



# CURRICULUM VITAE

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## Pietro A. Massignan

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**NAME:** Pietro Alberto Massignan  
**POSITION:** Associate Professor at *Universitat Politècnica de Catalunya (UPC)*  
& *ICREA Academia* awardee  
**BIRTH:** born in Milano (Italia) on the 20 of December 1977  
**NATIONALITY:** Italian

### EDUCATION AND ACADEMIC DEGREES

- Bachelor and Master studies in *Theoretical Physics* at the *Università degli Studi* in Milano, 1996-2002.
- Master thesis developed at *LENS* in Florence, group of Prof. M. Inguscio, 2001-2002.  
M.Sc. Thesis: “*One-dimensional model for the study of the expansion of elongated Bose Einstein condensates from optical lattices*”. Thesis defended in March 2002. Grade: 110/110 “cum laude”.
- Ph.D. studies in *Theoretical Quantum Physics* at the *Niels Bohr Institute* and *NORDITA* in Copenhagen, group of Profs. C. Pethick, H. Smith, and B. Mottelson, 2003-2006. Thesis defended in February 2006.  
Ph.D. Thesis: “*Positive ions, collective modes and Anderson localization in ultracold gases*”. Grade: “Excellent”.

### SCIENTIFIC CAREER

- PostDoc researcher at the *Institute for Theoretical Physics* in Utrecht, group of Prof. H. Stoof, 2006-2008.
- Joint PostDoc position at *ICFO/UAB* in Barcelona, groups of Profs. M. Lewenstein and A. Sanpera, 2008-2010.
- Research Fellow at *ICFO* in Barcelona, group of Prof. M. Lewenstein, 2011-2014.
- *Ramón y Cajal* Fellow at *ICFO* and *UPC* (tenure track grant), 2015-2019.
- *Associate Professor* at *Universitat Politècnica de Catalunya (UPC)*, 2020-present.

### AREAS OF RESEARCH AND INVESTIGATION

- ultracold quantum gases: quantum engineering (preparation, manipulation, and detection) of exotic states of matter, few- and many-body physics, pairing and superfluidity in unitary Fermi gases and quantum mixtures, synthetic gauge fields for ultracold neutral atoms, disordered interacting systems, open quantum systems
- emergence, characterization and detection of topological properties in photonic systems and ultracold atoms
- anomalous transport and self-organization in biological complexes and quantum stochastic systems
- machine-learning algorithms for classical and quantum systems

## ORGANIZATION OF INTERNATIONAL CONFERENCES AND MEETINGS

- 2023: Conference on *Quantum coherent dynamics: turbulence, non-equilibrium and interactions*, Barcelona (Spain).
- 2023: *Barcelona Cold Atoms Meeting* (Spain).
- 2022: *CAPS (Cold Atoms Physics Spain) School on Ultracold Atoms*, Barcelona (Spain).
- 2021: Trimester (June to August) on *Interacting Topological Matter: Atomic, Molecular and Optical Systems* (KITP - Kavli Institute for Theoretical Physics - Santa Barbara, California, USA).
- 2019: Conference on *Dynamics and interactions in quantum gases*, Maó (Menorca, Spain).
- 2018: Meeting on *Ultracold Quantum Mixtures (UPC-LENS-Århus-MPQ-ICFO)*, Barcelona (Spain).
- 2017: Workshop *From few to many: exploring quantum systems one atom at a time*, Obergurgl (Austria).

## SCIENTIFIC HONORS AND AWARDS

- 2023: researcher with the largest number of *Highly Cited Papers* (ESI-WoS) of the whole Physics Dep. at UPC
- 2021: *ICREA Academia Award* (for the period 2022-2026) by ICREA
- 2021: Awarded three consecutive *Research sexennia* (2003-2020) and one *Teaching Quinquennium* (2017-2021)
- 2021: *Sant Jordi Award* for authoring the most downloaded new book in the UPC collection
- 2020: Granted *Tenure* at the Universitat Politècnica de Catalunya
- 2019: Italian habilitation for *Professore Ordinario* (I Fascia - sett.02/B2)
- 2018: Italian habilitation for *Professore Associato* (II Fascia - sett.02/B2)
- 2013: Catalan habilitation (*Acreditació de recerca*)
- 2013: French habilitation as a *Maître de conférences*
- 2012: TOQATA prize
- *Outstanding Referee* of the *American Physical Society* (2019) and of the *Institute of Physics* (2016).

## GUEST POSITIONS AND EXTENDED STAYS

- Visiting scientist at *Institut Henry Poincaré* and *ENS (LKB)* in Paris; one month stays in 2024, 2012, and 2007.
- Visiting scientist at *Kavli Institute for Theoretical Physics* in Santa Barbara (USA); three months in 2021 (as organizer of a *KITP* program), one month in 2016, and another month in 2010.
- Visiting scientist at *Center for Theoretical Physics* in Aspen (USA); three weeks stays in 2017, 2015, and 2011.
- Visiting scientist at *Institut d'Etudes Scientifiques* in Cargèse (France); one week in 2016.
- Visiting scientist at *Centro de Ciencias* in Benasque (Spain); one week in 2019, and one in 2016.
- Visiting scientist at *Institute for Nuclear Theory* in Seattle (USA); two weeks in 2014.
- Visiting scientist at *Aarhus Institute of Advanced Studies*; one week in 2014, and one in 2013.
- Visiting scientist at *BEC Center* in Trento (Italy); one week in 2013.
- Visiting scientist at *Nordita* in Stockholm; two weeks in 2013.
- Visiting scientist at *ITAMP - Harvard-Smithsonian Center for Astrophysics*, Cambridge (USA); two weeks in 2012.
- Visit at *TCM laboratory* in Cambridge (UK); one week in 2012, and one in 2011.
- Visit at *Institut d'Optique* in Palaiseau (Paris, France); one week in 2011.
- Visiting scientist at *BEC Center* in Trento (Italy), group of Profs. S. Stringari and L. Pitaevskii, 2008.
- Visiting Research Fellow at *NORDITA*, Copenhagen; two months in 2006.
- **Visiting PhD guest at École Normale Supérieure (LKB) in Paris; nine months in 2004-2005.**
- European grant for preDoctoral studies at *LENS*, Florence; eight months in 2002.

## EXTERNAL FUNDING SECURED

- *Catalunya Quantum Academy*: funding awarded to UPC (with myself as the UPC coordinator) for the period 2024-25 to support actions for attracting, training, and retaining talent within the quantum ecosystem in Catalunya (145k€).
- Three *Marie Skłodowska-Curie* grants for PostDoctoral researchers joining my group, awarded by the *European Commission* to Andrea Tononi (2024), Andrea Richaud (2022) and Giulia De Rosi (2018) (160k€ each, total: 480k€).
- *ICREA Academia Award*: a prestigious personal grant offered by ICREA (Catalan Institution for Research and Advanced Studies), which aims at supporting excellent research done by permanent Professors in the Catalan Universities (2022-2026, 200k€).
- *Ramón y Cajal Fellowship*: the most prestigious personal research grant in Spain, yielding funding for 5 years of independent research and designed to lead the researcher to a tenured position. Awarded to me by the *Spanish Ministry of Research*. I have been employed at ICFO and UPC under this grant from 2015 until 2019 (300k€).
- Grant for the organization of a Trimester on *Interacting Topological Matter* and associated Conference, awarded to us by the *Kavli Institute for Theoretical Physics* of Santa Barbara in California, USA (~300k€).
- Two consecutive *Proyectos Nacionales* awarded to my research group at UPC in 2017 and 2020 (170k€).
- EU FEDER project *QuantumCAT*: research network grant funding disruptive quantum technologies (1.8M€ in total, of which 330k€ to my node at UPC).
- EU FET Proactive Grant on *Quantum Insulators and Conductors* (2.4M€, of which 540k€ to my node at ICFO).
- *Beatriu de Pinós* grant for a PostDoctoral researcher to join my group, awarded to Arturo Camacho-Guardian by *AQU-Catalunya* in 2021 (144k€). [declined by the awardee, because already employed somewhere else at the moment of notification]
- *Della Riccia* research grant for a PostDoctoral researcher to join my group, awarded to Giulia De Rosi by the *Fondazione Della Riccia* in 2018 (15k€).
- Grant for the organization of the Obergurgl Conference/School “From few to Many”, awarded to me by the *ExtreMe Matter Institute EMMI* in 2017 (20k€).
- Travel grant to allow a foreign PhD student to visit my group, awarded by *EU COST - ATOMQT* in 2019 (0.9k€).
- Grants for the organization of Meetings on *Ultracold Quantum Mixtures (UPC-LENS-Århus-MPQ-ICFO)*, awarded by the *Universitat Politècnica de Catalunya* in 2018 (0.7k€) and 2020 (1.2k€).
- Grants for research stays at the Aspen Center for Theoretical Physics, Aspen (CO, USA), awarded to me by the *Simons Foundation* in 2011 and 2015 (2k€).
- Grant for a research stay at ITAMP - Harvard-Smithsonian Center for Astrophysics, Cambridge (MA, USA), awarded to me in 2012 (2k€).
- Grant for a research stay at the KITP - Kavli Institute for Theoretical Physics, Santa Barbara (CA, USA), awarded to me in 2010 (2k€) and 2016 (1.6k€).
- Research grant for PostDoctoral studies at ICFO, awarded to me by the *Cellex Foundation* in 2013 (35k€).
- Postdoctoral Fellowship at ICFO, granted within the EuroQuam-FerMix network, awarded by the *European Science Foundation* in 2008 (45k€).
- Full PhD Fellowship granted by the University of Copenhagen, awarded to me in 2003.
- Pre-Doctoral grant to pursue studies at LENS, awarded in 2002 by the *European Union*.

## TALKS AT INTERNATIONAL CONFERENCES

- 2024 Programme on *Quantum Many-Body Systems Out of Equilibrium*, IHP-Paris (FR).
- 2023 Conference on *Impurity Physics with Cold Atoms and Ions*, Aarhus Inst. for Advanced Studies (DK). [invited]
- 2022 Workshop on *Cold Atoms* (CAW 2022), Madrid (ES). [invited]
- 2022 Workshop on *Quantum Bubble Physics*, online (organized by Hannover U.) [invited]
- 2022 Workshop on *Fermi polarons: from ultracold gases to 2D semiconductors* (FermiPolar), online. [invited]
- 2021 Workshop on *Cold Atoms* (CAW 2021), Granada (ES). [invited]
- 2021 Conference on *Bose Einstein Condensation* (BEC 2021), Sant Feliu (ES). [invited]
- 2021 Workshop on *Correlations in Mesoscopic Fermi Systems*, Heidelberg (DE). [invited]
- 2021 joint Grenoble-Barcelona-Tsukuba Workshop on *Clustering and global challenges* (online). [invited]
- 2020 Workshop on *Mesoscopic cold atom systems in and out of equilibrium*, MPI-PKS Dresden (DE). [invited]
- 2020 Conference on *New frontiers in photonics*, Madrid (ES). [invited / rescheduled due to COVID]
- 2020 Conference on *New Challenges in Optics*, Samarkand (UZ). [invited / rescheduled due to COVID]
- 2020 Conference on *Quantum Simulation and Quantum Walks*, CIRM, Marseille (FR).
- 2018 Workshop on *Cold Atoms*, U. of the Basque Country, Bilbao (ES). [invited / cancelled for paternity leave]
- 2018 Workshop on *Quantum Simulations with Atoms and Light*, Aarhus Inst. for Advanced Studies (DK). [invited]
- 2018 Workshop on *Quantum Machine Learning and Biomimetic Quantum Technologies*, Bilbao (Spain).
- 2017 Workshop on *Synthetic dimensions in quantum engineered systems*, ETH, Zurich (Switzerland). [invited]
- 2017 Conference on *Quantum Simulation*, Ecole Normale Supérieure, Paris (France).
- 2017 Workshop on *Correlations and Entanglement in and out of Equilibrium*, Aspen (CO-USA).
- 2016 KITP program *Universality in Few-Body Systems*, Santa Barbara (CA-USA).
- 2016 Workshop on *Disorder in Condensed Matter and Ultracold Atoms*, Cargèse (France). [invited]
- 2015 Autumn Meeting on *Imbalanced Fermi-Fermi mixtures*, Maria Waldrast (Austria).
- 2015 Workshop on *Ultra-Cold Quantum Matter with Atoms and Molecules*, Aspen (CO-USA).
- 2015 Conference *UPoN: Unsolved Problems on Noise*, Barcelona (ES). [invited]
- 2015 POLATOM ESF Conference *Cold atoms, excitons and polaritons*, Bad Honnef (DE).
- 2014 Workshop *New Trends in Topological Insulators*, Berlin-Brandenburg Academy of Sciences, Berlin (Germany).
- 2014 AIAS Workshop *Cold atoms and beyond*, Aarhus Institute for Advanced Studies, Aarhus (Denmark). [invited]
- 2014 INT program *Universality in few-body systems*, Seattle (USA).
- 2013 Guest Lecture at AIAS (the Aarhus Institute of Advanced Studies, Denmark).
- 2013 Summer Programme on *Synthetic Gauge Fields for Photons and Atoms*, BEC Center in Trento (Italy).
- 2013 OIST workshop *Coherent Control of Complex Quantum Systems*, Okinawa (Japan).
- 2013 NORDITA workshop *Pushing the Boundaries with Cold Atoms*, Stockholm (Sweden).
- 2012 joint ICFO-Hamburg Meeting, Center for Optical Quantum Technologies, Hamburg (Germany).
- 2012 POLATOM ESF workshop *Cold atoms, excitons and polaritons*, Cambridge (UK).

- 2012 Workshop on *Advances in Quantum Technologies*, International Institute of Physics, Natal (Brasil).
- 2012 Workshop on *Research Frontiers in Ultra-Cold Atoms and Molecules*, ITAMP, Harvard (MA-USA). [invited]
- 2012 joint LENS-ICFO Meeting, Institute of Photonic Sciences, Castelldefels (Spain).
- 2012 Winter Meeting on *Imbalanced Fermi-Fermi mixtures*, Maria Waldrast (Austria).
- 2011 Summer Meeting on *Coherent quasiparticle spectroscopy in Fermi-Fermi mixtures*, Maria Waldrast (Austria).
- 2011 Workshop on *Few- and Many-Body Physics in cold quantum gases near resonances*, Aspen (CO-USA).
- 2011 IFRAF-FerMix meeting, Paris (France).
- 2011 Spring Meeting on *Strongly-imbalanced Fermi-Fermi mixtures*, Maria Waldrast (Austria).
- 2010 ICFO-MPQ Joint meeting *New trends in Quantum Information and Quantum Optics*, Sant Benet (Spain).
- 2010 KITP program *Beyond Standard Optical Lattices*, Santa Barbara (CA-USA).
- 2010 Symposium on *Cold Atoms and Condensed Matter*, Vedbaek (Denmark). [invited]
- 2010 Workshop on *Correlations in Quantum Gases*, Maò (Menorca-Spain). [invited]
- 2010 Workshop on *Theory of quantum gases and quantum coherence*, Nice (France). [invited]
- 2009 ITAMP Conference on *Efimov States in molecules and nuclei*, Roma (Italy). [invited]
- 2009 FerMix meeting, Trento (Italy).
- 2008 *Physics@FOM*, Veldhoven (The Netherlands).
- 2007 *International Trimester on Quantum Gases*, Institut Henry Poincaré, Paris (France).
- 2007 *Spring Meeting* of the Dutch Physical Society, Lunteren (The Netherlands).
- 2005 Conference *Ultracold Plasma and Rydberg Systems*, Gif-sur-Yvette, Paris (France).

#### **EDITORIAL BOARD AND PEER-REVIEWING ACTIVITIES**

- Referee of the *European Commission* (EIC, MSCA, FP7 and CoFund calls).
- Referee of the *European Association of National Metrology Institutes* (EURAMET).
- Referee of the Austrian *Wissenschaftsfonds* (FWF), of the French *Agence National de la Recherche* (ANR), of the *Dutch Research Council* (NWO), of the Polish *National Science Centre* (NCN), of the Italian *Ministero dell'Istruzione, dell'Università e della Ricerca* (MIUR), of the Spanish Funding Agency, and of the *Latvian Council of Science*.
- Member of the Editorial Board of PLOS ONE.
- Referee for: Nature, Science, PRX, Nature Physics, PRL, EPL, Nature Comm., NJP, SciPost, PRA, J. Stat. Mech., Ann. Phys., J. Phys. A, J. Phys. B, EPJB, Few-Body Syst., Fortschritte der Physik, Photonics, Crystals.

#### **SCIENTIFIC ADMINISTRATION TRAINING AND EXPERIENCE**

- Training program on “*Patent Engineering and Management*” at ICFO (Barcelona), 2012.
- Training program “*From Science to Business*” at ESADE international business school (Barcelona), 2012.
- Responsible of ICFO collaboration in the ESF *EuroQuam* network, and in a EC FP7 Training Network proposal.

#### **OUTREACH ACTIVITIES**

- Author of a general public review titled “*Quantum Technologies and Society*”, published by ICFO in the framework of the ICFO/CatalunyaCaixa “*Ignacio Cirac Program Chair*” in 2010.
- Guide to the exhibition “*Som’Hi*” organized at *Universitat Autònoma de Barcelona* by Prof. A. Sanpera in 2010, in collaboration with Prof. Tilman Pfau, Univ. of Stuttgart; in a single month, it attracted 5000 students, aged 5-18.
- Museum guide for the exhibition “*The electrical revolution*” at *la Triennale* in Milano; three months in 1999.

## REFEREED PUBLICATIONS

My most important publications are marked with an asterisk (\*)

For continuously updated information, see my webpage <http://www.fen.upc.edu/users/pietro/>

### PAPERS

70	<i>Suppression of the superfluid Kelvin-Helmholtz instability due to massive vortex cores, friction and confinement</i> M. Caldara, A. Richaud, M. Capone, and P. Massignan arXiv:2403.11987
69	<i>Superfluid fraction of interacting bosonic gases</i> D. Pérez-Cruz, G. E. Astrakharchik, and P. Massignan arXiv:2403.08416. <span style="float: right; color: red;">[Covered by a Commentary by Thierry Giamarchi]</span>
68	<i>Study of unitary Bose polarons with Diffusion Monte-Carlo and Gross-Pitaevskii approaches</i> N. Yegovtsev, G. E. Astrakharchik, P. Massignan, and V. Gurarie arXiv:2311.14313.
67	<i>Superfluid vortex dynamics in an elliptical boundary</i> M. Caldara, A. Richaud, P. Massignan, and A. L. Fetter arXiv:2311.13545.
66	<i>(*) Mediated interactions between Fermi polarons and the role of impurity quantum statistics</i> C. Baroni, B. Huang, I. Fritsche, E. Dobler, G. Anich, E. Kirilov, R. Grimm, M.A. Bastarrachea-Magnani, P. Massignan, and G. Bruun <span style="color: red;">Nature Physics <b>20</b>, 68 (2024).</span> <span style="color: red;">[Covered by a Research Briefing in Nature Physics, by C. Baroni and P. Massignan]</span>
65	<i>Massive superfluid vortices and vortex necklaces on a planar annulus</i> M. Caldara, A. Richaud, M. Capone, and P. Massignan SciPost Phys. <b>15</b> , 057 (2023).
64	<i>Observation of <math>1/k^4</math>-tails after expansion of Bose-Einstein condensates with impurities</i> H. Cayla, P. Massignan, T. Giamarchi, A. Aspect, C. Westbrook, and D. Clément Phys. Rev. Lett. <b>130</b> , 153401 (2023).
63	<i>Ultra-long quantum walks via spin-orbit photonics</i> F. Di Colandrea, A. Babazadeh, A. Dauphin, P. Massignan, L. Marrucci, and F. Cardano Optica <b>10</b> , 324 (2023).
62	<i>Dynamics of a massive superfluid vortex in <math>r^k</math> confining potentials</i> A. Richaud, P. Massignan, V. Penna, and A. L. Fetter Phys. Rev. A <b>106</b> , 063307 (2022).
61	<i>Strongly interacting impurities in a dilute Bose condensate</i> N. Yegovtsev, P. Massignan, and V. Gurarie Phys. Rev. A <b>106</b> , 033305 (2022).
60	<i>Repulsive Fermi and Bose Polarons in Quantum Gases</i> F. Scazza, M. Zaccanti, P. Massignan, M. M. Parish, and J. Levinsen Atoms <b>10</b> , 55 (2022).
59	<i>Superfluid vortex dynamics on an ellipsoid and other surfaces of revolution</i> M.A. Caracanhas, P. Massignan, and A. L. Fetter Phys. Rev. A <b>105</b> , 023307 (2022).
58	<i>Linking topological features of the Hofstadter model to optical diffraction figures</i> F. Di Colandrea, A. D'Errico, M. Maffei, H. Price, M. Lewenstein, L. Marrucci, F. Cardano, A. Dauphin, P. Massignan New J. Phys. <b>24</b> , 013028 (2022).

57	<i>Renormalization-group study of Bose polarons</i> F. Isaule, I. Morera, P. Massignan, and B. Juliá-Díaz Phys. Rev. A <b>104</b> , 023317 (2021).	
56	<i>Stability and breakdown of Fermi polarons in a strongly interacting Fermi-Bose mixture</i> I. Fritsche, C. Baroni, E. Dobler, E. Kirilov, B. Huang, R. Grimm, G. M. Bruun, and P. Massignan Phys. Rev. A <b>103</b> , 053314 (2021).	[Editor's suggestion]
55	<i>Topological transport of mobile impurities</i> D. Pimenov, A. Camacho-Guardian, N. Goldman, P. Massignan, G. M. Bruun, and M. Goldstein Phys. Rev. B <b>103</b> , 245106 (2021).	
54	<i>Thermal instability, evaporation and thermodynamics of one-dimensional liquids in weakly-interacting Bose-Bose mixtures</i> G. De Rosi, G. E. Astrakharchik, and P. Massignan Phys. Rev. A <b>103</b> , 043316 (2021).	
53	<i>Bloch-Landau-Zener dynamics induced by a synthetic field in a photonic quantum walk</i> A. D'Errico, R. Barboza, R. Tudor, A. Dauphin, P. Massignan, L. Marrucci, and F. Cardano APL Photonics <b>6</b> , 020802 (2021).	[Featured Article]
52	<i>Universal aspects of a strongly interacting impurity in a dilute Bose condensate</i> P. Massignan, N. Yegovtsev, and V. Gurarie Phys. Rev. Lett. <b>126</b> , 123403 (2021).	[Editor's suggestion]
51	<i>Measuring topological invariants in a polaritonic analog of graphene</i> P. St-Jean, A. Dauphin, P. Massignan, B. Real, O. Jamadi, M. Milićević, A. Lemaître, A. Harouri, L. Le Gratiet, I. Sagnes, S. Ravets, J. Bloch, and A. Amo Phys. Rev. Lett. <b>126</b> , 127403 (2021).	[Editor's suggestion]
50	<i>Mobile impurity in a Bose-Einstein condensate and the orthogonality catastrophe</i> N.-E. Guenther, R. Schmidt, G. M. Bruun, V. Gurarie, and P. Massignan Phys. Rev. A <b>103</b> , 013317 (2021).	
49	<i>Detecting topology through dynamics in interacting fermionic wires</i> A. Haller, P. Massignan, and M. Rizzi Phys. Rev. Research <b>2</b> , 033200 (2020).	
48	<i>Bulk detection of time-dependent topological transitions in quenched chiral models</i> A. D'Errico, F. Di Colandrea, R. Barboza, A. Dauphin, M. Lewenstein, P. Massignan, L. Marrucci, and F. Cardano Phys. Rev. Research <b>2</b> , 023119 (2020).	
47	<i>Superfluid vortex dynamics on a torus and other toroidal surfaces of revolution</i> N.-E. Guenther, P. Massignan, and A. L. Fetter Phys. Rev. A <b>101</b> , 053606 (2020).	
46	<i>Two-dimensional topological quantum walks in the momentum space of structured light</i> A. D'Errico, F. Cardano, M. Maffei, A. Dauphin, R. Barboza, C. Esposito, B. Piccirillo, M. Lewenstein, P. Massignan, and L. Marrucci Optica <b>7</b> , 108 (2020).	
45	<i>Beyond-Luttinger-liquid thermodynamics of a one-dimensional Bose gas with repulsive contact interactions</i> G. De Rosi, P. Massignan, M. Lewenstein, and G. E. Astrakharchik Phys. Rev. Research <b>1</b> , 033083 (2019).	
44	<i>Superfluid Vortex Dynamics on Planar Sectors and Cones</i> P. Massignan and A. L. Fetter Phys. Rev. A <b>99</b> , 063602 (2019).	
43	<i>From Quantum Quasiparticles to a Classical Gas</i> P. Massignan Physics <b>12</b> , 25 (2019).	[Viewpoint on an MIT experiment]

42	<i>Dropping an impurity into a Chern insulator: a polaron view on topological matter</i> A. Camacho-Guardian, N. Goldman, P. Massignan, and G. M. Bruun Phys. Rev. B <b>99</b> , 081105(R) (2019).	[Rapid Communication]
41	(*) <i>Observation of the topological Anderson insulator in disordered atomic wires</i> E. J. Meier, F.A. An, A. Dauphin, M. Maffei, P. Massignan, T. L. Hughes, and B. Gadway Science <b>362</b> , 929 (2018).	[Highlighted in Nature Physics]
40	<i>Bose polarons at finite temperature and strong coupling</i> N.-E. Guenther, P. Massignan, M. Lewenstein, and G. M. Bruun Phys. Rev. Lett. <b>120</b> , 050405 (2018).	
39	<i>Topological characterization of chiral models through their long time dynamics</i> M. Maffei, A. Dauphin, F. Cardano, M. Lewenstein, and P. Massignan New J. Phys. <b>20</b> , 013023 (2018).	
38	<i>Quantized superfluid vortex dynamics on cylindrical surfaces and planar annuli</i> N.-E. Guenther, P. Massignan, and A. L. Fetter Phys. Rev. A <b>96</b> , 063608 (2017).	
37	<i>Measuring Chern numbers in Hofstadter strips</i> S. Muga, A. Dauphin, P. Massignan, L. Tarruell, M. Lewenstein, C. Lobo, and A. Celi SciPost Physics <b>3</b> , 012 (2017).	
36	(*) <i>Detection of Zak phases and topological invariants in a chiral quantum walk of twisted photons</i> F. Cardano, A. D'Errico, A. Dauphin, M. Maffei, B. Piccirillo, C. de Lisio, G. De Filippis, V. Cataudella, E. Santamato, L. Marrucci, M. Lewenstein, and P. Massignan Nature Comm. <b>8</b> , 15516 (2017).	
35	<i>Universality of the unitary Fermi gas: A few-body perspective</i> J. Levinsen, P. Massignan, S. Endo, and M. M. Parish J. Phys. B: At. Mol. Opt. Phys. <b>50</b> 072001 (2017).	[Topical review]
34	<i>Repulsive Fermi Polarons in a Resonant Mixture of Ultracold <math>6\text{Li}</math> Atoms</i> F. Scazza, G. Valtolina, P. Massignan, A. Recati, A. Amico, A. Burchianti, C. Fort, M. Inguscio, M. Zaccanti, and G. Roati Phys. Rev. Lett. <b>118</b> , 083602 (2017).	[Editor's suggestion]
33	<i>Vortex dynamics in coherently coupled Bose-Einstein condensates</i> L. Calderaro, A. L. Fetter, P. Massignan, and P. Wittek Phys. Rev. A <b>95</b> , 023605 (2017).	[Editor's suggestion]
32	<i>Lindblad Model of Quantum Brownian Motion</i> A. Lampo, S. H. Lim, J. Wehr, P. Massignan, and M. Lewenstein Phys. Rev. A <b>94</b> , 042123 (2016).	
31	<i>Topological bound states of a quantum walk with cold atoms</i> S. Muga, A. Celi, P. Massignan, J. K. Asbóth, M. Lewenstein, and C. Lobo Phys. Rev. A <b>94</b> , 023631 (2016).	
30	(*) <i>Magnetism in strongly interacting one-dimensional quantum mixtures</i> P. Massignan, J. Levinsen, and M. M. Parish Phys. Rev. Lett. <b>115</b> , 247202 (2015).	
29	<i>Crossover between few and many fermions in a harmonic trap</i> T. Grining, M. Tomza, M. Lesiuk, M. Przybytek, M. Musiał, R. Moszynski, M. Lewenstein, and P. Massignan Phys. Rev. A <b>92</b> , 061601(R) (2015) (2015).	
28	<i>Many interacting fermions in a one-dimensional harmonic trap: a quantum-chemical treatment</i> T. Grining, M. Tomza, M. Lesiuk, M. Przybytek, M. Musiał, P. Massignan, M. Lewenstein, and R. Moszynski New J. Phys. <b>17</b> , 115001 (2015).	
27	(*) <i>Strong-coupling Ansatz for the one-dimensional Fermi gas in a harmonic potential</i> J. Levinsen, P. Massignan, G. M. Bruun, and M. M. Parish Science Advances <b>1</b> , e1500197 (2015).	



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24	<i>Efimov trimers under strong confinement</i> J. Levinsen, P. Massignan, and M. M. Parish Phys. Rev. X <b>4</b> , 031020 (2014).
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22	(*) <i>Polarons, Dressed Molecules, and Itinerant Ferromagnetism in ultracold Fermi gases</i> P. Massignan, M. Zaccanti, and G. M. Bruun Rep. Prog. Phys. <b>77</b> , 034401 (2014). <span style="float: right;">[Long invited review paper]</span>
21	(*) <i>Synthetic gauge fields in synthetic dimensions</i> A. Celi, P. Massignan, J. Ruseckas, N. Goldman, I.B. Spielman, G. Juzeliunas, and M. Lewenstein Phys. Rev. Lett. <b>112</b> , 043001 (2014). <span style="float: right;">[Highlighted as an Editor's Choice in Science]</span>
20	<i>Itinerant Ferromagnetism in a polarized two-component Fermi gas</i> P. Massignan, Z. Yu, G. M. Bruun Phys. Rev. Lett. <b>110</b> , 230401 (2013).
19	<i>p-Wave Polaron</i> J. Levinsen, P. Massignan, F. Chevy, and C. Lobo Phys. Rev. Lett. <b>109</b> , 075302 (2012).
18	(*) <i>Metastability and Coherence of Repulsive Polarons in a Strongly Interacting Fermi Mixture</i> C. Kohstall, M. Zaccanti, M. Jag, A. Trenkwalder, P. Massignan, G. M. Bruun, F. Schreck, and R. Grimm Nature <b>485</b> , 615 (2012). <span style="float: right;">[Highlighted in Nature's News and Views]</span>
17	<i>Polarons and dressed molecules near narrow Feshbach resonances</i> P. Massignan Europhysics Letters <b>98</b> , 10012 (2012).
16	<i>Glass to superfluid transition in dirty bosons on a lattice</i> J. Stasinska, P. Massignan, M. Bishop, J. Wehr, A. Sanpera, and M. Lewenstein New J. Phys. <b>14</b> , 043043 (2012).
15	(*) <i>Repulsive polarons and itinerant ferromagnetism in strongly polarized Fermi gases</i> P. Massignan and G. M. Bruun, Eur. Phys. J. D <b>65</b> , 83 (2011), topical issue on "Cold Quantum Matter".
14	<i>Metastability in spin polarised Fermi gases and quasiparticle decays</i> K. Sadeghzadeh, G. Bruun, C. Lobo, P. Massignan, and A. Recati New J. Phys. <b>13</b> , 055011 (2011).
13	<i>Atomic wave packet dynamics in finite time-dependent optical lattices</i> T. Lauber, P. Massignan, G. Birkl, and A. Sanpera J. Phys. B <b>44</b> , 065301 (2011).
12	<i>Topological superfluids on a lattice with non-Abelian gauge fields</i> A. Kubasiak, P. Massignan, and M. Lewenstein EuroPhysics Letters <b>92</b> , 46004 (2010).
11	<i>Decay of polarons and molecules in a strongly polarized Fermi gas</i> G. M. Bruun and P. Massignan Phys. Rev. Lett. <b>105</b> , 020403 (2010).
10	<i>Creating p-wave superfluids and topological excitations in optical lattices</i> P. Massignan, A. Sanpera, and M. Lewenstein Rapid Communication in Phys. Rev. A <b>81</b> , 031607(R) (2010).

9	<i>Strongly interacting Bose gas: Nozières and Schmitt-Rink theory and beyond</i> A. Koetsier, P. Massignan, R.A. Duine, and H.T. C. Stoof Phys. Rev.A <b>79</b> , 063609 (2009).
8	<i>Spin polarons and molecules in strongly-interacting atomic Fermi gases</i> P. Massignan, G. M. Bruun, and H.T. C. Stoof Rapid Comm. in Phys. Rev.A <b>78</b> , 031602(R) (2008).
7	<i>Efimov states near a Feshbach resonance</i> P. Massignan and H.T. C. Stoof Rapid Comm. in Phys. Rev.A <b>78</b> , 030701(R) (2008).
6	<i>Twin peaks in rf spectra of Fermi gases at unitarity</i> P. Massignan, G. M. Bruun, and H.T. C. Stoof Rapid Comm. in Phys. Rev.A <b>77</b> , 031601(R) (2008).
5	<i>Energy-dependent effective interactions for dilute many-body systems</i> A. Collin, P. Massignan, and C. J. Pethick Phys. Rev.A <b>75</b> , 013615 (2007).
4	(*) <i>Three-dimensional strong localization of matter waves by scattering from atoms in a lattice with a confinement-induced resonance</i> P. Massignan and Y. Castin Phys. Rev.A <b>74</b> , 013616 (2006).
3	(*) <i>Viscous relaxation and collective oscillations in a trapped Fermi gas near the unitarity limit</i> P. Massignan, G. M. Bruun, and H. Smith Phys. Rev.A <b>71</b> , 033607 (2005).
2	<i>Static properties of positive ions in atomic Bose-Einstein condensates</i> P. Massignan, C. J. Pethick, and H. Smith Phys. Rev.A <b>71</b> , 023606 (2005).
1	<i>One-dimensional model for the dynamics and expansion of elongated Bose-Einstein condensates</i> P. Massignan and M. Modugno Phys. Rev.A <b>67</b> , 023614 (2003).

## PH.D. AND MASTER THESES

- *Positive ions, collective modes and Anderson localization in ultracold gases*  
Written at Niels Bohr Institute & NORDITA in Copenhagen. Supervisors: Christopher Pethick and Henrik Smith.
- *Modello unidimensionale per lo studio dell'espansione di condensati di Bose-Einstein da reticoli ottici*  
Developed at LENS in Florence. Supervisors: Michele Modugno and Massimo Inguscio.

## PUBLIC OUTREACH PUBLICATIONS

- *Quantum technologies and society*  
P. Massignan and A. Valencia  
ICFO and CatalunyaCaixa-Ignacio Cirac Program Chair.

## TEXTBOOKS

- *Quantum computing - problems and exercises*  
S. Torres, P. Bruna and P. Massignan  
IDP - UPC (2020).  
Awarded with the *Sant Jordi Award 2022* for the most downloaded new book in the UPC collection.

## CITATION METRICS (APRIL 2024)

SOURCE	CITATIONS	H-INDEX
Web of Science	3.617	30
Google Scholar (including citations to preprints)	5.348	35

Highly-cited papers (Essential Science Indicators - Web of Science): papers # 41, 40, 36, 34, 25, 23, 22, 21, 18  
Most cited on Google Scholar: papers # 21 (652 cits.), 18 (542 cits.), 22 (461 cits.).

## LANGUAGE SKILLS

<b>Italian</b>	mother tongue
<b>English, French, and Spanish</b>	fluent
<b>German</b>	advanced knowledge (five years of studies)
<b>Catalan and Portuguese</b>	advanced knowledge
<b>Danish and Dutch</b>	basic knowledge

## TEACHING EXPERIENCE

- Lecturer within the *Master in Quantum Science and Technology (UB-UPC-UAB-ICFO)* in Barcelona:
  - ◆ *Condensed Matter* (coordinator; 6 ECTS core Master course, 2022-23).
- Lecturer within the *Master degree in Engineering Physics at UPC* in Barcelona:
  - ◆ *Atomic and Molecular Physics* (coordinator; 4 ECTS Master course, 2020-23).
- Lecturer within the degrees of *Aeronautical and Telecom Engineering at UPC* in Barcelona:
  - ◆ *Quantum Information and Technology* (6 ECTS course for 4<sup>th</sup> year students, 2017-22).
  - ◆ *Fluid Mechanics* (7.5 ECTS course for 2<sup>nd</sup> year students, 2018-23).
  - ◆ *Classical Mechanics* (6 ECTS course for 1<sup>st</sup> year students, 2021).
- Lecturer within the *Theory Lectures at ICFO* in Barcelona, 2015; course on *Many-Body Methods for Ultracold Gases* for Master and Ph.D students.
- Lecturer within the *Joint Master in Photonics at UPC-UB-UAB-ICFO* in Barcelona, 2009: course on *Atom Optics* for Physics majors.
- Teaching Assistant at the *Niels Bohr Institutet* in Copenhagen, 2004-2005: courses on *Electromagnetism and Solid State Physics* for Physics majors.
- Teaching Assistant at the *Niels Bohr Institutet* in Copenhagen, 2004: supervision of lab experiments.
- Tutor at the dept. of Physics, *Università degli Studi (Milan)*, 1998-2001: supervision of lab experiments.

## (CO-)SUPERVISION OF BACHELOR, MASTER AND PH.D. STUDIES

- Ph.D. students (completed studies):
  - Nils Günther (2021)
  - Maria Maffei (2019)
  - Aniello Lampo (2018)
  - Samuel Muguel (2017)
  - Julia Stasinska (2012)
  - Anna Kubasiak (2011)
- Supervision of long-term visiting Ph.D students: Francesco Lorenzi (2023)
- Master students: Daniel Pérez (2023), Fredrik Akre (2023), Laura Olivella Eritja (2020), Joel Pérez Díaz (2019), Luca Calderaro (2015), Iason Tsiamis (2014).
- Tutor of Master studies: Victor Carballo Araruna (2024), Anna Sallés Rius (2022).
- Master internship: Matthieu Blanke (from *École Polytechnique-Palaiseau*, 2020; cancelled for COVID)
- Bachelor students (“*Treballs de Final de Grau*”): Bryan Leonardo Salto (2022), Claudia Martín Torres (2020), Alba Martín Muñoz (2018).

## NETWORK OF COLLABORATIONS

In the course of my research career, I had the pleasure to interact and work with a number of renowned scientists.

I have been participating in several collaborations with the experimental groups studying ultracold quantum gases in:

- Amsterdam (F. Schreck)
- Barcelona (L. Tarruell)
- Berlin (G. Valtolina)
- Florence (M. Inguscio, G. Modugno, M. Zaccanti, L. Fallani)
- Hamburg (K. Sengstock)
- Heidelberg (S. Jochim)
- Innsbruck (R. Grimm, F. Ferlaino)
- JQI-NIST (I. Spielman)
- Paris (D. Clément, C. Westbrook, A. Aspect [*Nobel prize in Physics 2022*])
- Trieste (F. Scazza)
- Urbana-Illinois (B. Gadway).

On the theoretical side, I am collaborating with physicists in:

- Aarhus (G. Bruun)
- Barcelona (M. Lewenstein and A. Sanpera)
- Beijing (Z. Yu)
- Berlin (A. Saenz)
- Birmingham (H. Price)
- Boulder (V. Gurarie)
- Bruxelles (N. Goldman)
- Budapest (J. Asbóth)
- Cambridge (A. Camacho-Guardian)
- Cologne (M. Rizzi)
- Copenhagen (C. Pethick, H. Smith)
- Darmstadt (G. Birkel)
- Genève (T. Giamarchi)
- Glasgow (F. Isaule)
- Luxembourg (A. Haller)
- Melbourne (J. Levinsen and M. Parish)
- Munich (R. Schmidt)
- Paris (Y. Castin and F. Chevy [ENS], L. Sanchez-Palencia [École Polytechnique])
- São Paulo (M. Caracanhas)
- Southampton (C. Lobo)
- Stanford (A. Fetter)
- Trento (A. Recati)
- Trieste (M. Capone)
- Tucson (J. Wehr)
- Urbana-Illinois (T. Hughes)
- Utrecht (H. Stoof)
- Vilnius (G. Juzeliunas)
- Warsaw (R. Moszynski).

Collaborations with experimental Photonics groups:

- Naples (L. Marrucci) [studying topological properties of quantum walks with twisted photons]

Collaboration with experimental Single-Molecule Bio-photonics groups:

- Barcelona (M. Garcia-Parajo) [investigating stochastic models of anomalous transport and self-organization]

Collaborations with experimental Exciton-Polariton groups:

- Paris (J. Bloch) and Lille (A. Amo) [studying topological properties of driven-dissipative exciton-polariton systems]