Curriculum Vitae

Francesca Maria Marchetti

November 6, 2025

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Citizenship:
Place of Birth:
Date of Birth:

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Work Experience

Sep 23 – ... Professor (Profesor Titular), Department of Theory of Condensed Matter, Universdad Autonoma de Madrid, Spain.

Oct 13 – Aug 23 Associate professor (Profesor Contratado Doctor), Department of Theory of Condensed Matter, Universdad Autonoma de Madrid, Spain.

Oct 08 – Sept 13 Ramon y Cajal fellow (Ministerio de Ciencia e Innovación), Department of Theory of Condensed Matter, Universdad Autonoma de Madrid, Spain.

Oct 07 – Sept 08 EPSRC (Engineering and Physical Sciences Research Council) Advanced Research Fellow (Grant No. EP/E054382/1 "Quantum Coherence Phenomena in Solid State and Atomic Condensates"), Rudolf Peierls Centre for Theoretical Physics, Department of Physics, Oxford, UK.

Oct 06 – Sept 07 Research Associate (EPSRC Grant No. EP/D050952/1), Rudolf Peierls Centre for Theoretical Physics, Department of Physics, Oxford, UK.

Oct 05 – Sept 06 Research Associate (EPSRC Grant No. GR/S61263/01), Theory of Condensed Matter (TCM) Group, Department of Physics, Cavendish Laboratory, Cambridge, UK.

Oct 02 –Sept 05 EPSRC Postdoctoral Fellow (Grant No. GR/R95951 "Phase Coherence Phenomena and Interaction Effects in Mesoscopic Structures"), TCM Group, Cambridge, UK (Research Quality Final Assessment: *Internationally leading*).

May 02 – Sept 02 Research Associate in TCM Group, Cambridge, UK.

I have been on maternity leave twice for around 6 months each time (period October 2006 - April 2007 and period November 2014 - May 2015). Aside from this, I have had no major career disruptions.

My role in research, teaching, and administration

Current role, 2013-present: Professor at the Universidad Autónoma de Madrid (UAM), Spain (50% research, 40% teaching, 10% administration).

3 December 2024-present: Departmental Academic Secretary, UAM.

Since the completion of my PhD in 2002 at the Scuola Normale Superiore, Pisa, Italy, I have been continuously employed full-time. During the period 2002-2008 I was on research-only positions, the majority of which has been on two prestigious UK independent fellowships (the EPSRC Postdoctoral fellowship which I held at the University of Cambridge and the EPSRC Advanced Research Fellowship which I held at the University of Oxford). In 2008 I took up a Spanish 5-year tenure-track prestigious independent fellowship (Ramon y Cajal fellowship) to work at the Theory of Condensed Matter Department of UAM, at the end of which I was promoted to an Associate Professor position in the same Department. Furthermore, I recently joined the newly founded Excellence Research Unit IFIMAC-Condensed Matter Physics Center.

Education

10 May 02 PhD in Physics, Scuola Normale Superiore, Pisa, Italy. Thesis: *Phase Coherence Phenomena in Normal and Superconducting Disordered Systems.* Internal supervisors: Prof. G. Jona-Lasinio and Prof.

S. Caracciolo. Collaborative research: Prof. B. D. Simons. Graduated with 70/70 cum laude (First-class honours).

17 Jul 98 Degree (MSc) in Theoretical Physics, Department of Physics, University of Rome "La Sapienza", Italy. Diploma thesis, *Magnetic Field Induced Symmetry Breaking in the* $2+1$*-dimensional Dirac Field Theory: Analysis of the Vacuum Structure*. Supervisor: Prof. G. Jona-Lasinio. Graduated with 110/110 cum laude (First-class honours).

Awards

Fellowships and grants: 5 year Ramon y Cajal Fellowship (Ministerio de Ciencia e Innovación), 5 year EPSRC Advanced Research Fellowship, 2 year Leverhulme Early Career Fellowship (offer declined), 3 year EPSRC Postdoctoral Fellowship.

Travel grants: 6 week Exchange Grant Intelbiomat (ESF) in 2009, 9 week Exchange Grant Intelbiomat (ESF) in 2010, 10 week Exchange Grant Polatom (ESF) in 2011, 10 week Exchange Grant Intelbiomat (ESF) in 2012.

Scholarships: 3 year Honor Scholarship at Scuola Normale Superiore, Pisa, Italy.

Colleges: 2 year Junior Research Fellowship, Mansfield College, Oxford, UK; 3 year Junior Research Fellowship Wolfson College, Cambridge, UK.

Research Support Income

Since arriving at the UAM I successfully obtained the following grants/fellowships:

2024-2027 Spanish Ministry of Economy and Competitiveness, National Research Grant "Quantum Relativistic Laboratory (QRAB)" (Ref. PID2023-150420NB-C31), PIs E. del Valle Reboul and F. M. Marchetti, 68.750keur.

2021-2024 Comunidad de Madrid Research Grant "Nanophotonics for Quantum Computing (NanoQuCo)" (Ref. Y2020/TCS6545), PIs J. J. García-Ripoll and F. J. García-Vidal, 600keur.

2021-2025 Spanish Ministry of Economy and Competitiveness, National Research Grant "Quantum correlations and interference of interacting photons in two-dimensional coupled light-matter structures (2DEnLight)" (Ref. AEI/10.13039/501100011033 PID2020-113415RB- C22), PIs F. M. Marchetti and E. del Valle Reboul, 90.750keur.

2018-2021 Spanish Ministry of Economy and Competitiveness, National Research Grant "Quantum light-matter coupling in two-dimensional systems (QLMC-2D)" (Ref. MAT2017-83722-R), PIs L. Vina and F. M. Marchetti, 200keur.

2015-2017 Spanish Ministry of Economy and Competitiveness, National Research Grant "Quantum optics in semiconductor nanostructures (QOINS)" (Ref. MAT2014-53119-C2-1-R), PI L. Vina, 411keur.

2011-2015 Spanish Ministry of Economy and Competitiveness, National Research Grant "Nanostructures for Quantum Optics (NANOQUO)" (Ref. MAT2011-22997), PI C. Tejedor, 564keur.

2010-2013 Madrid Autonomous Community, I+D Research Grant "Efficient nanodevices for classical and quantum light (Q&CLIGHT)" (Ref. S2009/ESP-1503), PI L. Vina, 840keur.

2008-2011 Spanish Ministry of Education and Science, National Research Grant "Quantum Optical Information Technology (QOIT)" (Ref. CSD2006-00019), PI J. Eschner (ICFO) and C. Tejedor (UAM), 400keur.

2009-2012 European Science Foundation (ESF) Exchange grants: I spent every summer (1-2 month visit each time) from 2009 to 2012 at the Theory of Condensed Matter Group, Cavendish Laboratory, University of Cambridge UK, around 4keur grant each summer.

Publications

Metric summary:
56 publications
6000 total cites (Google scholar)
H-index: 22 (Google Scholar)
Most cited publications:

Web of Science Researcher ID: F-7695-2012
Orcid: 0000-0003-1394-7394
Google scholar

[12] [24] [14] [17] [9] [16] [33] [25] [36] [43] [11] [30] [21] [40] [6] [28] [39]

[1] G. Jona-Lasinio and F. M. Marchetti, "On pairing structure of the vacuum induced by a magnetic field in $2+1$–dimensional Dirac field theory", *Phys. Lett. B* **459**, 208 (1999).

[2] F. M. Marchetti and B. D. Simons, "Optimal fluctuations and tail states of non-Hermitian operators", *J. Phys. A: Math. Gen.* **34**, 10805 (2001).

[3] F. M. Marchetti and B. D. Simons, "Tail states in disordered superconductors with magnetic impurities: the unitarity limit", *J. Phys. A: Math. Gen.* **35**, 4201 (2002).

[4] I. E. Smolyarenko, F. M. Marchetti and B. D. Simons, "Parametric spectral correlations in disordered and chaotic structures", *Phys. Rev. Lett.* **88**, 256808 (2002).

[5] F. M. Marchetti, I. E. Smolyarenko and B. D. Simons, "Universality of parametric spectral correlations: local *versus* extended perturbing potentials", *Phys. Rev. E* **68**, 036217 (2003).

[6] F. M. Marchetti, B. D. Simons, and P. B. Littlewood "Condensation of cavity polaritons in a disordered environment", *Phys. Rev. B* **70**, 155327 (2004). **Cited 25 (WoS).**

[7] F. M. Marchetti, M. H. Szymańska, P. R. Eastham, B. D. Simons, and P. B. Littlewood "Condensation and lasing of microcavity polaritons: comparison between two models", *Solid State Communications* **134**, 111 (2005).

[8] A. Lamacraft, F. M. Marchetti, J. S. Meyer, R. S. Moir, and B. D. Simons "Critical states in disordered superconducting films", *J. Phys. A: Math. Gen.* **37** L447 (Letter to the Editor) (2004).

[9] P. B. Littlewood, P. R. Eastham, J. Keeling, F. M. Marchetti, B. D. Simons, and M. H. Szymańska, "Models of coherent exciton condensation", *J. Phys.: Condens. Matter* **16** S3597 (2004). **Cited 79 (WoS).**

[10] M. V. Mostovoy, F. M. Marchetti, B. D. Simons, and P. B. Littlewood, "Effects of disorder on coexistence and competition between superconducting and insulating states", *Phys. Rev. B* **71**, 224502 (2005).

[11] F. M. Marchetti, J. Keeling, M. H. Szymańska, and P. B. Littlewood, "Thermodynamics and excitations of condensed polaritons in disordered microcavities", *Phys. Rev. Lett.* **96**, 066405 (2006). **Cited 37 (WoS).**

[12] J. Kasprzak, M. Richard, S. Kundermann, A. Baas, P. Jeambrun, J. Keeling, F. M. Marchetti, M. H. Szymańska, R. André, J. L. Staehli, V. Savona, P. B. Littlewood, B. Deveaud, Le Si Dang, "Bose-Einstein condensation of exciton polaritons", *Nature* **443**, 409 (2006). **Cited 1858 (WoS).**

[13] S. Tsonis, G. Varelogiannis, F. M. Marchetti, B. Simons and P.B. Littlewood, "Mixing of order parameters by particle-hole asymmetry, magnetic fields and impurities in fermionic systems: An interesting example", *Physica B: Condensed Matter* **378-380**, 428 (2006).

[14] M. M. Parish, F. M. Marchetti, A. Lamacraft, and B. D. Simons, "Finite temperature phase diagram of a polarised Fermi condensate", *Nature Physics* **3**, 124 (2007). **Cited 159 (WoS).**

[15] F. M. Marchetti, J. Keeling, M. H. Szymańska, and P. B. Littlewood, "Absorption, photoluminescence and resonant Rayleigh scattering probes of condensed microcavity polaritons", *Phys. Rev. B* **76**, 115326 (2007).

[16] M. M. Parish, F. M. Marchetti, A. Lamacraft, and B. D. Simons, "Polarized Fermi condensates with unequal masses: Tuning the tricritical point", *Phys. Rev. Lett.* **98**, 160402 (2007). **Cited 63 (WoS).**

[17] J. Keeling, F. M. Marchetti, M. H. Szymańska, and P. B. Littlewood, "Collective coherence in planar semiconductor microcavities", *Semicond. Sci. Technol.* **22**, R1 (2007). **Cited 108 (WoS).**

[18] A. Lamacraft and F. M. Marchetti, "Spinodal decomposition in polarised Fermi superfluids", *Phys. Rev. B* **77**, 014511 (2008).

[19] F. M. Marchetti, M. H. Szymańska, J. Keeling, J. Kasprzak, R. André, P. B. Littlewood, and Le Si Dang, "Microcavity polariton phase diagram: from theory to practice", *Phys. Rev. B* **77**, 235313 (2008).

[20] M. H. Szymańska, F. M. Marchetti, J. Keeling, and P. B. Littlewood, "Coherence properties and luminescence spectra of condensed polaritons in CdTe microcavities", *Solid State Communications* **144**, 364 (2007).

[21] F. M. Marchetti, C. Mathy, M. M. Parish, and D. A. Huse, "Phase separation and collapse in Bose-Fermi mixtures with a Feshbach resonance", *Phys. Rev. B* **78**, 134517 (2008). **Cited 29 (WoS).**

[22] F. M. Marchetti, Th. Jolicoeur, and M. M. Parish, "Stability and pairing in quasi-one-dimensional Bose-Fermi mixtures", *Phys. Rev. Lett.* **103**, 105304 (2009).

[23] P. B. Littlewood, J. M. J. Keeling, B. D. Simons, P. R. Eastham, F. M. Marchetti, M. H. Szymanska, *Lectures on the Physics of Strongly correlated Systems XIII*, chapter in a Book series, AIP Conference Proceedings **1162**, Ed.: A. Avella and F. Mancini (October 2008).

[24] D. Sanvitto, F.M. Marchetti, M.H. Szymanska, G. Tosi, M. Baudisch, F.P. Laussy, D.N. Krizhanovskii, M.S. Skolnick, L. Marrucci, A. Lemaitre, J. Bloch, C. Tejedor, and L. Viña, "Persistent currents and quantised vortices in a polariton superfluid", *Nature Physics* **6**, 527 (2010). **Cited 198 (WoS).**

[25] F.M. Marchetti, M.H. Szymanska, C. Tejedor, and D.M. Whittaker, "Spontaneous and triggered vortices in polariton OPO superfluids", *Phys. Rev. Lett.* **105**, 063902 (2010). **Cited 45 (WoS).**

[26] M.H. Szymanska, F.M. Marchetti, and D. Sanvitto "Propagating wave-packets and quantised currents in coherently driven polariton superfluids", *Phys. Rev. Lett.* **105**, 236402 (2010).

[27] M. M. Parish, F.M. Marchetti, and P. B. Littlewood, "Supersolidity in electron-hole bilayers with a large density imbalance", *Europhys. Lett.* **95**, 27007 (2011).

[28] E. Cancellieri, F.M. Marchetti, M. H. Szymanska, and C. Tejedor, "Superflow of resonantly driven polaritons against a defect", *Phys. Rev. B* **82**, 224512 (2010). **Cited 24 (WoS).**

[29] E. Cancellieri, F.M. Marchetti, M. H. Szymanska, and C. Tejedor, "Multistability of a two component exciton-polariton fluid", *Phys. Rev. B* **83**, 214507 (2011).

[30] G. Tosi, F. M. Marchetti, D. Sanvitto, C. Anton, M. H. Szymanska, A. Berceanu, C. Tejedor, L. Marrucci, A. Lemaitre, J. Bloch, L. Vina, "Onset and dynamics of vortex-antivortex pairs in polariton OPO superfluids", *Phys. Rev. Lett.* **107**, 036401 (2011). **Cited 34 (WoS).**

[31] F. M. Marchetti, M. H. Szymanska, "Vortices in polariton OPO superfluids", chapter in *Exciton Polaritons in Microcavities: New Frontiers* (Eds. Daniele Sanvitto and Vadislav Timofeev), Springer Series in Solid-State Sciences, Springer-Verlag, ISBN: 978-3-642-24185-7 (2012), arXiv:1107.4487.

[32] E. Cancellieri, F. M. Marchetti, M. H. Szymanska, D. Sanvitto, C. Tejedor, "Frictionless flow in a binary polariton superfluid", *Phys. Rev. Lett.* **108**, 065301 (2012).

[33] M. M. Parish and F. M. Marchetti, "Density instabilities in a two-dimensional dipolar Fermi gas", *Phys. Rev. Lett.* **108**, 145304 (2012). **Cited 51 (WoS).**

[34] A. Berceanu, E. Cancellieri, and F. M. Marchetti, "Drag in a resonantly driven polariton fluid", *J. Phys.: Condens. Matter* **24**, 235802 (2012).

[35] F. M. Marchetti and M. M. Parish, "Density-wave phases of dipolar fermions in a bilayer ", *Phys. Rev. B* **87**, 045110 (2013).

[36] M. De Giorgi, D. Ballarini, E. Cancellieri, F. M. Marchetti, M. H. Szymanska, C. Tejedor, R. Cingolani, E. Giacobino, A. Bramati, G. Gigli, and D. Sanvitto, "Control and Ultrafast Dynamics of a Two-Fluid Polariton Switch", *Phys. Rev. Lett.* **109**, 266407 (2012). **Cited 42 (WoS).**

[37] E. Malatsetxebarria, F. M. Marchetti, and M. A. Cazalilla, "Phase Equilibrium of Binary Mixtures in Mixed Dimensions", *Phys. Rev. A* **88**, 033604 (2013).

[38] F. M. Marchetti and J. Keeling, "Collective pairing of resonantly coupled microcavity polaritons", *Phys. Rev. Lett.* **113**, 216405 (2014).

[39] R. Hivet, E. Cancellieri, T. Boulier, D. Ballarini, D. Sanvitto, F. M. Marchetti, M. H. Szymanska, C. Ciuti, E. Giacobino, and A. Bramati, "Interaction-shaped vortex-antivortex lattices in polariton fluids ", *Phys. Rev. B* **89**, 134501 (2014). **Cited 20 (WoS).**

[40] L. Dominici, J. M. Fellows, S. Donati, D. Ballarini, M. De Giorgi, F. M. Marchetti, B. Piccirillo, L. Marrucci, A. Bramati, G. Gigli, M. H. Szymanska, D. Sanvitto, "Vortex and half-vortex stability in coherently driven spinor polariton fluid", *Science Advances* **1**, e1500807 (2015). **Cited 25 (WoS).**

[41] J. O. Hamp, A. K. Balin, F. M. Marchetti, D. Sanvitto, and M. H. Szymańska, "Spontaneous vortex arrays in a parametrically driven polariton condensate", *Europhysics Letters* **110** 57006 (2015).

[42] M. Van Regemortel, M. Wouters, and F. M. Marchetti, "Probing the collective excitations of a spinor polariton fluid ", *Phys. Rev. B* **91**, 075308 (2015)

[43] G. Dagvadorj, J. M. Fellows, S. Matyjaskiewicz, F. M. Marchetti, I. Carusotto, M. H. Szymanska, "Non-equilibrium Berezinskii-Kosterlitz-Thouless Transition in a Driven Open Quantum System", *Phys. Rev. X* **5**, 041028 (2015). **Cited 41 (WoS).**

[44] A. C. Berceanu, L. Dominici, I. Carusotto, D. Ballarini, E. Cancellieri, G. Gigli, M. H. Szymanska, D. Sanvitto, F. M. Marchetti, "On multicomponent polariton superfluidity in the optical parametric oscillator regime", *Phys. Rev. B* **92**, 035307 (2015).

[45] M. Callegari, M.M. Parish, and F.M. Marchetti, "Dipolar fermions in a multilayer geometry", *Phys. Rev. B* **95**, 085124 (2017).

[46] J. Keeling and F. M. Marchetti, "Viewpoint: Matter-light condensates reach thermal equilibrium", *Physics* **9** 154 (2017).

[47] G. Diaz-Camacho, C. Tejedor, F. M. Marchetti, "Spontaneous patterns in coherently driven polariton microcavities", *Phys. Rev. B* **97**, 245309 (2018).

[48] J. Levinsen, F. M. Marchetti, J. Keeling, M. Parish, "Spectroscopic probes of quantum many-body correlations in polariton microcavities", *Phys. Rev. Lett.* **123**, 266401 (2019).

[49] A. Munoz de las Heras, M. M. Parish, F. M. Marchetti, "Early-time dynamics of Bose gases quenched into the strongly interacting regime", *Phys. Rev. A* **99**, 023623 (2019).

[50] A. Tiene, J. Levinsen, M. M. Parish, A. H. MacDonald, J. Keeling, F. M. Marchetti, "Extremely imbalanced two-dimensional electron-hole-photon system", *Phys. Rev. Research* **2**, 023089 (2020).

[51] A. Strashko, F. M. Marchetti, A. H. MacDonald, J. Keeling, "Crescent states in charge-imbalanced polariton condensates", *Phys. Rev. Lett.* **125**, 067405 (2020).

[52] A. Tiene, J. Levinsen, J. Keeling, M. M. Parish, F. M. Marchetti, "Effect of fermion indistinguishability on optical absorption of doped two-dimensional semiconductors", *Phys. Rev. B* **105**, 125404 (2022).

[53] E. Laird, F. M. Marchetti, D. K. Efimkin, M. M. Parish, and J. Levinsen, "Rydberg exciton-polaritons in a magnetic field", *Phys. Rev. B* **106**, 125407 (2022).

[54] B. C. Mulkerin, A. Tiene, F. M. Marchetti, M. M. Parish, and J. Levinsen, "Virial expansion for the optical response of doped two-dimensional semiconductors", Phys. Rev. Lett. **131**, 106901 (2023).

[55] A. Tiene, B. C. Mulkerin, J. Levinsen, M. M. Parish, annd F. M. Marchetti, "Crossover from exciton polarons to trions in doped two-dimensional semiconductors at finite temperature", Phys. Rev. B **108**, 125406 (2023).

[56] A. Tiene, A. Tamargo Bracho, M. M. Parish, J. Levinsen, F. M. Marchetti, "Multiple polaron quasiparticles with dipolar fermions in a bilayer geometry", Phys. Rev. A **109**, 033318 (2024).

[57] D. de la Fuente Pico, J. Levinsen, E. Laird, M. M. Parish, F. M. Marchetti, "Rydberg excitons and polaritons in monolayer transition metal dichalcogenides in a magnetic field", Phys. Rev. B **111**, 035432 (2025).

[58] S. S. Kumar, B. C. Mulkerin, A. Tiene, F. M. Marchetti, M. M. Parish, J. Levinsen, "Trions in monolayer transition metal dichalcogenides", Phys. Rev. B **111**, 085404 (2025).

[59] M. Caldara, O. Bleu, F.M. Marchetti, J. Levinsen, M.M. Parish, "Quantum droplets of light in semiconductor micricavities", arXiv:2507.19324.

Invited Talks

4 Jul 25 *15th European Conference on Atoms Molecules and Photons (ECAMP15)*, Innsbruck, Austria.
17 Jun 25 *8th International Workshop of Rydberg Excitons (Rydexc8)*, INSA, Toulouse, France.
10 Dec 24 *1st Australian workshop on Quantum Light Information Matter and Electronics (QLIME)*, Pullman Albert Park Melbourne, Australia.
2 Jul 24 *Condensed Matter and Quantum Materials 2024 (CMQM 2024)*, University of St Andrews, Scotland.
6 Oct 22 *Hybrid Photonics and Materials(HPM 2022) International Conference*, Hydra, Greece.
15 Oct 20 *Cold Atom Workshop 2020*, online.
28 Jan 20 *10th International Conference on Spontaneous Coherence in Excitonic Systems (ICSCE10)*, Melbourne, Australia.
4 Sept 19 *Dynamics & interactions in quantum gases — Quantum Menorca 2019*, Maó, Menorca, Spain
16 Nov 18 *Cold Atom Workshop — CAW-Bilbao2018*, Bilbao, Spain.
4 Sept 18 *Correlations and Entanglement with Photons in Cavities*, Chicheley Hall, UK.
1 Apr 14 *DPG Spring Meeting*, Dresden, Germany.
14 May 13 Co-chair of plenary discussion on "Atomic vs. Polariton BECs", Lorentz Center workshop *Universal Themes of Bose-Einstein Condensation*, University of Leiden, the Netherlands.
23 May 12 2 hour lectures at the *Physics's school POLATOM* (ESF), Toledo, Spain.
6 Aug 11 Workshop *Quantum phenomena in graphene, other low-dimensional materials, and optical lattices*, Majorana center, Erice, Italy.
12 Apr 10 *Physics of Light-Matter Coupling in Nanostrusctures (PLMCN10)*, Cuernavaca, Mexico.
5 Feb 10 *VI Reunión del Grupo Especializado en Física del Estado Sólido (GEFES10)*, Zaragoza, Spain.
30 Jan 08 *2008 Latsis Symposium*, EPFL, Lausanne, Switzerland.
29 Sept 07 *Workshop on solving the Bogoliubov-de Gennes and Gross-Pitaevskii equations for superconductors, superfluids and BEC*, Britannia Hotel, Manchester, UK.
23 May 07 KITP Programme on *Strongly Correlated Phases in Condensed Matter and Degenerate Atomic Systems*, UCSB, Santa Barbara, CA, USA.
18 Sep 06 24° *Convegno di Fisica Teorica e Struttura della Materia*, Levico Terme, Italy.
4 Jul 06 *Quantum Complexities in Condensed Matter* conference, Cavendish Laboratory, Cambridge, UK.

Contributed Talks

10 Jun 24 *12th International Conference on Spontaneous Coherence in Excitonic systems (ICSCE-12)*, Trinity Collge, Dublin, Irland.
13 Sept 13 *International Conference on Optics of Excitons in Confined Systems (OECS13)*, Rome, Italy.

13 Sept 11 *International Conference on Optics of Excitons in Confined Systems (OECS12)*, Paris, France.
8 Feb 11 5^{th} *International Conference on Spontaneous Coherence in Excitonic Systems (ICSCE5)*, Lausanne, Switzerland.
9 Sept 09 *International Conference on Optics of Excitons in Confined Systems (OECS11)*, Madrid, Spain.
5 March 07 APS March Meeting 2007, Denver, CO, USA.
25 June 06 Network conference 6^{th} *Photon Mediated Phenomena in Semiconductor Nanostructures*, Cambridge, UK.
25 March 06 Network conference 5^{th} *Photon Mediated Phenomena in Semiconductor Nanostructures*, Lund, Sweden.
9 Sept 05 2^{nd} *International Conference on Spontaneous Coherence in Excitonic Systems (ICSCE2)*, University of Southampton, UK.
7 July 05 *Quantum Condensates Meeting* (IoP), Cambridge, UK.
11 June 05 Network conference 4^{th} *Photon Mediated Phenomena in Semiconductor Nanostructures*, Autrans, France.
23 Mar 05 APS March Meeting 2005, Los Angeles, CA, USA.
5 Oct 04 Network conference 3^{rd} *Photon Mediated Phenomena in Semiconductor Nanostructures*, University of Paderborn, Germany.

Invited Seminars

20 Apr 22 Condensed Matter Seminar, University of St Andrews, UK.
18 Nov 21 Department of Engineering Physics Seminar Series, Polytechnique Montréal (Québec), Canada.
5 Nov 21 C. Schneider's group online seminar, University of Oldenburg, Germany.
27 Mar 14 *ICMM Seminarios Alternativos*, Instituto de Ciencia de Materiales, CSIC, Madrid, Spain.
27 Jan 11 Departamento de Física de Materiales, Universidad Complutense de Madrid, Spain.
15 Jan 09 CSIC, Instituto de Ciencia de Materiales de Madrid, Spain.
18 May 07 Condensed Matter Physics Seminar, California Institute of Technology, Pasadena, CA, USA.
16 Feb 07 Laboratoire de physique théorique et modèles statistiques (LPTMS) Paris-sud, Orsay, France.
19 Dec 06 Sissa (International School for Advanced Studies), Trieste, Italy.
23 Nov 06 Scuola Normale Superiore, Pisa, Italy.
20 Nov 06 *Seminario di Struttura della Materia*, Università di Firenze, Florence, Italy.
13 Nov 06 EPFL (Ecole Polytechnique Fédérale de Lausanne), Lausanne, Switzerland.
19 Oct 05 CMT group, Theoretical Physics, Oxford University, UK.
12 Oct 05 School of Physics and Astronomy, Cardiff University, UK.
22 Sept 05 Departamento de Fisica Aplicada, Universidad de Alicante, Spain.
11 Apr 05 Laboratoire de de Spectrométrie Physique, Grenoble, France.
30 Mar 05 Condensed Matter Theory Group, Harvard University, Cambridge, MA, USA.
21 May 04 Department of Physics, Princeton University, USA.
11 Dec 03 Materials Science Centre, University of Groningen, The Netherlands.
30 Oct 01 Università di Roma "La Sapienza", Rome, Italy.

Teaching

Jan 25-May 25 Classes of "Mathematical Methods II" for undergraduate second year students in Physics (approx. 70 students for 45 hours).
Oct 24-Jan 25 Physics laboratory for undergraduate first year students in Physics, UAM, Madrid, Spain (approx. 10 students for 24 hours).
Jan 24-May 24 Classes of "Mathematical Methods II" for undergraduate second year students in Physics (approx. 62 students for 45 hours).
Jan 23-May 23 Classes of "Mathematical Methods II" for undergraduate second year students in Physics (approx. 70 students for 45 hours).
Oct 22-Dic 22 Physics laboratory for undergraduate first year students in Environmental Sciences, UAM, Madrid, Spain (16 students for 16 hours).
Mar 22-May 22 Classes of "Condensed Matter Physics" for undergraduate fourth year students in Physics

(approx. 20 students for 26 hours).
Oct 21-Dic 21 Physics laboratory for undergraduate first year students in Environmental Sciences, UAM, Madrid, Spain (16 students for 16 hours).
Jan 21-Mar 21 Classes of "Condensed Matter Physics" for undergraduate fourth year students in Physics (approx. 32 students for 26 hours).
Sept 20-Jan 21 Classes of "Classical Mechanics" ("Mecanica y Ondas I") for undergraduate second year students in Physics (approx. 68 students for 45 hours).
March 20-May 20 Classes of "Condensed Matter Physics" for undergraduate fourth year students in Physics (approx. 18 students for 26 hours).
Sept 19-Jan 20 Classes of "Classical Mechanics" ("Mecanica y Ondas I") for undergraduate second year students in Physics (approx. 60 students for 45 hours).
March 19-May 19 Classes of "Condensed Matter Physics" for undergraduate fourth year students in Physics (approx. 20 students for 25 hours).
Sept 18-Jan 19 Classes of "Classical Mechanics" ("Mecanica y Ondas I") for undergraduate second year students in Physics (approx. 60 students for 42 hours).
Sept 17-Jan 18 Classes of "Classical Mechanics" ("Mecanica y Ondas I") for undergraduate second year students in Physics (approx. 73 students for 42 hours).
Oct 17-Jan 18 Classes of "Computational Methods in Biophysics" for master students in Biophysics (approx. 6 students for 24 hours).
Sept 16-Jan 17 Classes of "Classical Mechanics" ("Mecanica y Ondas I") for undergraduate second year students in Physics (approx. 65 students for 42 hours).
Oct 16-Jan 17 Classes of "Computational Methods in Biophysics" for master students in Biophysics (approx. 8 students for 24 hours).
Feb 15-Apr 15 Physics laboratory for undergraduate first year students in Chemistry, UAM, Madrid, Spain (20 students for 35 hours).
Oct 15-Dec 15 Classes of "Computational Methods in Biophysics" for master students in Biophysics (approx. 10 students for 24 hours).
Sept 15-Dec 15 Classes of "Computation I" for undergraduate first year students in Physics (approx. 20 students for 42 hours).
Feb 15-Apr 15 Physics laboratory for undergraduate first year students in Chemical Engineering, UAM, Madrid, Spain (20 students for 35 hours).
Oct 14-Dec 14 Classes of "Computational Methods in Biophysics" for master students in Biophysics (approx. 10 students for 12 hours).
Sept 14-Dec 14 Classes of "Computation I" for undergraduate first year students in Physics (approx. 20 students for 42 hours: 6 credits).
Feb 14-Apr 14 Physics laboratory for undergraduate first year students in Chemistry and Chemical Engineering, UAM, Madrid, Spain (20 students for 35 hours: 4 credits).
Sept 13-Jan 14 Classes of "Computation I" for undergraduate first year students in Physics (approx. 27 students for 42 hours: 6 credits).
Jan-May 13 Classes of "Advances Statistical Mechanics: an introduction to superconductivity and superfluidity" for undergraduate fifth year students in Physics (approx. 14 students for 40 hours: 6 credits).
Apr-May 12 Classes of "Advances Statistical Mechanics: an introduction to superconductivity and superfluidity" for undergraduate fifth year students in Physics (approx. 12 students for 20 hours: 3 credits).
Oct 11-Jan 12 Classes of "Computation I" for undergraduate first year students in Physics (approx. 20 students for 20 hours: 2 credits).
Apr-May 11 Classes of "Advances Statistical Mechanics: an introduction to superconductivity and superfluidity" for undergraduate fifth year students in Physics (approx. 19 students for 20 hours: 3 credits).
Sept-Oct 10 Classes of "Computation I" for undergraduate first year students in Physics (approx. 20 students for 20 hours: 2 credits).
Apr-May 10 Classes of "Advances Statistical Mechanics: an introduction to superconductivity and superfluidity" for undergraduate fifth year students in Physics (approx. 9 students for 20 hours: 3 credits).
Nov 09-Jan 10 Classes of "Computation I" for undergraduate first year students in Physics (approx. 30

students for 20 hours: 2 credits).
Mar-Jun 09 Tutorial classes of "Mechanics and Waves II" for undergraduate second year students in Physics (approx. 30 students for 10 hours: 1 credit).
Feb-Mar 09 Laboratory for undergraduate first year students in Physics ("Tecnicas Experimentales I"), UAM, Madrid, Spain (6 students for 30 hours: 3 credit).
11, 12, 13 Sept 07 3 lecture course on *Ultracold atoms*, "Superfluidity in Ultracold Fermi Gases", for 1st year graduate students, *Physics by the Lake* summer school (EPSRC), University College of St Martin, Ambleside, UK (approx. 60 students).
8 Dec 05 1 lecture to undergraduate Part II and Part III students (TCM) on "Macroscopic Phase Coherence and Condensation Phenomena in Fermionic Systems", TCM Winter School, TCM Group, Cambridge, UK (approx. 10 students for 1 hours).
11-12 Jul 05 2 lectures to undergraduate (summer project) students on "Macroscopic Phase Coherence and Condensation Phenomena", TCM Group, Cambridge, UK (approx. 7 students for 2 hours).
Oct 04 – Dec 04 5 Graduate lectures on "Cold Fermions, Feshbach Resonances and the BEC-BCS Crossover", within the course *Quantum Condensed Matter Physics*, TCM Group, Cambridge, UK (approx. 15 students for 5 hours/Michaelmas term).
Oct 03 – Dec 03 Tutorial classes in undergraduate Part III major option course, *Concepts in Theoretical physics*, Cavendish Laboratory, Cambridge, UK (44 students for 4 hours/Michaelmas term).
Oct 02 – Dec 02 Tutorial classes in undergraduate Part III course major option, *Concepts in Theoretical physics*, Cavendish Laboratory, Cambridge, UK (40 students for 4 hours/Michaelmas term).
Oct 01 – Jun 02 Tutorial classes in undergraduate Part IA mathematics, Pembroke College, Cambridge, UK (3 students for 8 hours/Michaelmas term, 8 hours/Lent term, and 6 hours/Easter term).

Summer Schools and Long Term Workshops

28 Apr – 28 May 07 KITP Programme on *Strongly Correlated Phases in Condensed Matter and Degenerate Atomic Systems*, Kavli Institute for Theoretical Physics (KITP), UCSB, Santa Barbara CA, USA.
5 – 30 Jul 04 Boulder School for Condensed Matter and Material Physics *Coherence and Interactions in Atomic and Condensed Matter Physics* , Boulder, Colorado, USA.
24 Jun – 5 Jul 02 *Mesoscopic Physics and Electron Interaction* Workshop, Abdus Salam ICTP, Miramare-Trieste, Italy.
13 – 26 Aug 01 Nato ASI School *Field Theory of Strongly Correlated Fermions and Bosons in Low-Dimensional Disordered Systems*, Windsor, UK.
20 – 30 Jul 99 CXLII Course *New Directions in Quantum Chaos* of the International School of Physics *Enrico Fermi* Varenna, Italy.

Long Term Visits to International Institutions

School of Physics and Astronomy, Monash University, Melbourne, Australia.
Theory of Condensed Matter group, Cavendish Laboratory, Cambridge, UK.
Laboratoire de physique théorique et modèles statistiques (LPTMS), Orsay, France.
Kavli Institute for Theoretical Physics (KITP), UCSB, Santa Barbara CA, USA.

Referee

Referee for *Nature Reviews Physics* (Nature), *Nature Photonics* (Nature), *Scientific Reports* (Nature), *Physical Review X* (APS), *Physical Review Letters* (APS), *Physical Review B* (APS), *Journal of Optics B: Quantum and Semiclassical Optics* (IoP), *Journal of Physics: Condensed Matter* (IoP), *Physica Status Solidi (b)* (Wiley-VCH), *European Physics Letters* (IoP), *The European Physical Journal* (Springer). Grant referee for the *Engineering and Physical Sciences Research Council (EPSRC)*, *French National Research Agency (ANR)*, *Spanish "Agencia Estatal de Investigación" (AEI)*.

Organising and Editing

- Scientific Organizing Committee (SOC) member of the *13th International Conference on Spontaneous Coherence in Excitonic systems (ICSCE-13)*, Canarias, Spain (**12-16 Jan 2026**).

- Scientific Organizing Committee (SOC) member of the *Universal themes in Bose-Einstein Condensation (UBEC24* Workshop, European Center for Theoretical Studies in Nuclear Physics and Related Areas (ECT*), Trento, Italy (**4-8 Nov 2024**).
- Scientific Organizing Committee (SOC) member of the *12th International Conference on Spontaneous Coherence in Excitonic systems (ICSCE-12)*, Trinity College, Dublin, Ireland (**10-14 June 2024**).
- Co-organiser of the *Cold Atom Workshop (CAW) Madrid 2022* (**24,25 Nov 2022**).
- **Aug 2022 — May 2024** Associate Editor for Basic Science for Quantum Technologies (specialty section of *Frontiers in Quantum Science and Technology*).
- Co-Organiser of the online *FermiPolar Workshop — Fermi Polarons: from ultracold gases to 2D semiconductors* (**07-18 Feb 2022**).
- Program Committee member of the *International Conference on Optics of Excitons in Confined Systems (OECS13)*, Rome, Italy (**Sept 2013**).
- Seminar organiser (together with Merino) at the Departamento de Fisica Teorica de la Materia Condensada, Universidad Autonoma de Madrid, Spain (**Oct 2012 – Jun 2014**).
- Seminar organiser (together with J. Bravo) at the Departamento de Fisica Teorica de la Materia Condensada, Universidad Autonoma de Madrid, Spain (**Oct 2010 – May 2012**).
- Member of the LOC (together with M. Atature, J. Keeling, M. H. Szymanska, and P. B. Littlewood) of the *International Conference on Spontaneous Coherence in Excitonic Systems (ICSCE4)*, Cambridge, UK (**8 – 12 Sept 2008**).
- Guest editor of the special section of *Journal of Physics: Condensed Matter* (IoP) "Optical coherence and collective phenomena in nanostructures", *J. Phys.: Condens. Matter* **19** No 29 (25 July 2007), 290301.
- Co-organiser (together with S. Kos and P. B. Littlewood) of the 6^{th} *Photon Mediated Phenomena Workshop*, Cambridge, UK (**23-25 Jun 06**). This is the concluding workshop meeting in within the Research Training Network set up under the European Commission's Fifth Framework Programme (web-page `http://www.astro.cf.ac.uk/research/PMPnetwork/workshops/cambridge_workshop/index.php`).

Supervision of students: PhD

- Andrei Berceanu, Universidad Autonoma de Madrid, Spain (1 Oct 2010 — 08 Jul 2016), "Scattering and topological properties of driven-dissipative quantum fluids".
- Antonio Tiene, Universidad Autonoma de Madrid, Spain (1 Jul 2019 — 8 June 2023), "Charged polaritons in two-dimensional semiconductors".

Supervision of students: Master

- Erasmus: Mathias Van Regemortel, Universiteit Antwerpen (1 Sept 12 — 1 Feb 13, 6 credits), "Binary Polariton Fluids".
- Javier Galego, Universidad Autonoma de Madrid, Spain (1 Oct 13 — 1 Jun 2014), "Control of collective pairing phases in polariton microcavities".
- Erasmus: Michele Callegari, Universitá di Padova, Italia (1 Feb 13 — 1 Jun 2014), "Density instabilities in multi-layer dipolar Fermi gases".
- Alberto Muñoz de las Heras, Universidad Autonoma de Madrid (Jan 2018 - Sept 2018), "Dynamics of correlations in strongly interacting Bose-Einstein condensates".

- Erasmus: Antonio Tiene, Universitá di Padova, Italia (Mar 2018 - Oct 2018), "Strong light-matter coupling in tunable doped two-dimensional materials".
- Oscar Mateos Lopez, Universidad Autonoma de Madrid (Oct 2021 - Sept 2022).

Supervision of students: Final year project (TFG)

- Alberto Muñoz de las Heras, Universidad Autonoma de Madrid (2016-2017). "Early time quench dynamics of atomic Bose-Einstein condensates into the strongly interacting regime".
- Carmen Jimenez Lobaton, Universidad Autonoma de Madrid (2018-2019). "Spontaneous patterns in coherently driven spinor polariton structures".
- Miguel Francisco Martinez, Universidad Autonoma de Madrid (2018-2019). "Quench dynamics in dipolar Bose gases".
- Oscar Mateos Lopez, Universidad Autonoma de Madrid (2020-2021). "Interaction properties of Fermi polaron polaritons".
- Íñigo Lasheras Lopez-Ceron, Universidad Autonoma de Madrid (2021-2022). "Spreading of correlations after quench dynamics in ultracold dipolar gases.".
- Aitana Hurtado Mendoza , Universidad Autonoma de Madrid (2022-2023). "Dinamica de un condensado de Bose-Einstein dipolar cuasi-2D tras un quench en el angulo de orientacion de los dipolos".
- Andres Tamargo Bracho , Universidad Autonoma de Madrid (2022-2023). "Fermi polaron in 2D ultracold dipolar Fermi gases in a bilayer geometry".
- David de la Fuente Pico, Universidad Autonoma de Madrid (2023-2024). "Interaction properties of Rydberg polaritons in a magnetic field".
- Darian Leucian Pele, Universidad Autonoma de Madrid (2023-2024). "Andreev reflection in polariton superfluids".

Supervision of students: Undergraduate

- *Instituto Nicolás Cabrera* prize for Physics students: Manuel Lara, Universidad Autonoma de Madrid (Jun — Sept 2013).
- *Instituto Nicolás Cabrera* fellowship for Physics students: Miguel Francisco Martinez, Universidad Autonoma de Madrid (May 2018 — Dec 2018).
- *Instituto Nicolás Cabrera* fellowship for Physics students: Santiago Agüí Salcedo, Universidad Autonoma de Madrid (Jun 2019 — Dec 2019).
- *Instituto Nicolás Cabrera* fellowship for Physics students: Andres Tamargo Bracho, Universidad Autonoma de Madrid (Jun 2022 — Dec 2023).
- *Departmental Collaborative Fellowship* for Physics students: David de la Fuente Pico, Universidad Autonoma de Madrid (Nov 2023 — June 2024).

Committees

- **Jul 25** Secretary of the commission for a public competition for a Professor Titular post, Universidad Autónoma de Madrid (UAM).
- **2023-2024** Evaluation commission for the national "Juan de la Cierva" Fellowships.

- **Jan 24** Commission for a public competition for a Lecturer post, Universidad Autónoma de Barcelona (UAB).
- **Jan 22 — ...** Commission for genger equality and mentoring programme at IFIMAC.
- **June 20 — Sept 22** CIVIS Participative Council (`https://civis.eu/`).
- **Sept 18 – Jun 21** Coordinator of the Master programme "Physics of Condensed Matter and Biological Systems".
- **2018-2019** Evaluation commission for the national "Ramón y Cajal" Fellowships.

PhD Committees

- **13 Mar 09** Member of the jury, PhD thesis of Elena del Valle "Quantum electrodynamics with quantum dots in microcavities", Universidad Autonoma de Madrid, Spain.
- **14 Nov 11** Member of the jury, PhD thesis of Miguel Ibñez Berganza "Exactly solvable models in low-dimensional many-body physics", Universidad Autonoma de Madrid, Spain.
- **10 May 13** Member of the jury, PhD thesis of Eneko Malatsetxebarria Elizegi "Bosons and fermions in mixed-dimensional optical lattices: phase equilibria and quantum phase transitions", Universidad del Pais Vasco, Spain.
- **8 Sept 18** Member of the jury, PhD thesis of Javier del Pino Gutierrez "Vibrational and electronic strong light-matter coupling with molecular excitations", Universidad Autonoma de Madrid, Spain.
- **25 Sept 20** President of the jury, PhD thesis of Rocío Sáez Blázquez "Dressing the Vacuum: Strong Light-Matter Coupling for Enhancing Photon Correlations and Exciton Transport", Universidad Autonoma de Madrid, Spain.
- **13 June 22** President of the jury, PhD thesis of Mónica Sánchez Barquilla "Light-matter interactions in arbitrary photonic environments", Universidad Autonoma de Madrid, Spain.
- **14 March 24** Member of the jury, PhD thesis of Jesús Mateos Maroto "Superfluidez correlacionada y caos cuántico en un gas de bosones conducido periódicamente en el tiempo", Universidad Complutense de Madrid, Spain.
- **5 Aug 24** Member of the jury, PhD thesis of Daniela Gallego Valencia "Analysis of the structure and dynamics of polaritons through multidimensional spectroscopy", Universidad de Antioquia, Colombia (online).
- **23 January 25** Secreatary of the jury, PhD thesis of Juan José Esteve Paredes "An atomistic description of excitonic effects in the optical response of two-dimensional materials", Universidad Autonoma de Madrid, Spain.

Languages

Italian	native language	Spanish	fluent
English	fluent	French	basic

Outreach

- J. Keeling and F. M. Marchetti "Matter-Light Condensates Reach Thermal Equilibrium", *Physics* **9**, 154 (2017)
`http://physics.aps.org/articles/v9/154`

- Divulgative article
  http://www.agenciasinc.es/Noticias/Un-escenario-ideal-para-explorar-nuevas-fases-de-la-materia
- **7 Mar 2014**, **3 Oct 2014**, **10 Feb 2017** Presentation at the "A Day of Divulgation of the Department Research Activieties" ("Jornada de Divulgación de la Investigación"), Department of Theory of Condensed Matter, Universdad Autonoma de Madrid, Spain
- **10 May 2023**, **2 Apr 2022** Presentation "Emergent behaviour in quantum matter-light systems" for first year physics studentes at the Universdad Autonoma de Madrid, Spain
- **9, 10 Feb 2024** Participation in the outreach activities for the International Day of Women and Girls in Science (11 February). General audience theoretical-practical activity "Exploring quantum physics in our classical world".
- **8 Feb 2025** Participation in the outreach activities for the International Day of Women and Girls in Science (11 February). General audience theoretical-practical activity "Good Vibrations".
- **4 Apr 2025** As part of Cultural Week 2025 at Majadahonda Professional Music Conservatory, I presented the practical/theoretical workshop on "Good Vibrations: The Physics of Music".