Category: Bachelor's Degree Projects

Category: Conferences & Events
- XXV International Summer School Nicolás Cabrera – 2018
- BIOMOLECTRO: Conference on BioMolecular Electronics
- XXIV International Summer School Nicolás Cabrera – 2017
- Doors Open Day – Jornadas de Divulgación de la Investigación en Física en la UAM
- 12th International Meeting on Thermodynamics
- XXII International Summer School Nicolás Cabrera – 2015
- Annual INC Young Researchers Meeting 2014 – La Cristalera
- Doors Open Day – Jornadas de Divulgación de la Investigación en Física en la UAM
- TNT 2014 Barcelona – Spain
- TNT 2013 Seville – Spain

Category: Departmental News
- FET Open Project CATCH-U-DNA: Capturing non-Amplified Tumor Circulating DNA with Ultrasound Hydrodynamics
- Physics Degree at UAM No. 1 – “El Mundo” Universities Ranking 2018
- Merry Christmas And Happy New Year 2018
- Best Theoretical Doctoral Thesis in Condensed Matter Physics 2017
- Francisco J. Garcia-Vidal included in Clarivate 2017 Compilation of Most Influential Authors
- Winner of the IUPAP Young Scientist Prize in Atomic, Molecular and Optical Physics 2017
- Thesis Defense – Entropy, Order and 2D Confinement of Hard Particles
- Physics Undergraduate Student Research Awards – 2017
- International Day of Women and Girls in Science – 11 February
- Merry Christmas And Happy New Year 2017
- Thesis Defense – Reaching Quantum Polaritons
- Thesis Defense – Generation of Non Classical States of Light
- ERC Starting Grant Obtained by Johannes Feist
- Informal Seminars: 2015-2016 Series
- Physics Undergraduate Student Research Awards – 2016
- Thesis Defense – Characterizing Real-life Graphene Through The Latest First-principles Methodological Developments
- APS Announces Outstanding Referees for 2016
Thesis Defense – Theoretical Description of Wave Propagation in Magnetoplasmonic Nanostructures
Prof. Carlos Tejedor – Café Scientifique

Physics Undergraduate Student Research Awards – 2015
Thesis Defense – Dynamics of the Formation of Rings of Protein Filaments
Francisco J. García-Vidal included in Thomson Reuters 2014 Compilation of Most Influential Authors

Elections to the Head of Department
Thesis Defense – Minimal Models for Finite Particles in Fluctuating Hydrodynamics
Prof. Pedro Tarazona Lafarga – Medal of the Royal Spanish Society of Physics
Jorge Bravo-Abad – MIT Technology Review Innovadores

Category: Funded Projects
Category: International Projects
MESOPLAS – FP7 Marie Curie Career Integration Grants
SQUIRREL – Sensing Quantum Information Correlations
PLASMONANOQUANTA – Frontiers in Plasmonics: Transformation Optics, Quantum and Nonlinear Phenomena
ACRITAS – Actuation and Characterisation at the Single Bond Limit
POLAFLOW – Polariton Condensates: From Fundamental Physics to Quantum Based Devices
SE2ND – Source of Entangled Electrons in Nano Devices

Category: National Projects
Classical and Quantum Electrodynamics of Light-matter Coupling
Protein-based Electronics
Strongly Correlated Electrons in Quantum Materials and in Far from Equilibrium Nanostructures
Quantum and Nonlinear Phenomena in Plasmonics
NANOQUO – Nanostructures for Quantum Optics
Correlated Electrons in Hybrid Nanostructures: From Transport Properties to Quantum Information Processing
Theoretical Description of Wave Propagation in Magneto-Plasmonic Nanostructures
Self-Assembling Materials: Theory and Simulation
Force-for-Future – Advanced Force Technology for Future Nanomechanics and Nanomedicine
Structure and Dynamics of Complex Fluids and their Interfaces

Category: Job Opportunities
Category: Closed Jobs
Postdoctoral Position at UAM-IFIMAC in Electron Transport Through Proteins and
Peptides – Closed
IFIMAC’s Master Grants for 2017-2018 – Closed
Postdoctoral Position Available at IFIMAC and FTMC on Classical and Quantum Electrodynamics of light-matter Coupling – Closed
Pre-doctoral Training Program at IFIMAC – Center of Excellence Severo Ochoa 2015 – Closed
PhD Studentship Funded by the EU-FP7 Marie Curie Career Integration Grants – Closed

Category: Job Openings
HPC Systems Administrator at CCC-UAM

Category: Research Highlights

Category: Articles
Frequency-resolved Monte Carlo
First Observation of the Quantized Exciton-polariton Field and Effect of Interactions on a Single Polariton
Resonant Tunneling in Protein-based Junctions
Peltier Cooling in Molecular Junctions
Triggering Many Molecular Reactions With a Single Photon
Solving the Mystery of the Strikingly Different Mechanical Response of Nucleic Acids
Enhancing Radiative Heat Transfer With Silicon Metasurfaces
Zero-energy Pinning from Interactions in Majorana Nanowires
Computational Simulation of Photochemical Reactions in DNA
Quantized Thermal Transport in Single-Atom Junctions
Radiative Heat Transfer in Ångström and Nanometer-sized Gaps
A Bright Nanolight for Plasmonic Circuitry
Exploiting Vibrational Strong Coupling to Make an Optical Parametric Oscillator out of a Raman Laser
Intermittent Chaos for Ergodic Light Trapping in a Photonic Fiber Plate
Quench Dynamics in Superconducting Nanojunctions: Formation of Andreev Bound States and Quasiparticle Trapping
When Quantum Light Meets Matter
Suppressing Photochemical Reactions Through Strong Coupling
Attosecond Correlation Dynamics
Uncoupled Dark States Can Inherit Polaritonic Properties
Transformation Optics Approach to Plasmon-Exciton Strong Coupling in Nanocavities
Polaritonic Rabi and Josephson Oscillations
Atomically Resolved Three-dimensional Structures of Electrolyte Aqueous
Solutions Near a Solid Surface
The Electric Field of CO Tips and Its Relevance for Atomic Force Microscopy
Solid-state Lasers Go Nano
Quantum Statistics of Bosonic Cascades
Self-Interfering Wave Packets
Enhanced Two-photon Emission from a Dressed Biexciton
Real-space Collapse of a Polariton Condensate
Radiative Heat Transfer In The Extreme Near Field
Nonequilibrium Phase Transition in a Two-Dimensional Driven Open Quantum System
Quantum Interference in a Cooper Pair Splitter Makes Entanglement Production Plausible
Pronounced Photovoltaic Response from Multilayered Transition-Metal Dichalcogenides PN-Junctions
Cavity-Induced Modifications of Molecular Structure in the Strong-Coupling Regime
Polarization Shaping of Poincaré Beams by Polariton Oscillations
Ultraefficient Coupling of a Quantum Emitter to the Tunable Guided Plasmons of a Carbon Nanotube
Exciting Polaritons with Quantum Light
Coupling of Artificial Atoms to V-groove Plasmonic Waveguides
The Environment Does the Trick
Excitons do the Long Jump – published in Physical Review Letters
Direct Observation of Josephson Vortex Cores – published in Nature Physics
Disorder Sets Light Straight – published in Nature Physics News and Views
Ultrafast Control and Rabi Oscillations of Polaritons – published in Physical Review Letters
Long-range Charge Transport in Single G-quadruplex DNA Molecules – published in Nature Nanotechnology
Emitters of N-photon bundles – published in Nature Photonics
Heat Dissipation in Atomic-Scale Junctions – published in Nature

Category: Projects
Condensed Matter Physics Center has been awarded with a “María de Maeztu” Grant
**Category: Seminars**

- Enhanced Surface Tension of Liquid-vapour Interfaces at Mesoscopic Scales
- Signatures of Quantum Condensation in a Plasmonic Nanoparticle Array
- Capillary Emptying and Wetting Transitions: Why the Tragedy of Spilling a Glass of Beer is Actually a Rare Interfacial Phase Transition
- Modelling of Active Plasmonic and Metamaterial Systems in the Time-Domain
- Density instabilities in 2D dipolar Fermi gases
- Advances in three-dimensional imaging, quantitative mapping and device fabrication by force microscopy
- A force generating living polymer: experiments and theory to understand how it works
- The influence of defects in the electrical transport properties of metalorganic nanoribbons and in the mechanical properties of suspended graphene flakes
- Thermoelectric properties of Chromium Nitride
- Continuous Mott transition between a Fermi-liquid and a gapless spin-liquid
- Periodically nanostructured graphene
- Theory and experiments with quantum fluids of light
- The Nobel prize in Physics 2012
- Spin-orbit interaction in carbon nanotubes and its utility for proving entanglement of electrons
- Structural flexibility mapping by bimodal atomic force microscopy in liquids
- A new tool for particle hydrodynamics at different scales
- Transport spectroscopy of NS nanowire junctions with Majorana fermions
- Ultrafast switching of semiconductor microcavities
- Improvement of STM Resolution with H-sensitized Tips
- Digital Quantum Simulation with Rydberg Atoms and Ions
- Magnetic ground states in transition-metal oxides driven by superexchange interactions
- Integrable Richardson-Gaudin models in mesoscopic physics
- Non-Abelian gauge fields in twisted bilayer graphene
- Dynamical Simulations of Virus Wrapping and Budding
- DFT analysis of combined 3D NC-AFM and STM imaging of the Cu(100)-O oxide surface
- Understanding nc-AFM contrast on TiO2 and water adsorption on CeO2
- Semiconductor nanostructures grown on GaAs nanoholes for quantum optical information technologies
- Superradiance Mediated by Graphene Surface Plasmons
- Fano interference and infrared phonon activity in bilayer graphene
- Quantum Effects in Plasmonic Nanostructures
- Electronic transport in defective low dimensional carbon materials: nanotubes and graphene
On the optical properties of graphenes
Quantum Information for Molecular Physics
First-Principles Simulations on PbTiO3/SrTiO3 Superlattices
Towards a microscopic description of the pseudogap phase in cuprate and organic superconductors
Pi-phases and triplet pair correlations in s-wave superfluids as signatures of the FFLO-type states
Magnetoplasmonics: The interplay between magneto-optics and plasmonics
Lens-like particles and their entropy-driven clustering
Josephson current in finite-length nanowire SNS junctions with Majorana fermions
Quantum Optics as Tools to Probe the Spacetime Structure
The impact of electron interactions on one-dimensional helical conductors and Majorana end states
Landau-Zener tunneling of qubits: dynamics, decoherence, and measurement
A new tool for particle hydrodynamics at different scales
DiagMC for the Anderson-Holstein model: Separation of timescales
Quantum transport of cold atoms
Collection and Concentration of Light by Touching Spheres: A Transformation Optics Approach
The Tau-3 lattice, graphene’s big brother: transport and spectral properties
2D nematics in a circular cavity
Entanglement and Quantum Criticality
Molding the flow of Terahertz radiation using plasmonic metamaterials
Spin transport in graphene
Ring-shaped nanomagnets: from quantum effects to spin-cluster qubits
Torsion and anchoring of protein filaments
Density Functional Theory – OpenMX
The glass transition and the universal properties of glasses
PForces and currents in carbon nanostructures
Phase-controlled transport in periodically-driven optical lattices
Shaping a quantum field with dissipation
Towards quantum plasmonics: plasmon mediated qubit-qubit entanglement
Dynamic response of a Kondo dot in a photonic cavity
Quantum transport of cold atoms
Which is the origin of the resistivity anisotropy in iron superconductors?
Non Linear processes in structured solid state lasers
Huge enhancement of the magnetoresistance in nanoparticle arrays
Resonant Optical Forces on Metallic and Dielectric Nanoparticles
Optical Response of Metallic Nanogaps: From Nanoelectronics to Nanoplasmonics
Coupling between topological insulators: Band topology and quantum spin Hall
effect in bilayer graphene
Spin Coherent Phenomena in Quantum Dots Driven by AC Magnetic Fields
Quantum Entanglement in Many Body Systems
Spoof Plasmons: Dominos, Endoscopes and Invisibility Cloaks
Single Molecule Junctions
Lasers made from self-assembled photonic structures
Microcavity-Mediated coupling of two distant semiconductor quantum dots
Plasmon Quantum Tsunami on C60 observed with highly charged ion energy gain spectroscopy
Organic and inorganic semiconductor interfaces across physics, chemistry and time
The curious magnetic state in undoped iron pnictides
Nuclear magnetism, electron order, spin-filtering, and spin-selective Peierls transitions in interacting one-dimensional conductors
Quantum pumping in graphene
Superconducting molecular quantum dots
Spectroscopy of the Andreev Bound States in a Carbon Nanotube
Persistent currents and quantised vortices in a matter-light superfluid
Noise Correlations and Coherent Coupling in Solid State Qubits
QM/MM Methods: Towards an Efficient and Accurate Description of Biological Photoreceptors and their Rractivity: Rhodopsin-Like Systems as an Example
Quantum control of spin qubits in Silicon
Charge and spin transfer statistics of quantum impurity models
Modifications of geometric and electronic properties of surface systems caused by structural defects
Light-matter coupling in photonic crystal structures: from sea-mouse to exciton-polaritons
The effect of the supporting oxide on the activity of vanadia catalysts
Probing the spin of a single atom with tunneling electrons
Many-body physics in arrays of ultracold atoms
Interplay of Coulomb correlations and geometrical frustration in two-dimensional compounds
Intermolecular interaction in DFT: Application to Carbon Nanotubes and Fullerenes
Control and instability of a periodically-driven Bose-Einstein condensate
Three-Dimensional Force Imaging and Quantification with Atomic Resolution
Transport studies of self-assembled InAs quantum dots contacted with superconducting leads
Unusual elastic and inelastic behaviors of carbon nanotubes due to molecular encapsulations: Dynamic force microscopy and spectroscopy studies
Numerical evaluation of four-center molecular intergals for localized orbitals
Dissipative Systems and Non-Equilibrium Bose-Einstein Condensation: from microcavity polaritons to atom lasers
Sculpting Membranes. Mechanisms of Curvature Generation by Proteins
Excitons in Carbon based quasi-1D systems: an ab-initio study of nanotubes and graphene ribbons
Electrical conduction through molecules: Influence of endgroups and sidegroups
Magnetotransport in non-magnetic inhomogeneous media
Cluster-based density functional approach to transport through molecular and atomic contacts
Tunable superfluids in ultracold atomic gases
Molecular simulations in the Era of GPUs
Exciton and Polariton Manipulation Within Semiconductor Microstructures
Toward molecule-machines at the nanoscale
Weak localization-like processes in gapped systems in connection with the realization of a source of entangled pairs of electrons
Theoretical aspects and modelization of low dimensional Molecular Conductors
Adiabatic pumping through quantum dots
Hard Superconductivity in Soft Quantum Films
Adaptive Resolution Molecular Dynamics Scheme

Category: IFIMAC Seminars
Periodic Energy Transport and Entropy in Quantum Electronics
Recent Developments and Applications of Inverse Design in Nanophotonics
The Quantum Design of Photosynthesis for Bio-Inspired Solar-Energy Conversion
Enhancing Quantum Coherence of Organic Molecules with Nanophotonic Structures
Active Colloid at a Fluid Interface
Resolution of Superluminal Signalling in Non-perturbative Cavity Quantum Electrodynamics
Theoretical Challenges in Levitated Nanomechanics: the case of magnon-phonon interaction
Coupling Molecules and Atomic-scale Plasmonic Fields
Robustness of Yu-Shiba-Rusinov Resonances in Presence of a Complex Superconducting Order Parameter
Large Deviations and Quantum Non-equilibrium
Optical Characterization at the Nanoscale
Bubbles, Drops and Vesicles: The Charm of Microfluidics
Superconductors and Quantum Information Preservation in Black Holes
Geometry-invariant Phenomena in Near-zero-index Media
Polariton Lattices: A Novel Platform for Analogue Simulation
Charge and Energy Noise in ac-driven Conductors and their Detection from Frequency-resolved Potential and Temperature Fluctuations
Velocity Gradient Power Functional Theory for Brownian Dynamics
Computational Study of the Collective Motion of Micro-swimmers
Polymer-theory Insights into Biomolecular Systems
Fabrication of Gold Nano-Crystal Arrays for Molecular Electronics: High Frequency Molecular Rectifiers and π-π Inter Molecular Interaction Energy
Complex Magnetic Structures at Surfaces and Their Imaging with STM from First Principles
Molecular and Biomolecular Electron Transfer Processes: From the Single Molecule to the Cellular Length Scales
Bottom-up Nanoelectronics: Contacting Single Molecules and Nanoparticles
Liquid-vapour Interfaces of Patchy Colloids
Josephson Photonics: Quantum Optics Meets Quantum Electronics
Fractional Spin And Josephson Effect In Time-reversal-invariant Topological Superconductors
Unexpected Phenomena In The Quantum Transport Through Carbon Nanotubes
Quantum Optics in Low Dimensions: From Fundamentals to Applications
Chiral Quantum Optics
Transport Through Topological Confined States of Matter
Modelling Organic Condensates From Weak To Strong Coupling
Multi-scale Molecular Dynamics Simulations of Photoactive Molecules Strongly Interacting With Confined Light
Weyl Semimetals in 3D Optical Lattices, and Synthetic Gauge Fields in Strongly Interacting 1D Bose Gases
A Single-photon Fock State Filter in the Solid State
Submolecular AFM Imaging and Spectroscopy on Single Molecules Using KolibriSensorTM and Cantilevers
Spin-orbit Coupling in Photonic Systems: from Optical Spin Hall Effect to Z Topological Insulator Analog
Polaritons in Lattices: A Nonlinear Photonic Emulator of Graphene
Spin Pumping And Quantum Anomalous Hall Effect In 2D-based Materials
Non-Covalent van der Waals Interactions at the Nanoscale: A Solved Problem?
Photonics of Excitonic Nanomaterials: Understanding and Controlling the Flow of Energy
Spin Polarization and Molecular Chirality In STM Junctions
Spin States in Molecules from a Quantum Information Perspective
Metal Nonlinearity – Some New Aspects
First Principles Understanding of Liquid Water and its Anomalies
Exfoliation, Hybridization and Chemical Functionalization of 2D Materials
International Year of Light: Two New Kinds of Light
Spin Texture of Sub-Gap Andreev Levels in Semiconductor Quantum Dots
Proximity-coupled to Superconductors
Building Nano-Lenses Based on DNA Origami Structures
Calculating the Conductance of Single Molecule Junctions from First Principles
Spectroscopy and Topological Phases for Organic Excitons
Crystallographic Transitions Coupled to Spin Crossover in Molecular Complexes
The Small Frontier: Imaging Atomic and Molecular Functionality
Quantum Merging: A Physical Mechanism for non-Abelian Matter
Non-equilibrium Transport Theory Compared with Experiments on Single Molecular Junctions
Packing Them In: Using Self-Assembled Protein Cages to Direct the Synthesis and Packaging of Polymers, Minerals, and Proteins
Superconductor Nanowire Superconductor Junctions as Useful Platforms to Study Topological Superconductivity and Majorana Bound States
Strained Graphene Revisited
Anisotropic Magnetoresistance and the Nature of the Electronic Reconstruction in Oxide Heterostructures
Cooper Pair Splitting as a Source of Entangled Electrons
Thermalization and Cooling of Plasmon-exciton-polaritons: Towards Quantum Condensation
Ising Phase in AA Stacked Bilayer Graphene
Transport in Atomically Resolved Graphene Nanoribbons

Category: INC Colloquium
Imaging the Surface States of a Strongly Correlated Topological Insulator, SmB6
Maxwell’s Demon and Quantum Computers
Meeting at Oxide Interfaces: Superconductivity Between Insulators
Droplets of Quantum Physics or Why Helium is The Superelement
Materials, Energy and Life: Entertaining Aspects of High Magnetic Field Research
Majorana Braiding in Superconductors: How to Operate on a Zen Particle
Exploring Flatland with Cold Atomic Gases
Superconductors: the Magic and the Mystery
Material Design and Strongly Correlated Electron Systems
Electronic Liquid Crystals
How Mesoscopic Superconductivity is Changing Astronomical Observation
Particle Physics On a Chip: the Search for Majorana Fermions
A Chance to Grow: Design, Discovery, Growth and Characterization of Novel Compounds

Category: Trainings & Courses
Linux Administration Course
Parallel Programming with OpenMP and MPI
Linux on Scientific and Production Environment: Linux Security
Linux on Scientific and Production Environment: Advanced Level
Linux on Scientific and Production Environment
FAQs

5.18 Locomotion in Complex Environments
5.17 Refracción Negativa, Óptica de Transformación e Invisibilidad
5.16 Dynamics of Plasmonic Nanoparticles Under Optical Forces in an Hydrodynamic Environment / Dinámica de Nanopartículas Plasmónicas y luz en un Medio Hidrodinámico
5.15 Hibridación de Modos Ópticos en Sistemas Moleculares
5.14 Modelización de un Microscopio de Fuerzas Atómico (AFM): Imágenes de alta resolución de moléculas y materiales 2D
5.13 Comportamiento de Campos Electromagnéticos en Cristales Fotónicos
5.12 Demonios de Maxwell que Hacen Trabajo sin Gastar Energía (ni violar el 2º principio de la termodinámica)
5.11 ¿Cómo se Define la Temperatura en Sistemas Fuera del Equilibrio?
5.10 Electron Transport Through Molecular Junctions
5.9 Spontaneous Patterns in Coherently Driven Spinor Polariton Structures
5.8 Materia Activa: La Física de las Bandadas de Pájaros y los Motores Moleculares
5.7 H2O
5.6 Simulaciones de Microscopía Túnel en Superficies Semiconductoras
5.5 Interacción de Moléculas con el Campo Electromagnético en Microcavidades
5.4 Entrelazamiento de Parejas de Fotones Mediante Potenciales Oscilantes
5.3 Hard-spherocylinder Fluids as Two-phase Media and a Direct Test of the Decoupling Approximation
5.2 Fluctuaciones en Interacción Luz-materia: Cisnes Negros y Estados Paralelos
5.1 Passive Radiative Cooling