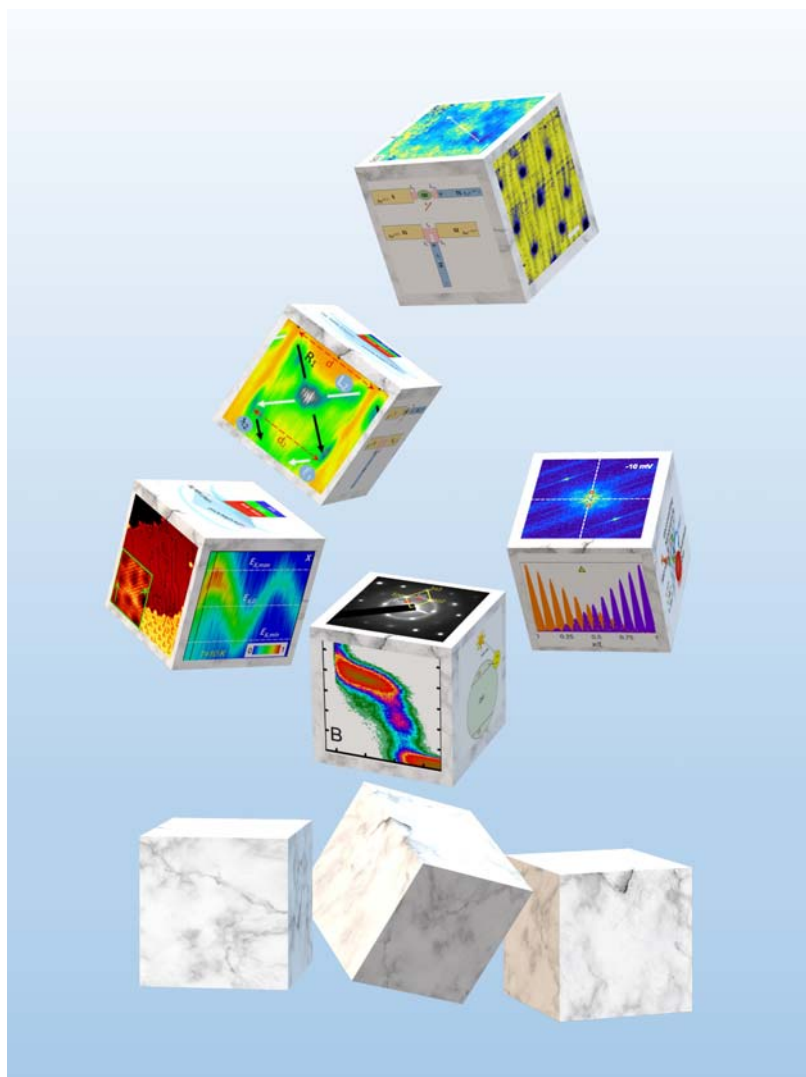


Instituto Universitario de Ciencia de Materiales Nicolás Cabrera



Activity report 2018

UAM

Universidad Autónoma
de Madrid

excelencia Campus Internacional **UAM
CSIC+**

INC
INSTITUTO NICOLÁS CABRERA

 **FACULTAD DE
CIENCIAS**

Cover: Herko van der Meulen

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Welcome

Dear reader:

The Institute has changed a lot during past years. This is the eight activity report issued by the INC. We have organized activities using funds of the FBBVA that amount to more than 350 000 €. This is probably the most relevant private investment in Physics at our University. The INC has been able to help more than 50 undergraduate students and given 7 prizes for young researchers, recognizing the work of more than 10 of our youngest colleagues. Our youtube channel has over 80 000 visits and more than 500 followers. The Nicolás Cabrera Summer School has brought 131 professors and researchers, which have taught our research subjects to more than 400 students world-wide. Within the colloquia, we have received more than 22 researchers (with one Nobel prize winner among them), who visited our research laboratories. We have also helped in organizing the 50 years of UAM, with the visit of another Nobel prize winner and organized five international workshops, using separate funds. The Summer School is our most visible activity, and the dissemination work organized by FBBVA regularly reaches the general public each September.

These numbers do not need explanation and provide an idea about an activity that has been beneficial to all of us. But the Institute also contains Science, with more than 100 publications each year. The Institute's members are PIs of ERC (four), COST (one) or FET-Open (one) projects and are participating in numerous European initiatives. This activity requires a continued support.

The Campus of the UAM has no internationally visible scientific infrastructure, which is probably an issue that affects negatively to attract talent. The rectorate is preparing new governing rules for the Institutes of this University and we face the challenge of projecting the INC into the future. The INC will change the premises and approach the Condensed Matter Physics Research Center, to exploit synergies and complementarities.

The Nicolás Cabrera Institute will start internal consultations to decide the objectives of the Institute during the coming years. We will set-up activities to serve a large number of competitive groups and promote collaboration among our members and try to get into European programs such as Capacities, that exploit synergies among different areas around a large infrastructure. The INC has a considerable impact in the undergraduate students and we should think on how to increase this impact, probably by supporting advanced practical activities of the students. The challenge is to provide a coherent offer, gathering complementarities among members of the Institute, within the competition of other Institutes in the Campus.

During 2018, Johannes Feist., Antonio I. Fernández Domínguez and Francisco J. García Vidal have organized the [Nicolás Cabrera Summer School 2018](#). The School has been a great success, thanks to the dedication and efforts of the organizers. The [Fundación BBVA](#), funders of the School, has provided media coverage, with many interviews in national level journals and other media. The School 2019 already has a list of [speakers](#).

Thanks to the [Coloquia](#), we have enjoyed the visit of several researchers and our students have interacted with them.

I would also like to thank and highlight the efforts of some members of the Institute to reduce the gender gap. Their work brings our University closer to an international movement which is topical in the countries with which we like to compare our scientific activity. I hope that this initiative will be soon seen in our numbers. Although this year we have had equal participation of male and female in the colloquia, we are still far from that in other activities (during past seven years, 117 male and 14 female speakers at the Summer School and we have supported 50 male and 9 female undergraduate students).

Hermann Suderow

Director del INC

Nicolás Cabrera Summer School

The Nicolás Cabrera Summer School is celebrated annually since 1994. The school is funded by [Fundación BBVA](#) since 2002.



The BBVA Foundation worked on the media coverage of the school, editing videos that can be seen [here](#).

The 2018 Summer School, directed by Johannes Feist, Antonio I. Fernández-Domínguez and Francisco J. García-Vida, was entitled "Manipulating Light and Matter at the Nanoscales" and took place from 10 to 14 september 2018 in Miraflores de la Sierra. The objective of the School is to provide a general and complete vision on the field of nanophotonics. With this aim, the School gathered leaders in the field, both experimentalists and theoreticians. The speakers provided a global view to the students, opening up discussions with the students about the latest advances in quantum transport and hybrid systems. Speakers have given an exhaustive and complete view of research in the field.

The School dealt with the following subjects:

- Near field photonics
- Plasmonics
- Metamaterials
- Quantum optics
- Quantum optomechanics
- Biophotonics
- Ultrafast lasers

The School took place at the "[La Cristalera](#)" residence, as every year. There were a total of 92 participants, of 24 different countries, 23 female and 69 male. 65 of them were students or young researchers (of which only 17 with a Spanish affiliation).

[The talks](#) covered topical subjects. Speakers were available during the whole school and students could take advantage of a relaxed working atmosphere, having speakers available for discussions. Numerous new scientific contacts were made.

Students and Young researchers were active by placing questions during the talks and activating discussions during coffee breaks. Poster sessions were highly valued by participants.

Many participants, in particular invited speakers, coincided that the level of the talks was very high. The evaluation by students has been positive and included interviews with students and communication via e-mail after the meeting.

The list of speakers included:

Jeremy Baumberg (University of Cambridge)

Prof. Shanhui Fan (Stanford University)

John B. Pendry (Imperial College London)

Ursula Keller (ETH Zürich)

Martin Wegener (Karlsruhe Institute of Technology)

Niek van Hulst (ICFO)

Luis Martín-Moreno (Universidad de Zaragoza)

Leo Kouwenhoven (QuTech, Delft Univ. of Technology)

Pablo Alonso, Universidad de Oviedo

Hatice Altug, EPFL Lausanne

Juan Carlos Cuevas, Universidad Autónoma de Madrid

Himadri Shekhar Dhar, Vienna University of Technology

Simone De Liberato, University of Southampton

Rubén Esteban, Donostia International Physics Center

Juanjo García Ripoll, IFF-CSIC

Ulrich Hohenester, Karl-Franzens University of Graz

Jonathan Keeling, University of St. Andrews

Laura Na Liu, University of Heidelberg

Said R.-K. Rodriguez, AMOLF

Michael Ruggenthaler, Max Planck Institute for the Structure and Dynamics of Matter

Daniele Sanvitto, CNR Nanotec

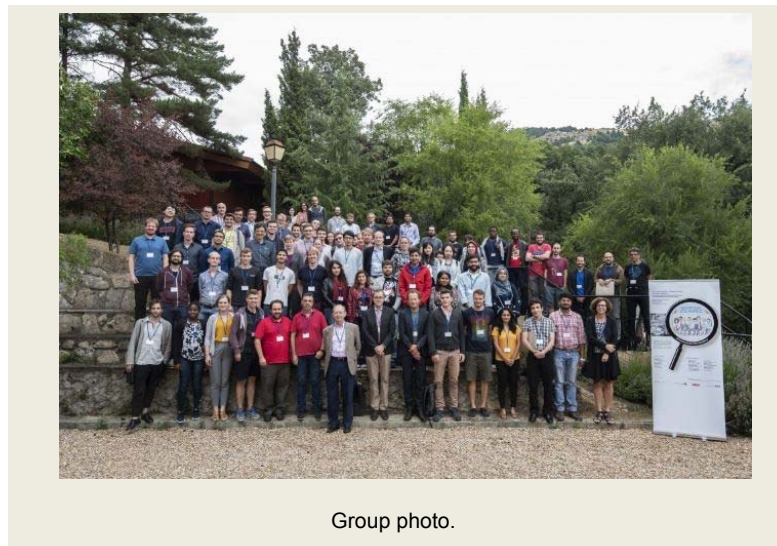
Roy Shiloh, Friedrich-Alexander University Erlangen-Nürnberg

Mário Silveirinha, University of Lisbon

Päivi Törmä, Aalto University

Jana Zaumseil, University of Heidelberg

Ferry Prins, Universidad Autónoma de Madrid



Group photo.

Colloquia

During 2018 we organized again the colloquia "Frontiers of Condensed Matter Physics", in collaboration with FBBVA, dedicated to Professor Nicolás Cabrera. This year we had **Jenny Hoffman**, with a talk entitled "*Imaging the Surface States of a Strongly Correlated Topological Insulator, Sb_2Te_3* "; **Jens Biegert**, with "*Lightwave driven quantum dynamics: from molecular movies to Bloch waves*"; **Javier Aizpurúa**, with "*When Light goes small*" and **Silke Paschen**, who spoke about "*Heavy, heavier, the softest – Heavy electrons to explore correlated quantum matter*".

Colloquium Frontiers of Condensed Matter Physics 2018
Dedicated to Prof. Nicolás Cabrera (1913-1989)

IMAGING THE SURFACE STATES OF A STRONGLY CORRELATED TOPOLOGICAL INSULATOR
 Sb_2Te_3

12/04
"Imaging the Surface States of a Strongly Correlated Topological Insulator, Sb_2Te_3 ."
Jenny Hoffman

When: 12 April at 12h 30
Where: Sala de grados, módulo 08, Facultad de Ciencias, UAM

"I will give a general introduction to topological materials, and show the first direct proof of a strongly correlated topological insulator using strongly correlated spectroscopy to probe the real and momentum space structure of Dirac, valence and conduction bands. I will also discuss the emergence of the bandgap, Dirac surface states in any material, with mass $\sim 100m_e$."

Instituto Nicolás Cabrera

Colloquium Frontiers of Condensed Matter Physics 2018
Dedicated to Prof. Nicolás Cabrera (1913-1989)

"Lightwave driven quantum dynamics: from molecular movies to Bloch waves"
17/09
Jens Biegert

When: 17 September at 12h 30
Where: Sala de conferencias, módulo 0, Facultad de Ciencias, UAM

Jens Biegert, ICFO Group Leader, ICREA Professor
"We have, over the years, developed intense sources of wavefront-controlled mid-IR light that have provided us with a comprehensive insight into the dynamics of molecules and condensed matter, with the future possibility to address fundamental and long-standing questions such as molecular ionization, phase transitions and superconductivity. By way of example I will show first results in which we resolve the carrier dynamics in a quantum material in real time and within the material's unit cell."

Instituto Nicolás Cabrera

Colloquium Frontiers of Condensed Matter Physics 2018
Dedicated to Prof. Nicolás Cabrera (1913-1989)

"When light goes small"
19/11
Javier Aizpurúa

When: 19 November at 12h 30
Where: Sala de conferencias, módulo 00, Facultad de Ciencias, UAM

Excitonic excitations and relaxations of molecules can be efficiently excited by light thanks to the action of optical antennas. In particular, plasmonic cavities "nearly light itself" giving rise to a reduction of the electromagnetic effective mode volume down to the molecule. This enhanced "small light" volume has been used for bringing molecular spectroscopy to extreme levels of detection and resolution, reaching the single-molecule regime. To describe the interaction of light and matter at this extreme level, quantum theoretical frameworks need to be developed.

Instituto Nicolás Cabrera

Colloquium Frontiers of Condensed Matter Physics 2018
Dedicated to Prof. Nicolás Cabrera (1913-1989)

"Heavy, heavier, the softest"
10/12
Silke Paschen

When: 10 December at 12h 30
Where: Sala de conferencias, módulo 00, Facultad de Ciencias, UAM

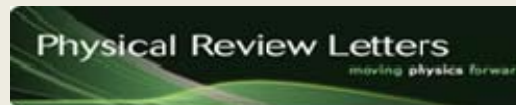
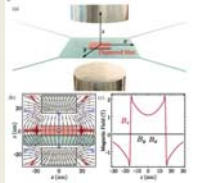
Vienna University of Technology
Heavy electrons
Heavy fermion compounds and their model systems to explore quantum phases and transitions driven by correlations. The effective mass of the conduction electrons is not only large, but can become even heavier and "heavy", but can become even heavier and a point, where the mass may diverge and a continuum of excitations leads to exotic properties not described by the standard Fermi liquid theory. The assumed accumulation of entropy makes the material extremely soft to the formation of new phases, including unconventional forms of superconductivity.

Instituto Nicolás Cabrera

Science at INC

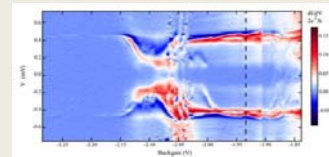
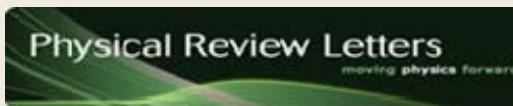
Hybrid Systems for the Generation of Nonclassical Mechanical States via Quadratic Interactions, Carlos Sánchez Muñoz, Antonio Lara, Jorge Puebla, Franco Nori, *Physical Review Letters* **121**, 123604, (2018).

We present a method to implement two-phonon interactions between mechanical resonators and spin qubits in hybrid setups, and show that these systems can be applied for the generation of nonclassical mechanical states even in the presence of dissipation



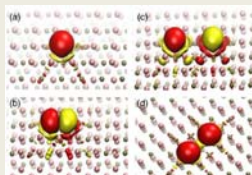
Mirage Andreev Spectra Generated by Mesoscopic Leads in Nanowire Quantum Dots, Z. Su, A. Zarassi, J.F. Hsu, P. San Jose, E. Prada, R. Aguado, E.J. H. Lee, S. Gazibegovic, R. Op het Veld, D. Car, S.R. Plissard, M. Hocevar, M. Pendharkar, J. S. Lee, J. A. Loga, C.J. Palmstrom, E.P.A.M. Bakkers, S.M. Frolov, *Physical Review Letters* **121**, 127705, (2018).

We study transport mediated by Andreev bound states formed in InSb nanowire quantum dots. Two kinds of superconducting source and drain contacts are used: epitaxial Al/InSb devices exhibit a doubling of tunneling resonances, while in NbTiN/InSb devices Andreev spectra of the dot appear to be replicated multiple times at increasing source-drain bias voltages. devices



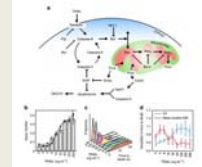
Influence of Magnetic Ordering between Cr Adatoms on the Yu-Shiba-Rusinov States of the β -Bi₂Pd Superconductor, D.J. Choi, C. García GFernández, E. Herrera, C. Rubio Verdú, M.M. Ugeda, I. Guillamón, H. Suderow, J.I. Pascual, N. Lorente, *Physical Review Letters* **120**, 167001, (2018).

We show that the magnetic ordering of coupled atomic dimers on a superconductor is revealed by their intragap spectral features. Chromium atoms on the superconductor β -Bi₂Pd surface display Yu-Shiba-Rusinov bound states, detected as pairs of intragap excitations in tunneling spectra.



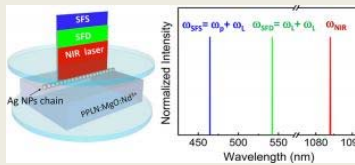
Mitochondrial Levels determine variability in cell death by modulating apoptotic gene expression, S. Márquez-Jurado, J. Díaz-Colunga, R. Pires das Neves, A. Martinez Lorente, F. Almazán, R. Guantes, F. J. Iborra, Nature Communications 9, 389, (2018).

Fractional killing is the main cause of tumour resistance to chemotherapy. This phenomenon is observed even in genetically identical cancer cells in homogeneous microenvironments. To understand this variable resistance, here we investigate the individual responses to TRAIL in a clonal population of HeLa cells using live-cell microscopy and computational modelling.



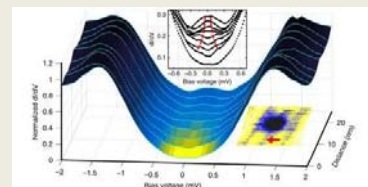
Multiline Operation from a Single Plasmon-Assisted Laser, D. Hernandez Pinilla, P. Molina, C. de las Heras, J. Bravo-Abad, L. E. Bausa, M. O. Ramirez, ACS Photonics 5, 406, (2018).

The demonstration of plasmon-assisted lasing by associating optical gain media with plasmonic nanostructures has led to a new generation of nanophotonic devices with unprecedented performances. However, despite the variety of designs demonstrated so far, the operation of these systems is in most cases limited to a single output wavelength, and some reports on multiline emission refer to mixing single nanolasers with the subsequent limitation in compactness.

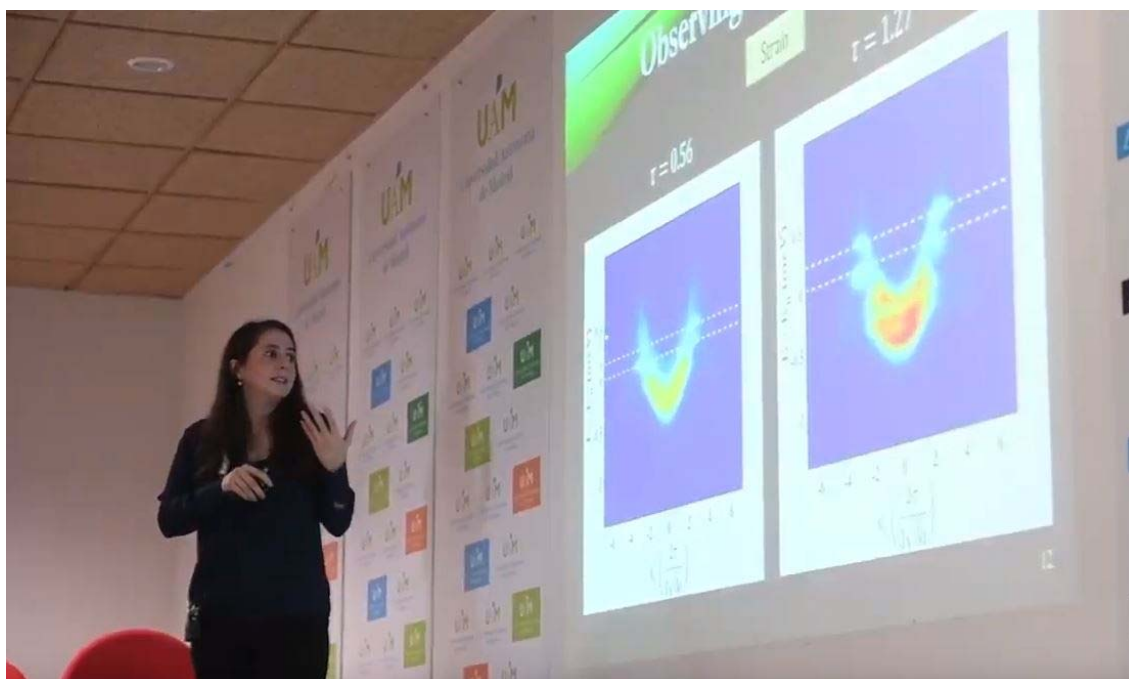


M, J.A. Galvis, E. Herrera, C. Berthod, S. Vieira, I. Guillamón, H. Suderow, Communications Physics 1 30, (2018).

The superconductor 2H-NbSe₂ features vortices with a sixfold star shape when the magnetic field is applied perpendicular to the plane of the hexagonal crystal structure. This is due to the anisotropy in the quasi-two-dimensional Fermi surface tubes oriented along the c axis. But the properties of another, three-dimensional, pocket are unknown, in spite that it has a dominant contribution in many experiments.



Young researchers meeting



The Young researchers meeting 2018 took place in December in the residence La Cristalera. Many young doctoral researchers participated and organizers gave the prize "Young researchers prize in materials science" to David Hernández Pinilla for his work "Multiline Operation from a Single Plasmon-Assisted Laser" made in collaboration with INC members P. Molina, Carmen. de las Heras, Luisa E. Bausá and Mariola O. Ramírez, and published in ACS Photonics 5, 406 (2018), to (second prize) Edwin Herrera for his work "Tilted vortex cores and superconducting gap anisotropy in 2H-NbSe₂", made in collaboration with INC members J.A. Galvis, S. Vieira, I. Guillamon and H. Suderow, and published in Communications Physics 1, 30 (2018) and to (third prize) Natalia Lera Valverde for his work "Mechanical topological insulator in zero dimensions" made in collaboration with INC member J.V. Alvarez and published in Physical Review B 97, 134118 (2018). We also gave the "Award for instrument and computational model makers at the INC" to José Luis Fernandez Cuñado, for his work "Direct observation of temperature-driven magnetic symmetry transitions by vectorial resolved MOKE magnetometry". The jury, elected by the board of the INC, was composed by Enrique García Michel, Francesca María Marchetti and Herko van der Meulen.

The talks presented at the meeting were:

- *"Development of Ultra-thin Oxides Membranes as Electron Transparent Windows for Atmospheric Pressure Photoelectron Spectroscopy and Atomic-scale Imaging"* Carlos Morales (Dpto. de Física Aplicada)
- *"Structural Colors in Three-Dimensional Mesoporous Network Metamaterials"* Invite Talk Marisol Martín-González (Instituto de Microelectrónica de Madrid, Madrid, Spain).
- *"Observing Landau levels in strained honeycomb lattices of photonic resonators"*, Elena Rozas (Dpto. de Física de Materiales).
- *"Analysis of the spatiotemporal dynamics of the developing zebrafish retina"*, Mario Ledesma Terrón (Dpto. de Física de la Materia Condensada).
- *"A general phenomenological relation for the subdiffusive exponent of anomalous diffusion in disorder media"*, Nerea Alcázar-Cano (Dpto. de Física Teórica de la Materia Condensada).
- *"Superconducting density of states and vortex lattice in a superconductor with noncollinear magnetic order"*, José Benito (Dpto. de Física de la Materia Condensada).
- *"Controlling electromagnetic fields with plasmonic metasurfaces: the effect of singularities"* Invite Talk, Paloma Arroyo Huidobro (Physics Department, Imperial College London, Blackett Laboratory, London, United Kingdom).
- *"Gold nanoshells: Contrast agents for cell imaging by cardiovascular optical coherencetomography"* Jie Hu, (Departamento de Física de Materiales).
- *"Light-Forbidden Transitions in Plasmon- Emitter Coupling"*, Álvaro Cuartero-González (Dpto. de Física Teórica de la Materia Condensada).
- *"Eu³⁺ ions as luminescent sensors at the molecular scale for the study of water anomalies"*, Lucía Labrador (Dpto. de Física de Materiales).

Seminars and stays

During 2018, we had the following seminar :

monday, 28 May 2018, "**Waveguide QED in superconducting quantum circuits**", Pol Forn-Diaz, Barcelona Supercomputing center, Centro Nacional de Supercomputación.

Prizes for undergraduate students

The Institute organized stays of eight students in the research group of our members. Their work was presented at the young researchers meeting and was entitled:

- Sebastián Vicente, Carlos: "Dinámica de la manipulación de nanopartículas por pinzas fotovoltaicas sobre la superficie de LiNbO_3 ".
- Arribas Mercado, Daniel: "Graphene growth on oxides".
- Fernandez de la Pradilla Vido, Diego: "Cavity-induced changes of material properties".
- Sáez Mollejo, Jaime: "Quantum transport in hybrid superconductor-semiconductor nanowire devices"
- García Esteban, Juan José: "Passive radiative cooling"
- Gonzalez López, Manuel: "Topological insulators."
- Martínez Miquel, Miguel Francisco: "Dinámica de gases atómicos ultrafríos con interacciones dipolares a largo alcance"
- Lara Izcue, Iñigo: "Photon correlations in two-dimensional semiconductors".

Publications

- R. Sanchez, P. Buset, A. Levy Yeyati:**
Cooling by Cooper pair splitting
Physical Review **98**, 241414, (2018).
- R. Delgado-Buscalioni, M. Melendez, J.L. Hita, et al:**
Emergence of collective dynamics of gold nanoparticles in an optical vortex lattice.
Physical Review E **98**, 062614, (2018).
- I. J. Van Beek, A. Levy Yeyati, B. Braunecker:**
Nonequilibrium charge dynamics in Majorana-Josephson devices
Physical Review B **98**, 224502, (2018).
- A. Schuray, A. Levy Yeyati, P. Recher:**
Influence of the Majorana nonlocality on the supercurrent.
Physical Review B **23**, 235301, (2018).
- F. Penaranda, R. Aguado, P. San José, et al:**
Quantifying wave-function overlaps in inhomogeneous Majorana nanowires
Physical Review B **98**, 235406, (2018).
- W. W. Hayes, A. Al Taleb, G. Anemone, et al:**
Ne atom scattering from Ir(111) under nearly classical conditions.
Surface Science **678**, 20, (2018).
- G. Anemone, A. Al Taleb, R. Miranda, et al:**
Neon diffraction from graphene on Ru(0001).
Surface Science **678**, 52, (2018).
- D. Frombach, S. Park, A. Schroer, et al:**
Electrically controlled crossover between 2π and 4π Josephson effects through topologically confined channels in silicene.
Physical Review B **98**, 205305, (2018).
- T. Stauber, T. Low, G. Gómez Santos:**
Linear response of twisted bilayer graphene: Continuum versus tight-binding models.
Physical Review B, **98**, (2018).
- P. Pellacani, V. Torres-Costa, F. Agullo-Rueda, et al:**
Laser writing of nanostructured silicon arrays for the SERS detection of biomolecules with inhibited oxidation.
Colloids and surfaces.B. Biointerfaces **174**, 174, (2018).
- G. Anemone, E. Climent Pascual, A. Al Taleb, et al**
A simple means of producing highly transparent graphene on sapphire using chemical vapor deposition on a copper catalyst
Nuclear Instruments & Methods Carbon **139**, 593, (2018).
- E. Leary, B. Limburg, A. Alanazy, et al:**
Bias-Driven Conductance Increase with Length in Porphyrin Tapes.
Journal of the American Chemical Society **140**, 12877, (2018).
- Y. Niu, R. Frisenda, E. Flores, et al:**
Polarization-Sensitive and Broadband Photodetection Based on a Mixed-Dimensionality TiS₃/Si p-n Junction.
Advanced Optical Materials **6**, 1800351, (2018).
- J. Merino, A.C Jacko, A. Kohsla, et al:**
Spin molecular-orbit coupling and magnetic properties of the decorated honeycomb layers of Mo₃S₇(dmit)(3) crystals
AIP Advances **8**, 101430, (2018).
- C. Morales, E. Flores, J. R. Ares, et al:**
Improving the Efficiency of Thin Film Thermoelectric Generators under Constant Heat Flux by Using Substrates of Low Thermal Conductivity.
Physica Status Solidi-Rapid Research Letters **12**, 1800277, (2018).
- A. Al Taleb, G. Anemone, R. Miranda et al:**
Characterization of interlayer forces in 2D

heterostructures using neutral atom scattering. 2D Materials **5**, 045002, (2018).

J. Hernandez Muñoz, E. J. Chacon, P. Tarazona: *Density correlation in liquid surfaces: Bedeaux-Weeks high order terms and non capillary wave background.* Journal of Chemical Physics **149**, 124704, (2018).

C. Sánchez Muñoz, A. Lara, J. Puebla et al: *Hybrid Systems for the Generation of Nonclassical Mechanical States via Quadratic Interactions.* Physical Review Letters **121**, 123604, (2018).

Z. Zu, A. Zarassi, J. Hsu, et al: *Mirage Andreev Spectra Generated by Mesoscopic Leads in Nanowire Quantum Dots* Physical Review letters **121**, 127705, (2018).

M. J. Capitan, J. Alvarez, F. Yndurain: *Organometallic MTCNQ films: a comparative study of CuTCNQ versus AgTCNQ.* Physical Chemistry Chemical Physics **20**, 21705, (2018).

A. Martine Galera, J. M. Gomez Rodriguez: *Influence of metal support in-plane symmetry on the corrugation of hexagonal boron nitride and graphene monolayers.* Nano Research **11**, 4643, (2018).

F. Ajejas, A. Gudín, R. Guerrero, et al: *Unraveling Dzyaloshinskii-Moriya Interaction and Chiral Nature of Graphene/Cobalt Interface.* Nano Letters **18**, 5364, (2018).

M. Mocetic, A. Vesel, G. Primc, et al: *Recent developments in surface science and engineering, thin films, nanoscience, biomaterials, plasma science, and vacuum technology* Thin Solid Films **660**, 120, (2018).

T. Kondo, A. Al Taleb, G. Anemone, et al: *Low-energy methane scattering from Pt(111)* Journal of Chemical Physocs **149**, 084703, (2018).

R. Seoane Souto, R. Avriller, A. Levy Yeyati, et al: *Transient dynamics in interacting nanojunctions within self-consistent perturbation theory.* New Journal of Physic **20**, 083039, (2018).

D. Diaz Fernandez, E. Salas, J. Mendez, et al: *Ultra-thin CoO films grown on different oxide substrates: Size and support effects and chemical stability.* Journal of Alloys and Compounds **758**, 5, (2018).

V. Doldan-Martelli, D. G. Miguez: *Drug treatment*

efficiency depends on the initial state of activation in nonlinear pathways. Scientific Reports **8**, 12495, (2018).

O. Concepcion, M. Galvan Arellano, V. Torres Costa, et al: *Controlling the Epitaxial Growth of Bi₂Te₃, BiTe, and Bi₄Te₃ Pure Phases by Physical Vapor Transport.* Inorganic Chemistry **57**, 10090, (2018).

A. Gomez-Tornero, C. Tserkezis, J. Robledo Moreno, et al: *Field enhancement and spectral features of hexagonal necklaces of silver nanoparticles for enhanced nonlinear optical processes* Optics Express **26**, 22394, (2018).

S. Escribano, A. Levy Yeyati, E. Prada: *Interaction-induced zero-energy pinning and quantum dot formation in Majorana nanowires.* Beilstein Journal of Nanotechnology **9**, 2171, (2018).

C. Rodriguez, V. Torres-Costa, O. Ahumada, et al: *Gold nanoparticle triggered dual optoplasmonic-impedimetric sensing of prostate-specific antigen on interdigitated porous silicon platforms.* Sensors and Actuators B-Chemical **267**, 559, (2018).

M.T. Deng, S. Vaitiekenas, E. Prada, et

- al:**
Nonlocality of Majorana modes in hybrid nanowires.
Physical Review B **98**, 085125, (2018).
- C. Romero Muñiz, A. Martin Recio, P. Pou, et al:**
Substrate-induced enhancement of the chemical reactivity in metal-supported graphene.
Physical Chemistry Chemical Physics **20**, 19492, (2018).
- J. Hu, D. Romero Abujetas, D. Tsoutsi, et al:**
Invited Article: Experimental evaluation of gold nanoparticles as infrared scatterers for advanced cardiovascular optical imaging.
APL Photonics **3**, 080803, (2018).
- B. Wu, D. Aoki, J.P. Brison:**
Vortex liquid phase in the p-wave ferromagnetic superconductor UCoGe.
Physical Review B **98**, 024517, (2018).
- N. Papadopoulos, R. Frisenda, R. Biele, et al:**
Large birefringence and linear dichroism in TiS₃ nanosheets.
Nanoscale **10**, 12424, (2018).
- O. de Melo, L. Garcia Pelayo, Y Gonzalez, et al:**
Chemically driven isothermal closed space vapor transport of MoO₂: thin films, flakes and in situ tellurization
2D Journal of Materials Chemistry **6**, 6799, (2018).
- N. Lera, J.V. Alvarez, K. Sun:**
Topological mechanical metamaterial with nonrectilinear constraints.
Physical Review B **98**, 014101, (2018).
- A. Al Taleb, G. Anemone, D. Farias, et al:**
Resolving localized phonon modes on graphene/Ir(111) by inelastic atom scattering
Carbon **113**, 31, (2018).
- G. Anemone, A. Al Taleb, A. Castellanos, et al:**
Experimental determination of thermal expansion of natural MoS₂.
2D Materials **5**, 035015, (2018).
- A. Zazunov, A. Iks, M. Alvarado, et al:**
Josephson effect in junctions of conventional and topological superconductors.
Beilstein Journal of Nanotechnology **9**, 1659, (2018).
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