesis of DHPs with surface-anchoring groups in the 2,7- and 4,9-positions is described. The molecular structures of several intermediates and DHPs were elucidated by X-ray single-crystal diffraction.



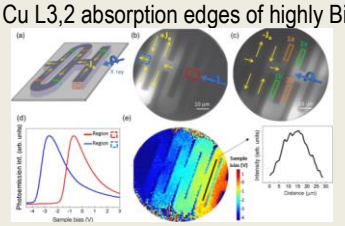
Imaging Phase Segregation in Nanoscale LixCoO2 Single Particles. Fuller, EJ; Ashby, DS; **Polop, C; Salagre, E;** Bhargava, B; Song, Y; Vasco, E; Sugar, JD; Albertus, P; Menteş, TO; Locatelli, A; **Segovia, P;** Gonzalez-Barrio, MA; Mascaraque, A; **Michel, EG e**t al. **ACS Nano** 16, 16363–16371 (Oct 2022).

Li_xCoO_2 (LCO) is a common battery cathode material that has recently emerged as a promising material for other applications including electrocatalysis and as electrochemical random access memory (ECRAM). During charge–discharge cycling LCO exhibits phase transformations that are significantly complicated by electron correlation.



Direct X-Ray Detection of the Spin Hall Effect in CuBi. Ruiz-Gómez, S; Guerrero, R; Khaliq, MW; Fernández-González, C; Prat, J; Valera, A. Finizio, S; Perna, P; **Camarero, J** et al. **Phys. Rev. X 12,** 031032 (13) (Jul 2022).

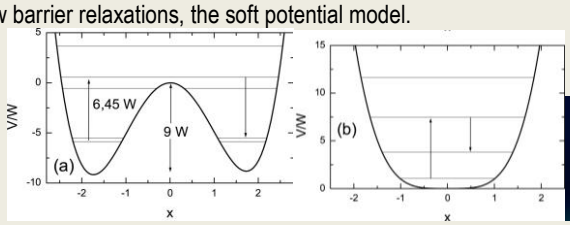
The spin Hall effect and the inverse spin Hall effect are important spin-charge conversion mechanisms. The direct spin Hall effect induces a surface spin accumulation from a transverse charge current due to spin-orbit coupling even in nonmagnetic conductors. However, most detection schemes involve additional interfaces, leading to large scattering in reported data. Here we perform interface-free x-ray spectroscopy measurements at the Cu L3,2 absorption edges of highly Bi-doped Cu (Cu95Bi5).



PHYSICAL REVIEW X

Sound absorption in glasses. Buchenau, U; D'Angelo, G; Carini, G; Liu, X; **Ramos MA. Reviews in Physics 9,** 100078(22) (Oct 2022).

The paper presents a description of the sound wave absorption in glasses, from the lowest temperatures up to the glass transition, in terms of three compatible phenomenological models. Resonant tunneling, the rise of the relaxational tunneling to the tunneling plateau and the crossover to classical relaxation are universal features of glasses and are well described by the tunneling model and its extension to include soft vibrations and low barrier relaxations, the soft potential model.

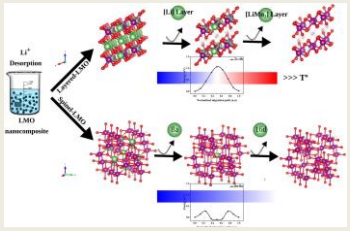


REVIEWS IN PHYSICS

Experimental and density functional theory study of the Li+ desorption in spinel/layered lithium manganese oxide nanocomposites using HCl. **Pulido, R; Naveas, N; Martín-Palma, JR;** Graber, T; Brito I; Hernández-Montelongo, J; **Manso Silván, M** et al. **Chemical Engineering Journal 441,** 136019 (Aug 2022).

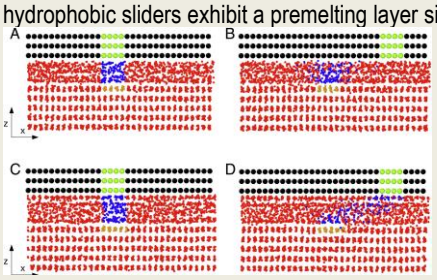
The increasing demand for portable electronic devices and batteries has led to a growing interest in Li compounds. Lithium manganese oxides (LMO) are the most popular lithium-ion sieves (LIS) precursor materials due to their high lithium adsorption capacity and selectivity. The key step in forming LIS is the lithium desorption process from the crystalline lattice of the LMO. However, this process has been less researched than its counterpart, the lithium adsorption process.

CEJ CHEMICAL ENGINEERING JOURNAL



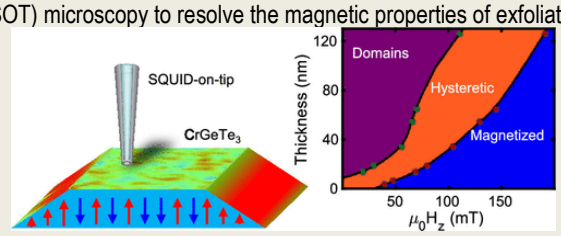
Ice friction at the nanoscale. Baran, L; **Llombart, P;** Rzysko, W; MacDowell, L.G. **PNAS 119**, e2209545119(7) (Nov 2022).

The origin of ice slipperiness has been a matter of great controversy for more than a century, but an atomistic understanding of ice friction is still lacking. Here, we perform computer simulations of an atomically smooth substrate sliding on ice. In a large temperature range between 230 and 266 K, hydrophobic sliders exhibit a premelting layer similar to that found at the ice/air interface.



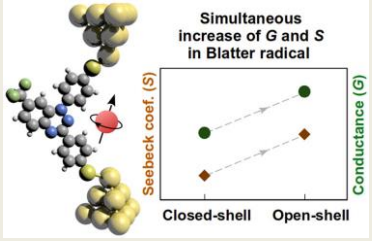
Interior and Edge Magnetization in Thin Exfoliated CrGeTe3 Films. Noah, A; Alpern, H; Singh, S; Gutfreund, A; Zisman, G; Feld, TD; Vakahi, A; Remennik, S; Paltiel, Y; Huber, ME; **Barrena, V; Suderow, H** et al. **Nano letters**, 22, 3165–3172 (Mar 2022).

$CrGeTe_3$ (CGT) is a semiconducting vdW ferromagnet shown to possess magnetism down to a two-layer thick sample. Although CGT is one of the leading candidates for spintronics devices, a comprehensive analysis of CGT thickness dependent magnetization is currently lacking. In this work, we employ scanning SQUID-on-tip (SOT) microscopy to resolve the magnetic properties of exfoliated CGT flakes at 4.2 K.



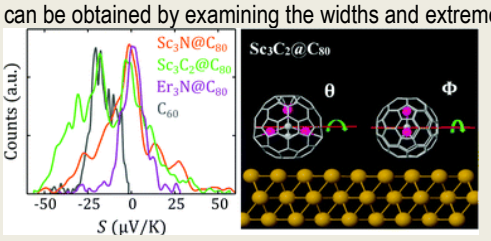
Thermoelectric Enhancement in Single Organic Radical Molecules. Hurtado-Gallego, J; Sangtarash, S; Davidson, R; Rincón-García, L; Daaoub, A; **Rubio-Bollinger, G;** Lambert, CJ; Oganesyan, VS; Bryce, MR; **Agraït, N** et al. **Nano Letters 22,** 948 (Feb 22).

Organic thermoelectric materials have potential for wearable heating, cooling, and energy generation devices at room temperature. For this to be technologically viable, high-conductance (G) and high-Seebeck-coefficient (S) materials are needed. For most semiconductors, the increase in S is accompanied by a decrease in G.



Exploring seebeck-coefficient fluctuations in endohedral-fullerene, single-molecule junctions. Ismael, AK; Rincón-García, L; Evangeli, C; Dallas, P; Alotaibi, T; Al-Jobory, AA; Rubio-**Bollinger, G;** Porfyrakis, K; **Agraït, N** et al. **Nanoscale Horizons 7,** 616-625 (Apr 2022).

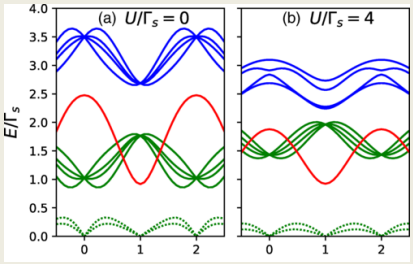
For the purpose of creating single-molecule junctions, which can convert a temperature difference ΔT into a voltage ΔV via the Seebeck effect, it is of interest to screen molecules for their potential to deliver high values of the Seebeck coefficient S = −ΔV/ΔT. Here we demonstrate that insight into molecular-scale thermoelectricity can be obtained by examining the widths and extreme values of Seebeck histograms.



Nanoscale Horizons

Signatures of Interactions in the Andreev Spectrum of Nanowire Josephson Junctions. **Matute-Cañadas FJ;** Metzger C; **Park, S;** Tosi, L; Krogstrup, P; Nygård, J; Goffman, MF; Urbina, C; Pothier, H; **Levy Yeyati, A. Physical Review Letters 128,** 197702 (May 2022).

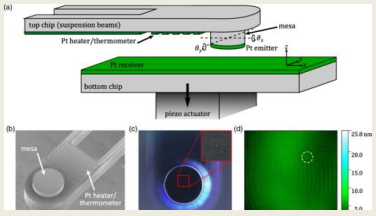
We performed microwave spectroscopy of an InAs nanowire between superconducting contacts implementing a finite-length, multichannel Josephson weak link. Certain features in the spectra, such as the splitting by spin-orbit interactions of the transition lines among Andreev states, have been already understood in terms of noninteracting models. However, we identify here additional transitions, which evidence the presence of Coulomb interactions.



Physical Review Letters moving physics

Enhancement and Saturation of Near-Field Radiative Heat Transfer in Nanogaps between Metallic Surfaces. Rincón-García, L; Thompson, D; Mittapally, R; **Agraït, N** et al. **Physical Review Letters 129,** 145901 (Sep 2022).

Near-field radiative heat transfer (NFRHT) between planar metallic surfaces was computationally explored over five decades ago by Polder and van Hove [Phys. Rev. B **4**, 3303 (1971)]. These studies predicted that, as the gap size (d) between the surfaces decreased, the radiative heat flux first increases by several orders of magnitude until d is ∼100 nm after which the heat flux saturates.



Physical Review Letters moving physics

Publications

Lu B.; Cheng G.; Burset P.; et al.:
Identifying Majorana bound states at quantum spin Hall edges using a metallic probe.
Physical Review B 126, 245427 (Dec 2022).

Gao, J.; Lambert, C.-H.; Schlitz, R. et al.:
Magnon transport and thermoelectric effects in ultrathin Tm3 Fe5 O12/Pt nonlocal devices.
Physical Review Research 4, 043214 (Dec 2022).

Vignolo-González, H.; 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, 2203315 (Dec 2022).

López, M.F., Powell, B.J. and Merino, J.:
Topological superconductivity from doping a triplet quantum spin liquid in a flat-band system.
Physical Review B 106, 235129 (Dec 2022).

Barrio, R.; González, N.; Portugal, A. et al.:
Hydrogenated Amorphous Silicon-Based Nanomaterials as Alternative Electrodes to Graphite for Lithium-Ion Batteries.
Nanomaterials 12, 4400 (Dec 2022).

Cistaro, G.; Malakhov, M.; Esteve-Paredes, J.et al.:
Theoretical Approach for Electron Dynamics and Ultrafast Spectroscopy (EDUS).
Journal of Chemical Theory and Computation, (Dec 2022).

Szewczyk, Daria and Ramos, M.A.:
Low Temperature Thermal Properties of Nanodiamond Ceramics.
Crystals 12, 1774 (Dec 2022).

Fernandez-Martinez, J.; Carretero-Palacios, S. Molina, P. et al.:
Silver Nanoparticle Chains for Ultra-Long-Range Plasmonic Waveguides for Nd3+ Fluorescence.
Nanomateriales 12, 23 (Dec 2022).

Baran, L.; Llombart, P.; Rzysko, W. and MacDowell, L.G.:
Ice friction at the nanoscale.
Proceedings of the National Academy of Sciences of the United States of America 119, e2209545119 (Nov 2022).

Dolado I., Maciel-Escudero C., Nikulina E. et al.:
Remote near-field spectroscopy of vibrational strong coupling between organic molecules and phononic nanoresonators.
Nature Communications 13, 6850 (Nov 2022).

Elvira, I., Puerto, A., Mínguez-Vega, G. et al.:
Micro-patterns of gold nanoparticles assembled by photovoltaic optoelectronic tweezers: application to plasmonic fluorescence enhancement.
Optics Express 30, 41541 (Nov 2022)

Fresno-Hernández A. and Marqués M.I.:
Opto-mechanically generated resonant field enhancement.
Scientific reports 12, 18292 (Oct 2022)

Fuller, E.J., Ashby, D.S., Polop, C. et al.:
Imaging Phase Segregation in Nanoscale LixCoO2Single Particles.
ACS Nano 16, 16363 (Oct 2022).

Sokolov, D.Y.; Yerezhep, D.; Vorobyova, O. et al.:
Optical Studies of Thin Films of Cryocondensed Mixtures of Water and Admixture of Nitrogen and Argon.
Materials 15, 21 (Oct 2022).

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

Fernández-Alonso, F.J., Pau, J.L. and Redondo-

Cubero, A.:
Implementation of a home-made high accuracy pulsimeter and oximeter.
Journal of Instrumentation 17, C10020 (Oct 2022).

Buchenau, U., D'Angelo, G., Carini, G. et al.:
Sound absorption in glasses.
Reviews in Physics 9, 100078 (Oct 2022).

Hernandez-Munoz, J.; Tarazona, P. and Chacon, E.:
Layering and capillary waves in the structure factor of liquid surfaces.
Journal of Chemical Physics 157, 154703 (Oct 2022).

Wan, W.; Dreher, P.; Munoz-Segovia, D. et al.:
Observation of Superconducting Collective Modes from Competing Pairing Instabilities in Single-Layer NbSe2.
Advanced Materials 34, 2206078 (Oct 2022).

Jacot, B. J.; Velez, S.; Noel, P. et al.:
Control of field- and current-driven magnetic domain wall motion by exchange bias in Cr2O3/Co/Pt trilayers.
Physical Review B 106, 134411 (Oct 2022).

Cinacchi, Giorgio:
Dense disordered jammed packings of hard very elongate particles: A new derivation of the random contact equation.
Journal of Chemical Physics 157, 134903 (Oct 2022).

Casado Aguilar, P.; Calleja, F.; Kuo, C.N. et al.:
Atomic-scale study of type-II Dirac semimetal PtTe2 surface.
Journal of Physics-Materials 5, 044003 (Sep 2022).

Al Taleb, A.; Majer, L.N.; Selfors, E.W. et al.:
Ultrasmooth graphene-coated metal thin films on sapphire grown by thermal laser epitaxy.
Thin Solid Films 758, 139449 (Sep 2022).

Ayani, Cosme G.; Calleja, F.; Ibarburu, I.M. et al.:
Switchable molecular functionalization of an STM tip: from a Yu-Shiba-Rusinov Tip to a Kondo tip.
Nanoscale 14,15111 (Sep 2022).

Rincón-García, L., Thompson, D., Mittapally, R. et al.:
Enhancement and Saturation of Near-Field Radiative Heat Transfer in Nanogaps between Metallic Surfaces.
Physical Review Letters 129, 145901 (Sep 2022).

Sebastian-Vicente, C.; Remacha-Sanz, P.; Elizechea-Lopez, E. et al.:
Combinatorial nanoparticle patterns assembled by photovoltaic optoelectronic tweezers.
Applied Physics Letters 121, 121104 (Sep 2022).

Dednam, W.; Tewari, S.; Lombardi, E.B. et al.:
Dynamic bonding influenced by the proximity of adatoms to one atom high step edges.
Physical Review B 106, 125418 (Sep 2022).

Tabatabaei, S.M., Sánchez, D., Yeyati, A.L. and Sánchez, R.:
Nonlocal quantum heat engines made of hybrid superconducting devices.
Physical Review B 106, 115419 (Sep 2022).

Cayao, J.; Dutta, P.; Burset, P. and -Schaffer, A.M.B:
Phase-tunable electron transport assisted by odd-frequency Cooper pairs in topological Josephson junctions.
Physical Review B 106, L100502 (Sep 2022).

Pulido, R., Naveas, N., Martin-Palma R.J. et al.:
Phonon Structure, Infra-Red and Raman Spectra of Li2MnO3 by First-Principles Calculations.
Materials 15, 6237 (Sep 2022).

Ouassou, J. L. ; González-Ruano, C.; Caso, C. et al:
Complete magnetic control over the superconducting thermoelectric effect.
Phys. Rev. B 106, 094514 (Sep 2022)

Martínez-Raton, Yuri and Velasco, Enrique.:
Effect of combined roundness and polydispersity on the phase behavior of hard-

rectangle fluids.
Physical Review E 106, 034602 (Sep 2022).

Sebastian-Vicente, C; Garcia-Cabanes, A and Carrascosa, M.: *Transfer of Photovoltaic Surface Charge Patterns to Passive Dielectric Substrates via Direct Contact with LiNbO3:Fe Ferroelectric Stamps.*
2022 IEEE International Symposium on Applications of Ferroelectric (Sep 2022).

Ramos, M.A.: *Low-Temperature Thermal and Vibrational Properties of Disordered Solids. A Half-Century of Universal "Anomalies" of Glasses.*
Word Scientific, (Sept 2022).

Lu, D., Retama, J.R., Marin, R. et al.: *Thermoresponsive Polymeric Nanolenses Magnify the Thermal Sensitivity of Single Upconverting Nanoparticles.*
Small 18, 2202452 (Aug 2022).

Martin, A.Pe.S.; Uribe, K.; Hernandez-Montelongo, J. et al.: *Antibacterial Activity and Kinetic Release of Laureliopsis philippiana (Looser) Essential Oil from Nanostructured Porous Silicon with Surface-Functionalization Alternatives.*
Applied Sciencies-Basel 12, 8258 (Aug 2022).

Escribano, Samuel D.; Maiani, A.; Leijnse, M. et al..: *Semiconductor-ferromagnet-superconductor planar heterostructures for 1D topological superconductivity.*
NPJ Quantum Materials 7, 81 (Aug 2022).

Morales, C.; Pascual, A.; Leinen, D. et al..: *Reaction Mechanism and Kinetic Model of Fe Thin Film Transformation into Monosulfides (FeS): First Step of the Fe Films Sulfuration Process into Pyrite.*
Journal of Physical Chemistry C 126, 13870 (Aug 2022).

Edelstein, S., Garcia-Martin, A., Serena, P.A. and Marqués, M.: *Circular dichroism in magneto-optical forces.*
Optics Express 30, 28668 (Aug 2022).

Pulido, R., Naveas, N., J.Martín-Palma, R., et al.: *Experimental and density functional theory study of the Li+ desorption in spinel/layered lithium manganese oxide nanocomposites using HCl.*
Chemical Engineering Journal 441, 136019 (Aug 2022).

Yang, C; Chen, L; Zhang, R et al.: *Local high-density distributions of phospholipids induced by the nucleation and growth of smectic liquid crystals at the interface*
Chinese Chemical Letters 33, 3973 (Aug 2022).

Ersu, G; Munuera, C; Mompean, FJ et al.: *Low-cost and biodegradable thermoelectric devices based on van der Waals semiconductors on paper substrates.*
Energy and Environmental Materials (Aug 2022)

Luengo-Marquez, J.; Izquierdo-Ruiz, F. and MacDowell, L.G.: *Intermolecular forces at ice and water interfaces: Premelting, surface freezing, and regelation.*
Journal of Chemical Physics 157, 044704 (Jul 2022).

Ruiz-Gómez, S., Guerrero, R., Khaliq, M.W. et al.: *Direct X-Ray Detection of the Spin Hall Effect in CuBi.*
Physical Review X 12, 031032 (Jul 2022).

Alvarado, Miguel; Yeyati, Alfredo Levy: *2D topological matter from a boundary Green's functions perspective: Faddeev-LeVerrier algorithm implementation.*
SciPost Physics 13, 009 (Jul 2022)

Prieto, P.; Serrano, A.; Rojas-Hernandez, R. E. et al.: *Spinel to disorder rock-salt structural transition on (111) nickel ferrite thin films tailored by Ni content.* **Journal of Alloys and Compounds 910**, 164905 (Jul 2022)

Valencia-Ibanez, S.; Jimenez-Guerrero, D.;

Salcedo-Pimienta, J.D. et al.:
Raman Spectroscopy of Few-Layers TaS2 and Mo-Doped TaS2 with Enhanced Superconductivity.
Advanced Electronic Materials 8, 2200457 (Jul 2022)

Ramadan, Rehab and Martin-Palma, Raúl J.:
The Impact of Nanostructured Silicon and Hybrid Materials on the Thermoelectric Performance of Thermoelectric Devices: Review.
Energies 15, 5363 (Jul 2022).

Mahmoodi, E.; Amiri, M.H.; Salimi, A. et al.:
Paper-based broadband flexible photodetectors with van der Waals materials.
Scientific Reports 12, 12585 (Jul 2022).

Manuel Diez, J.; Cunado, JLF; Lapa, P et al.:
Interfacial Exchange Phenomena Driven by Ferromagnetic Domains.
Advanced Materials Interfaces 9, 2200331 (Jul 2022).

Roemer, M.; Gillespie, A.; Jago, D. et al.:
2,7- and 4,9-Dialkynyldihydropyrene Molecular Switches: Syntheses, Properties, and Charge Transport in Single-Molecule Junctions.
Journal of the American Chemical Society 144, 12698 (Jul 2022).

de-la-Pena, S.; Schlitz, R.; Velez, S. et al.:
Theory of drift-enabled control in nonlocal magnon transport.
Journal of Physics: Condensed Matter 34, 295801 (Jul 2022).

Abramovich, S.; Dutta, D.; Rizza, C. et al.:
NiSe and CoSe Topological Nodal-Line Semimetals: A Sustainable Platform for Efficient Thermoplasmonics and Solar-Driven Photothermal Membrane Distillation.
Small 18, 2201473 (Jul 2022).

Ripoll-Sau, J.; Calleja, F.; Aguilar, P.C. et al.:
Phase control and lateral heterostructures of MoTe2 epitaxially grown on graphene/Ir(111).
Nanoscale 14, 10880 (Jul 2022).

Hurtado-Gallego, J.; Davidson, R.; Grace, I. M. et al.:
Quantum interference dependence on molecular configurations for cross-conjugated systems in single-molecule junctions.
Molecular Systems Design and Engineering 7, 1287 (Jul 2022).

Luengo-Marquez, J. and MacDowell, L.G.:
Analytical theory for the crossover from retarded to non-retarded interactions between metal plates.
Journal of Physics-Condensed Matter 34, 275701 (Jul 2022).

Velez, S.; Ruiz-Gomez, S.; Schaab, J. et al.:
Current-driven dynamics and ratchet effect of skyrmion bubbles in a ferrimagnetic insulator.
Nature Nanotechnology 17, 834 (Jul 2022)

Munoz-Ortiz, T.; Hu, J.; Sanz-Rodriguez, F. et al.:
Optical detection of atherosclerosis at molecular level by optical coherence tomography: An in vitro study.
Nanomedicine: Nanotechnology, Biology and Medicine 43, 102556 (Jul 2022)

Okugawa, T.; Park, S.; Recher, P. and Kennes, D.M.:
Vortex control in superconducting Corbino geometry networks.
Physical Review B 106, 024501 (Jul 2022)

Martin-Vega, F.; Herrera, E.; Wu, BL et al.:
Superconducting density of states and band structure at the surface of the candidate topological superconductor Au2Pb.
Physical Review Research 4, 023241 (Jun 2022).

Martinez-Galera, A. J.; Guo, H.J.; Jimenez-Sanchez, M.D. et al.:
There is life after coking for Ir nanocatalyst superlattices.
Nano Research 15, 6969 (Jun 2022).

Ortuzar, J.; Trivini, S.; Alvarado, M. et al.:
Yu-Shiba-Rusinov states in two-dimensional

superconductors with arbitrary Fermi contours. **Physical Review B 105**, 245403 (Jun 2022)

Chumak, A. V.; Kabos, P; Wu, M. et al.: *Advances in Magnetics Roadmap on Spin-Wave Computing.* **IEEE Transactions on Magnetics 58**, 0800172 (Jun 2022)

Anemone, G.; Taleb, A.A.; Politano, A. et al.: *Setting the limit for the lateral thermal expansion of layered crystals via helium atom scattering.* **Physical chemistry chemical physics 24**, 13229 (Jun 2022)

Caso, D. and Aliev, F. G.: *Edge spin wave transmission through a vertex domain wall in triangular dots.* **SN Applied Sciences 4**, 188 (May 2022).

Esteso, V.; Carretero-Palacios, S. and Miguez, H.: *Effect of Spatial Inhomogeneity on Quantum Trapping.* **The Journal of Physical Chemistry Letters 13,** 4513 (May 2022)

Hernandez-Del-Valle, M.; Valencia-Exposito, A.; Gorfinkiel, N. et al.: *Analysis of Actomyosin Oscillatory Dynamics Using a Coarse-Grained Model.* **Frontiers in Physics 10**, 881384 (May 2022).

Merino, J. and Ralko, A.: *Majorana chiral spin liquid in a model for Mott insulating cuprates.* **Physical Review Research 4**, 023122 (May 2022).

Jemai R.; Wederni M.A.; Amorri O. et al.: *Effects of doping by copper on electrical properties of LaCrO3 based perovskite.* **Ceramics International 48**, 14050 (May 2022).

Matute-Cañadas F.J.; Metzger C.; Park, Sunghun et al.: *Signatures of Interactions in the Andreev Spectrum of Nanowire Josephson Junctions.* **Physical Review Letters 128**, 197702 (May 2022).

Pawlak, M.; Baginski, M.; Llombart, P. et al.: *Tuneable helices of plasmonic nanoparticles using liquid crystal templates: molecular dynamics investigation of an unusual odd-even effect in liquid crystalline dimers.* **Chemical communications**, (May 2022).

Hernandez-del-Valle, M.; Valencia-Exposito, A.; Lopez-Izquierdo, A. et al.: *A coarse-grained approach to model the dynamics of the actomyosin cortex.* **BMC Biology 20**, 90 (Apr 2022).

Ismael, A. K.; Rincón-García, L.; Evangeli, C. et al.: *Exploring seebeck-coefficient fluctuations in endohedral-fullerene, single-molecule junctions.* **Nanoscale Horizons 6**, (Apr 2022).

Urfa-Alvarez, A.J.; Molpeceres-Mingo, D. and Palacios, J.J.: *Deep learning for disordered topological insulators through their entanglement spectrum.* **Physical Review B 105,** 155128 (Apr 2022).

Steffensen G.O.; Saldaña, J. C. Estrada; Vekris A.: *Direct transport between superconducting subgap states in a double quantum dot.* **Physical Review B 105,** L161302 (Apr 2022).

Hernández-Muñoz, J.; Bresme, F.; Tarazona, P. and Chacón, E.: *Bending Modulus of Lipid Membranes from Density Correlation Functions.* **Journal of Chemical Theory and Computation 18**, 3151 (Apr 2022).

Zotti, L.A.; Dednam, W.; Lombardi, E.B. and Palacios, J.J.: *Constrained DFT for Molecular Junctions.* **Nanomaterials 12,** 1234 (Apr 2022).

Fernández López, Manuel and Merino, Jaime: *Bad topological semimetals in layered honeycomb compounds.* **Physical Review B 105**, 115138 (Mar 2022).

Wederni M.A.; Hzez W.; Rached A. et ál.: *Effect of co doping on the electric and dielectric properties of Bi3.8−xEr0.2YbxTi3O12 lead-free ceramics.* **Journal of Alloys and Compounds 898**, 162899 (Mar 2022).

Martínez-Ratón, Yuri and Velasco, Enrique: *Effect of clustering on the orientational properties of a fluid of hard right isosceles triangles.* **Physics of Fluids 34**, 037110 (Mar 2022).

Luis-Hita, J.; Sáenz, J. J. and Marqués, M.I.: *Active Motion Induced by Random Electromagnetic Fields.* **ACS Photonics 9**, 1008 (Mar 2022).

Rodriguez-Tinoco, C.; Gonzalez-Silveira, M.; Ramos, M.A. et al.: *Ultrastable glasses: new perspectives for an old problem.* **La Rivista del Nuovo Cimento**, (Mar 2022).

Noah, Avia; Alpern, Hen; Singh, Sourabh et al.: *Interior and Edge Magnetization in Thin Exfoliated CrGeTe3 Films.* **Nano letters**, (Mar 2022).

Toral-Lopez, A.; Santos, H.; Marin, E.G. et al.: *Multi-scale modeling of 2D GaSe FETs with strained channels.* **Nanotechnology 33**, 105201 (Mar 2022).

Calderon, J.A.; Quiroz, HP.; Manso-Silvan, M. et al.: *GaSb/Mn multilayers structures fabricated by DC magnetron sputtering: Interface feature and nano-scale surface topography.* **Journal of Materials Science: Materials in Electronics volume 33**, 8159 (Mar 2022).

Machín, A.; Fontánez, K.; García, D. et al.: *Hydrogen Production and Degradation of Ciprofloxacin by Ag@TiO2-MoS2 Photocatalysts.* **Catalysts 12**, 267 (Feb 2022).

Soda, M.; Kagamida, N.; Campillo, E. et al.: *Penetration Depth and Coherence Length in the Superconductor β-PdBi2.* **Journal of the Physical Society of Japan, 91**, 034706 (Feb 2022)

Hurtado-Gallego, J.; Sangtarash, S.; Davidson, R. et al.: *Thermoelectric Enhancement in Single Organic Radical Molecules.* **Nano Letters 22**, 948 (Feb 22)

D'Olimpio, G; Zhang, L.X.; Kuo, C.N. et al.: *Efficient Hydrogen Evolution Reaction with Bulk and Nanostructured Mitrofanovite Pt3Te4.* **Nanomaterials 12**, 558 (Feb 2022).

Hermansen, C.; Yeyati, A.L. and Paaske, J.: *Inductive microwave response of Yu-Shiba-Rusinov states.* **Physical Review B 105**, 054503 (Feb 2022).

D'Olimpio, G.; Farias, D.; Kuo, C.N. et al.: *Tin Diselenide (SnSe2) Van der Waals Semiconductor: Surface Chemical Reactivity, Ambient Stability, Chemical and Optical Sensors.* **Materials 15**, 1154 (Feb 2022).

Sebastian-Vicente, C.; Garcia-Cabanes, A.; Agullo-Lopez, F. et al.: *Light and Thermally Induced Charge Transfer and Ejection of Micro-/Nanoparticles from Ferroelectric Crystal Surfaces.* **Advanced Electronic Materials 8**, 2100761 (Feb 2022).

Ramadan, R.; Dadgostar, S.; Manso-Silvan, M.et al.: *Silver-enriched ZnO:Ag thin films deposited by magnetron co-sputtering: Post annealing effects on structural and physical properties.* **Materials Science and Engineering B 276**, 115558 (Feb 2022).

Machin, A.; Fontanez, K.; Duconge, J. et al.: *Photocatalytic Degradation of Fluoroquinolone Antibiotics in Solution by Au@ZnO-rGO-gC3N4 Composites.* **Catalysts 12**, 166 (Jan 2022).

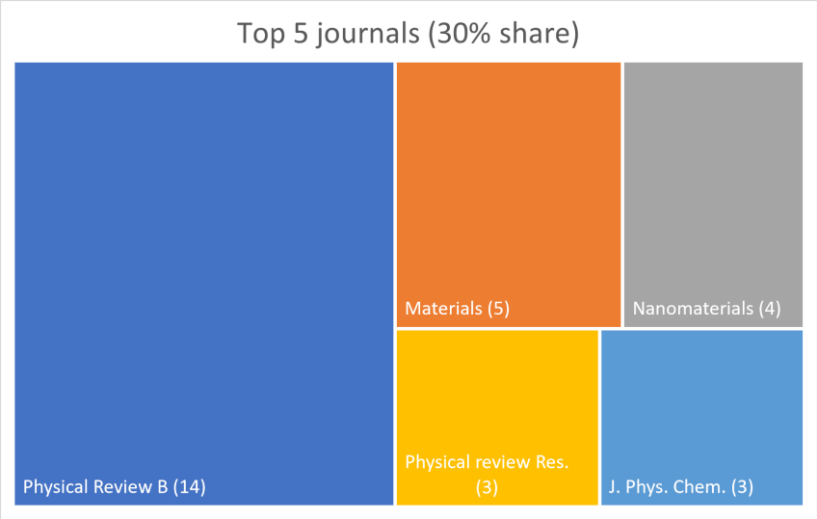
Ramadan R. and Martín-Palma R.J.: *The Infiltration of Silver Nanoparticles into Porous Silicon for Improving the Performance of Photonic Devices.* **Nanomaterials 12,** 271 (Jan 2022)

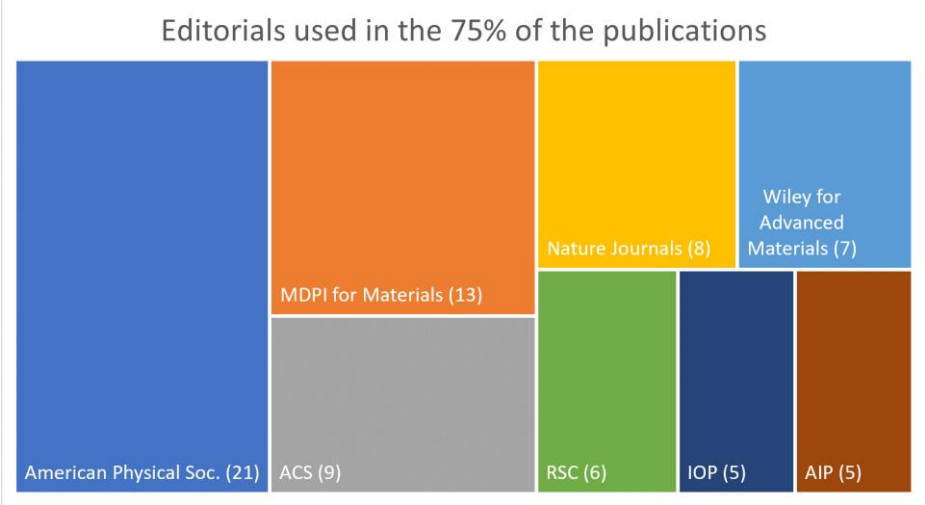
Guo, H.; Jimenez-Sanchez, M.D.; Martinez-Galera, A.J. and Gomez-Rodriguez, J.M.: *Unraveling the Highly Complex Nature of Antimony on Pt(111).* **Advances Materials Interfaces 9,** 2101272 (Jan 2022)

Garnica, M.; Otrokov, M.M.; Casado Aguilar, P.; et al.: *Native point defects and their implications for the Dirac point gap at MnBi2Te4(0001).* **Quantum Materials 7,** 7 (Jan 2022)

Escribano, S.D.; Yeyati, A.L.; Aguado, R. et al.: *Fluxoid-induced pairing suppression and near-zero modes in quantum dots coupled to full-shell nanowires.* **Physical Review B 105,** 045418 (Jan 2022)

Naveas, N.; Manso-Silvan, M.; Carmona, E. et al.: *Green synthesized silver nanoparticles decorated on nanostructured porous silicon as an efficient platform for the removal of organic dye methylene blue.* **Green Chemistry Letters and Reviews 15**, 106 (Jan 2022)





Permanent Members

	PROFESSOR-RESEARCHERS	DEPARTMENT
1	Agraït de la Puente, Nicolás	CONDENSED MATTER PHYSICS
2	Aliev Kazanski, Farkhad	CONDENSED MATTER PHYSICS
3	Álvarez Alonso, Jesús	CONDENSED MATTER PHYSICS
4	Álvarez Carrera, José Vicente	CONDENSED MATTER PHYSICS
5	Arranz de Gustín, Antonio	APPLIED PHYSICS
6	Barandiarán Piedra, Zoila	CHEMISTRY
7	Bausá López, Luisa	MATERIALS PHYSICS
8	Bravo Abad, Jorge	THEORETICAL CONDENSED MATTER PHYSICS
9	Bravo Roldán, David	MATERIALS PHYSICS
10	Brihuega Alvarez, Iván	CONDENSED MATTER PHYSICS
11	Caballero Mesa, Raquel	APPLIED PHYSICS
12	Camarero de Diego, Julio	CONDENSED MATTER PHYSICS
13	Cantelar Alcaide, Eugenio	MATERIALS PHYSICS
14	Carrascosa Rico, Mercedes	MATERIALS PHYSICS
15	Cervera Goy, Manuel	APPLIED PHYSICS
16	Cinacchi, Giorgio	THEORETICAL CONDENSED MATTER PHYSICS
17	Cuevas Rodríguez, Juan Carlos	THEORETICAL CONDENSED MATTER PHYSICS
18	Cussó Pérez, Fernando	MATERIALS PHYSICS
19	De Miguel Llorente, Juan José	CONDENSED MATTER PHYSICS
20	De Pablo Gomez, Pedro José	CONDENSED MATTER PHYSICS
21	Delgado Buscalioni, Rafael	THEORETICAL CONDENSED MATTER PHYSICS
22	Díaz Palacios, Raquel	APPLIED PHYSICS
23	Farias Tejerina, Daniel	CONDENSED MATTER PHYSICS
24	Feist, Johannes	THEORETICAL CONDENSED MATTER PHYSICS
25	Fernández Dominguez, Antonio I.	THEORETICAL CONDENSED MATTER PHYSICS
26	Fernández Ríos, José Francisco	MATERIALS PHYSICS
27	García Cabañes, Angel	MATERIALS PHYSICS
28	García Carretero, Basilio Javier	APPLIED PHYSICS
29	García Michel, Enrique	CONDENSED MATTER PHYSICS
30	García Solé, José	MATERIALS PHYSICS
31	García Vidal, Francisco José	THEORETICAL CONDENSED MATTER PHYSICS
32	Garrido Salas, Javier	ELECTRONIC AND COMMUNICATIONS TECHNOLOGY
33	Gómez Herrero, Julio	CONDENSED MATTER PHYSICS
34	Gómez Santos, Guillermo	CONDENSED MATTER PHYSICS
35	Gómez-Navarro González, Cristina	CONDENSED MATTER PHYSICS
36	Guantes Navacerrada, Raúl	CONDENSED MATTER PHYSICS
37	Guillamón Gómez, Isabel	CONDENSED MATTER PHYSICS
38	Gutiérrez Delgado, Alejandro	APPLIED PHYSICS
39	Hernández Muñoz, María Jesús	APPLIED PHYSICS
40	Jaafar Ruiz-Castellanos, Miriam	CONDENSED MATTER PHYSICS
41	Jaque García, Daniel	MATERIALS PHYSICS

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

	PROFESSOR-RESEARCHERS	DEPARTMENT
86	Viña Liste, Luis	MATERIALS PHYSICS

22% of the INC's permanent members are women.

Non Permanent Members

DOCTORS

	PROFESSOR-RESEARCHERS	DEPARTMENT
1	Agulló López, Fernando	MATERIALS PHYSICS
2	Antón Solanas, Carlos	MATERIALS PHYSICS
3	Aragó López, Carmen	MATERIALS PHYSICS
4	Aragonés Gómez, Juan L.	THEORETICAL CONDENSED MATTER PHYSICS
5	Ares García, Pablo	CONDENSED MATTER PHYSICS
6	Assenza, Salvatore	THEORETICAL CONDENSED MATTER PHYSICS
7	Benayas Hernández, Antonio	MATERIALS PHYSICS
8	Burset Atienza, Pablo	THEORETICAL CONDENSED MATTER PHYSICS
9	Burzurí Linares, Enrique	CONDENSED MATTER PHYSICS
10	Carretero Palacios, Sol	MATERIALS PHYSICS
11	Chacón Fuertes, Enrique	MATERIALS SCIENCE INSTITUT (ICMM-CSIC)
12	Fernández Cuñado, José Luis	CONDENSED MATTER PHYSICS
13	Fernández Garrido, Sergio	APPLIED PHYSICS
14	Galán Estella, Luis	APPLIED PHYSICS
15	Garnica Alonso, Manuela	IMDEA Nanoscience
16	Gordillo García, Nuria	APPLIED PHYSICS
17	Haro González, Patricia	MATERIALS PHYSICS
18	Hernández Pinilla, David	MATERIALS PHYSICS
19	Hernando Pérez; Mercedes	MATERIALS PHYSICS
20	Herrera Vasco, Edwin	CONDENSED MATTER PHYSICS
21	Llombart González, Pablo	THEORETICAL CONDENSED MATTER PHYSICS
22	Marin, Riccardo	MATERIALS PHYSICS
23	Martín Rodríguez, Emma	APPLIED PHYSICS
24	Martínez Galera, Antonio Javier	MATERIALS PHYSICS
25	Moratalla Martín, Manuel Eduardo	CONDENSED MATTER PHYSICS
26	Nistor, Valentín	APPLIED PHYSICS
27	Ortgies, Dirk	MATERIALS PHYSICS
28	Pampillón Arce, María Ángela	APPLIED PHYSICS
29	Prins, Ferry	CONDENSED MATTER PHYSICS
30	Quintanilla Morales, Marta	MATERIALS PHYSICS
31	Rodríguez Arriaga, Laura	THEORETICAL CONDENSED MATTER PHYSICS
32	Sánchez López, Carlos	MATERIALS PHYSICS

	PROFESSOR-RESEARCHERS	DEPARTMENT
33	Sánchez Muñoz, Carlos	CONDENSED MATTER PHYSICS-IFIMAC
34	Sanz García, Juan Antonio	MATERIALS PHYSICS
35	Szewczyk, Daria	CONDENSED MATTER PHYSICS
36	Tabares Jiménez, Gema	APPLIED PHYSICS
37	Tejedor de Paz, Carlos	THEORETICAL CONDENSED MATTER PHYSICS
38	Vélez Centoral, Saül	CONDENSED MATTER PHYSICS
39	Vélez Tirado, Marisela	BIOCATALYSIS
40	Vieira Díaz, Sebastián	CONDENSED MATTER PHYSICS
41	Yndurain Muñoz, Félix	CONDENSED MATTER PHYSICS

32% of the INC's non-permanent doctors members are women.

NON DOCTORS

	PROFESSOR-RESEARCHERS	DEPARTMENT
1	Andrino Gómez, Alberto	CONDENSED MATTER PHYSICS
2	Calvo Membibre, Rodrigo	APPLIED PHYSICS
3	Camarero Linares, Pablo	MATERIALS PHYSICS
4	Campusano Cortés, Richard A.	THEORETICAL CONDENSED MATTER PHYSICS
5	Díaz Sánchez, Jesús	CONDENSED MATTER PHYSICS
6	Escobar Ortiz, Arin	THEORETICAL CONDENSED MATTER PHYSICS
7	Fernández García, Alejandro	APPLIED PHYSICS
8	Galindo Sanz, Arturo	APPLIED PHYSICS
9	Geva, Galor	THEORETICAL CONDENSED MATTER PHYSICS
10	López Peña, Gabriel	APPLIED PHYSICS
11	Lu, Dasheng	MATERIALS PHYSICS
12	Luengo Márquez, Juan	THEORETICAL CONDENSED MATTER PHYSICS
13	Magrinyá Aguiló, Paula	THEORETICAL CONDENSED MATTER PHYSICS
14	Muñoz Ortiz, Tamara	MATERIALS PHYSICS
15	Naveas Ríos, Nelson Andrés	APPLIED PHYSICS
16	Ortiz Rivero, Elisa	MATERIALS PHYSICS
17	Puerto Vivar, Andrés	MATERIALS PHYSICS
18	Pulido Venegas, Ruth Noemí	APPLIED PHYSICS
19	Ramadan Shehata, Rehab	APPLIED PHYSICS
20	Ramírez Peral, Mª Jesús	CONDENSED MATTER PHYSICS
21	Sánchez Barquilla, Mónica	THEORETICAL CONDENSED MATTER PHYSICS
22	Tiene, Antonio	THEORETICAL CONDENSED MATTER PHYSICS
23	Tinao Nieto, Berta	THEORETICAL CONDENSED MATTER PHYSICS
24	Salagre Rubio, Elena	CONDENSED MATTER PHYSICS
25	Zhang, Fengchan	MATERIALS PHYSICS

36% of the INC's non doctors members are women.

Instituto Nicolás Cabrera

Management:

Director: Miguel Angel Ramos Ruiz
Deputy director: Isabel Jiménez Ferrer
Secretary: Juan L. Aragonés Gómez (January 1 –September 28)
Enrique Velasco Caravaca (September 29–December 31)
Adiminstrative secretary: Rocío Gómez-Argüello Gordillo

Board:

Carmen Morant Zacarés, Mª Dolores Martín Fernández, Iván Brihuega Álvarez, Enrique Velasco Caravaca (January 1 –September 28), Jaime Merino Troncoso (September 29–December 31)

Scientific Advisory Committee:

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

Responsible for website:: Juan L. Aragonés (1 enero – 28 septiembre)
Enrique Velasco (29 septiembre – 31 diciembre)
Twitter Manager: Paula Mangriyá (1 enero – 28 septiembre)
Infrastructure Manager: Hermann Suderow

Universidad Autónoma de Madrid

Campus Internacional excelencia UAM CSIC