



Ikerbasque Research Professor

DPTO. DE FÍSICA TEÓRICA E HISTORIA DE LA CIENCIA
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- Born in Florence (Italy), on December 21st, 1967
- Italian citizenship

EMPLOYMENT

- [since 2010] **Research Professor**, Ikerbasque & Department of Theoretical Physics and History of Science, UPV/EHU, Bilbao, Spain.
- [2008-2010] **Researcher**, Department of Physics and Astronomy, University of Florence, Italy.
- [2005-2008] **Researcher**, Department of Applied Mathematics, University of Florence, Italy.
- [2000-2005] **Research Fellow**, Department of Physics, University of Florence, Italy.
- [2001] **Fellowship ESF BEC2000+** at the École Normale Supérieure of Paris, France.
- [1998-2000] **Post-Doc** at LENS, University of Florence, Italy.

EDUCATION

- [1998] **PhD in Physics**, University of Florence, Italy.
 Thesis: *The chiral phase transition in the Gross-Neveu model in 1+1 and 2+1 dimensions*
 (Advisor: Prof. R. Casalbuoni)
- [1993] **Degree (Laurea) in Physics** with full marks (110/110), University of Florence, Italy.
 Thesis: *Phase transitions in the Gross-Neveu model* (Supervisor: Prof. R. Casalbuoni)

AWARDS

- **Habilitation as Full Professor** in Italy (02/B2, Theoretical Physics of Matter, 2013).
- **APS Outstanding Referee** for the Physical Review and Physical Review Letters journals (2012).
- **Certificate of Recognition** for outstanding contribution towards **New Journal of Physics** peer review process (2014).
- **Distinguished Referee** of The European Physical Journal (2015).

RESEARCH INTERESTS

Ultracold atoms in optical lattices and disordered potentials; quantum simulations; phenomenology of Bose-Einstein condensation in trapped gases (coherence and interference properties of matter waves; vortices and superfluidity; properties of bose-bose and fermi-bose mixtures; transport properties, instabilities and dispersion management of condensates in optical lattices; parametrical instability and pattern formation; condensates in quasiperiodic and disordered potentials; quantum control; spin-orbit coupling).

Past activities: multiband electron transport, symmetrization postulate, quantum chaos, phase transitions in quantum field theory, chiral symmetry breaking, quark-gluon plasma.

MEMBERSHIPS & COLLABORATIONS

- Member of QuInST - Quantum Information, Science & Technology group, UPV/EHU, Bilbao, Spain (since 2010).
- Past member of the QDG group of Prof. M. Inguscio at LENS, University of Florence, Italy (1998-2010).
- Visiting scientist of the CNR-INFN BEC Center in Trento, Italy (1999-2010).
- During my PhD I have spent several periods as a visiting scientist at the Physics Department of the University of Geneva (Switzerland) for a collaboration with Prof. R. Gatto (1993-1997).

STUDENTS & FELLOWS

- D. Viedma Palomo, Master in Quantum Science and Technology, UPV/EHU (2019).
- S. Terrads Briansó, Master in Quantum Science and Technology, UPV/EHU (2018).
- E. Campillo Muñoz, Master in Quantum Science and Technology, UPV/EHU (2017).
- S. Martinez Garaot, post-doc fellow, UPV/EHU (2017-2018).
- A. Movilla, BA student, UPV/EHU (2016).
- X. Lopez Gonzalez, Master in Quantum Science and Technology, UPV/EHU (2013).
- A. Aldama Campino, Master in Quantum Science and Technology, UPV/EHU (2012).
- X. Lopez Gonzalez, BA student, UPV/EHU (2012).
- M. Moratti, PhD student, LENS, University of Florence (2010).
- U. Shrestha, post-doc at LENS, University of Florence (2009-2010).
- M. Larcher, diploma student, University of Trento (2009).
- G. Colzi, BA student, University of Florence (2009).
- J. Giacomelli, diploma student, University of Florence (2007).
- G. Barontini, BA student, University of Florence (2004).
- F. Nesi, diploma student, University of Florence (2003).
- X.-J. Liu, post-doc fellow, LENS (2002-2003).
- P. Massignan, diploma student, University of Milan (2002).
- F. Riboli, diploma student, University of Florence (2002).

TEACHING ACTIVITY

- Course on “*Superconductivity, Superfluids, and Condensates*”, Master in Quantum Science and Technology, UPV/EHU (2017, 2018)
- Course on the “*Theory of Bose-Einstein condensation in trapped gases*”, Master in Quantum Science and Technology, UPV/EHU, Bilbao (2011-2013, 2015-2017).
- Series of lectures on “*Desde Arquímedes hasta el LED: un recorrido por la física y su influencia en nuestra vida cotidiana*”, Aulas de la Experiencia de Bizkaia, Gipuzkoa y Alava, UPV/EHU (2015-2019).
- Course on “*Theory of Bose-Einstein condensates*”, Department of Physics, University of Florence (2009, 2010).

- Lectures on Quantum Statistics, *Solid State Physics*, in the course “Models for Electronic Devices”, Faculty of Engineering, University of Florence (2006-2008).
- Lectures on Error Analysis, Faculty of Engineering, University of Florence (2007).
- Tutorial on Analysis and Geometry, Faculty of Engineering, University of Florence (2005).
- Lectures on General Physics, Faculty of Agriculture, University of Florence (2002).

REFERRAL AND MANAGERIAL ACTIVITIES

- Secretary of the FFAF (Foro de Física de Átomo Fríos) of the Spanish Physics Society RSEF.
- National coordinator of the network Cold Atoms Spain (RED2018-102488-T).
- Referee for the following journals: Nature Physics, Physical Review Letters, Physical Review A, B and E, European Physical Journal D, Europhysics Letters, Journal of Physics A and B, New Journal of Physics, Physics Letters A, and others (~ 250 papers reviewed, see publons.com/a/1313367).
- Evaluator for the *French National Research Agency* (ANR, 2008, 2010), the *Austrian Science Fund* (FWF, since 2011), the *Agencia Nacional de Evaluación y Prospectiva* (ANEP, Spain, since 2014), the *Agenzia Nazionale per la Valutazione del sistema Universitario e della Ricerca* (ANVUR, Italy, since 2016), and the *European Research Council* (ERC, since 2016).
- Member of the steering committee for the Master program in Quantum Science and Technology, UPV/EHU (since 2013)
- Programme Committee Member of the CLEO/Europe-EQEC 2015 and 2017 conferences.

PUBLICATIONS & PREPRINTS

orcid.org/0000-0002-0532-1423

researcherid.com/rid/A-6218-2009 (h-index: **32**, > 5000 citations)

- [1] C. Fort and M. Modugno, *Self-evaporation dynamics of quantum droplets in a ^{41}K - ^{87}Rb mixture*, preprint arXiv:2012.10347.
- [2] D. Viedma and M. Modugno, *Effective self-similar expansion of a Bose-Einstein condensate: Free space versus confined geometries*, Phys. Rev. Research **2**, 033478 (2020).
- [3] A. Burchianti, C. D’Errico, L. Marconi, F. Minardi, C. Fort, and M. Modugno, *Effect of interactions in the interference pattern of Bose-Einstein condensates*, Phys. Rev. A **102**, 043314 (2020).
- [4] Da-Wei Luo, Michele Modugno, Mike Guidry, J. Q. You and Lian-Ao Wu, *Quantum simulation of electron Coulomb interactions*, Europhys. Lett. **130**, 10001 (2020).
- [5] G. Ferioli, G. Semeghini, S. Terradas-Briansó, L. Masi, M. Fattori, and M. Modugno, *Dynamical formation of quantum droplets in a ^{39}K mixture*, Phys. Rev. Research **2**, 013269 (2020).
- [6] Y. V. Kartashov, L. Torner, M. Modugno, E. Ya. Sherman, B.A. Malomed, and V. V. Konotop, *Multidimensional hybrid Bose-Einstein condensates stabilized by lower-dimensional spin-orbit coupling*, Phys. Rev. Research **2**, 013036 (2020).
- [7] A. Burchianti, C. D’Errico, M. Prevedelli, L. Salasnich, F. Ancilotto, M. Modugno, F. Minardi and C. Fort, *A Dual-Species Bose-Einstein Condensate with Attractive Interspecies Interactions*, Condens. Matter **5**, 21 (2020).
- [8] F. Minardi, F. Ancilotto, A. Burchianti, C. D’Errico, C. Fort, and M. Modugno, *Effective expression of the Lee-Huang-Yang energy functional for heteronuclear mixtures*, Phys. Rev. A. **100**, 063636 (2019).

- [9] C. D’Errico, A. Burchianti, M. Prevedelli, L. Salasnich, F. Ancilotto, M. Modugno, F. Minardi, and C. Fort, *Observation of Quantum Droplets in a Heteronuclear Bosonic Mixture*, Phys. Rev. Research **1**, 033155 (2019).
- [10] Y. V. Kartashov, V. V. Konotop, M. Modugno, E. Ya. Sherman, *Solitons in inhomogeneous gauge potentials: Integrable and nonintegrable dynamics*, Phys. Rev. Lett. **122**, 064101 (2019).
- [11] Sh. Mardonov, M. Modugno, E. Ya. Sherman, and B.A. Malomed, *Rabi-coupling driven motion of a soliton in a Bose-Einstein condensate*, Phys. Rev. A **99**, 013611 (2019).
- [12] A. Burchianti, C. D’Errico, S. Rosi, A. Simoni, M. Modugno, C. Fort, F. Minardi, *Dual-species Bose-Einstein condensate of ^{41}K and ^{87}Rb in a hybrid trap*, Phys. Rev. A **98**, 063616 (2018).
- [13] Sofía Martínez-Garaot, Giulio Pettini, and Michele Modugno, *Non-linear mixing of Bogoliubov modes in a bosonic Josephson junction*, Phys. Rev. A **98**, 043624 (2018).
- [14] Sh. Mardonov, V. V. Konotop, B. A. Malomed, M. Modugno, and E. Ya. Sherman, *Spin-orbit coupled soliton in a random potential*, Phys. Rev. A **98**, 023604 (2018).
- [15] G. Semeghini, G. Ferioli, L. Masi, C. Mazzinghi, L. Wolswijk, F. Minardi, M. Modugno, G. Modugno, M. Inguscio, and M. Fattori, *Self-bound quantum droplets in atomic mixtures*, Phys. Rev. Lett. **120**, 235301 (2018).
- [16] M. Modugno, G. Pagnini, M. A. Valle Basagoiti, *Effective self-similar expansion for the Gross-Pitaevskii equation*, Phys. Rev. A **97**, 043604 (2018).
- [17] D.-W. Luo, P. V. Pyshkin, M. Modugno, M. Guidry, J. Q. You, and L.-A. Wu, *Ion-based quantum simulation of many-body electron-electron Coulomb interaction*, Quantum Inf. Process **17**, 238 (2018).
- [18] M. Modugno and G. Pettini, *Correspondence between a shaken honeycomb lattice and the Haldane model*, Phys. Rev. A **96**, 053603 (2017).
- [19] M. Modugno, E. Ya. Sherman, and V. V. Konotop, *Macroscopic random Paschen-Back effect in ultracold atomic gases*, Phys. Rev. A **95**, 063620 (2017).
- [20] A. Burchianti, C. Fort, and M. Modugno, *Josephson plasma oscillations and the Gross-Pitaevskii equation: Bogoliubov approach vs two-mode model*, Phys. Rev. A **95**, 023627 (2017).
- [21] M. Modugno, J. Ibañez-Azpiroz, and G. Pettini, *Tight-binding models for ultracold atoms in optical lattices: general formulation and applications*, Sci. China-Phys. Mech. Astron. **59**, 660001 (2016).
- [22] J. Ibañez-Azpiroz, A. Eiguren, A. Bergara, G. Pettini, and M. Modugno, *Ab initio analysis of the topological phase diagram of the Haldane model*, Phys. Rev. B **92**, 195132 (2015).
- [23] Sh. Mardonov, M. Modugno, and E. Ya. Sherman, *Dynamics of spin-orbit coupled Bose-Einstein condensate in a random potential*, Phys. Rev. Lett. **115**, 180402 (2015).
- [24] N. Fabbri, C. Fort, M. Modugno, S. Rosi, M. Inguscio, *Energy and momentum transfer in one-dimensional trapped gases by stimulated light scattering*, New J. Phys. **17**, 063012 (2015).
- [25] Sh. Mardonov, M. Modugno, and E. Ya. Sherman, *Dynamics of a macroscopic spin qubit in spin-orbit coupled Bose-Einstein condensates*, J. Phys. B **48**, 115302 (2015).
- [26] W. Ganczarek, M. Modugno, G. Pettini, and J. Zakrzewski, *Wannier functions for one-dimensional s-p optical superlattices*, Phys. Rev. A **90**, 033621 (2014).
- [27] J. Ibañez-Azpiroz, A. Eiguren, A. Bergara, G. Pettini, and M. Modugno, *Breakdown of the Peierls substitution for the Haldane model with ultracold atoms*, Phys. Rev. A **90**, 033609 (2014).
- [28] Sh. Mardonov, M. Palmero, M. Modugno, E. Ya. Sherman and J. G. Muga, *Interference of spin-orbit coupled Bose-Einstein condensates*, Europhys. Lett. **106**, 60004 (2014).
- [29] Z.-M. Wang, L.-A. Wu, M. Modugno, M. S. Byrd, T. Yu, and J. Q. You, *Fault-tolerant breathing pattern in optical lattices as a dynamical quantum memory*, Phys. Rev. A **89**, 042326 (2014).

- [30] X. Lopez-Gonzalez, J. Sisti, G. Pettini, and M. Modugno, *Effective Dirac equation for ultracold atoms in optical lattices: role of the localization properties of the Wannier functions*, Phys. Rev. A **89**, 033608 (2014).
- [31] S. Martínez-Garaot, E. Torrontegui, X. Chen, M. Modugno, D. Guéry-Odelin, S.-Y. Tseng, and J. G. Muga *Vibrational mode multiplexing of ultracold atoms*, Phys. Rev. Lett. **111**, 213001 (2013).
- [32] Z.-M. Wang, L.-A. Wu, M. Modugno, W. Yao, and B. Shao, *Fault-Tolerant Almost Exact State Transmission*, Sci. Rep. **3**, 3128 (2013).
- [33] J. Ibañez-Azpiroz, A. Eiguren, A. Bergara, G. Pettini, and M. Modugno, *Self-consistent tight-binding description of Dirac points moving and merging in two dimensional optical lattices*, Phys. Rev. A **88**, 033631 (2013).
- [34] M. Palmero, E. Torrontegui, J. G. Muga, and M. Modugno, *Detecting quantum backflow by the density of a Bose-Einstein condensate*, Phys. Rev. A **87**, 053618 (2013).
- [35] E. Torrontegui, S. Martínez-Garaot, M. Modugno, Xi Chen, J. G. Muga, *Engineering fast and stable splitting of matter waves*, Phys. Rev. A **87**, 033630 (2013).
- [36] J. Ibañez-Azpiroz, A. Eiguren, A. Bergara, G. Pettini, and M. Modugno, *Tight binding models for ultracold atoms in honeycomb optical lattices*, Phys. Rev. A **87**, 011602(R) (2013).
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- [38] M. Moratti and M. Modugno, *Localization from quantum interference in one-dimensional disordered potentials*, Eur. Phys. J. D **66**, 138 (2012).
- [39] M. Modugno and G. Pettini, *Maximally localized Wannier functions for ultracold atoms in one-dimensional double-well periodic potentials*, New J. Phys. **14**, 055004 (2012).
- [40] E. Torrontegui, Xi Chen, M. Modugno, A. Ruschhaupt, D. Guéry-Odelin and J. G. Muga, *Fast transitionless expansions of cold atoms in optical Gaussian beam traps*, Phys. Rev. A **85**, 033605 (2012).
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- [42] I. L. Egusquiza, M. Modugno, and M. A. Valle Basagoiti, *Multiple-scale approach for the expansion scaling of superfluid quantum gases*, Phys. Rev. A **84**, 043629 (2011).
- [43] E. Lucioni, B. Deissler, L. Tanzi, G. Roati, M. Modugno, M. Zaccanti, M. Larcher, F. Dalfovo, M. Inguscio, and G. Modugno, *Observation of subdiffusion of a disordered interacting system*, Phys. Rev. Lett. **106**, 230403 (2011).
- [44] G. Pettini and M. Modugno, *Anomalous Bloch oscillations in one dimensional parity-breaking periodic potentials*, Phys. Rev. A **83**, 013619 (2011).
- [45] M. Larcher, M. Modugno, F. Dalfovo, *Localization in momentum space of ultracold atoms in incommensurate lattices*, Phys. Rev. A **83**, 013624 (2011).
- [46] B. Deissler, E. Lucioni, M. Modugno, G. Roati, L. Tanzi, M. Zaccanti, M. Inguscio, G. Modugno, *Correlation function of weakly interacting bosons in a disordered lattice*, New J. Phys. **13**, 023020 (2011).
- [47] G. M. Falco, A. A. Fedorenko, J. Giacomelli, M. Modugno, *Density of states in an optical speckle potential*, Phys. Rev. A **82**, 053405 (2010).
- [48] U. Shrestha and M. Modugno, *Correlated bosons in a one-dimensional optical lattice: Effects of the trapping potential and of quasiperiodic disorder*, Phys. Rev. A **82**, 033604 (2010).
- [49] S. Pilati, S. Giorgini, M. Modugno and N. Prokof'ev, *Dilute Bose gas with correlated disorder: A Path Integral Monte Carlo study*, New J. Phys. **12**, 073003 (2010).

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- [51] M. Larcher, F. Dalfovo, M. Modugno, *Effects of interaction on the diffusion of atomic matter waves in one-dimensional quasi-periodic potentials*, Phys. Rev. A **80**, 053606 (2009).
- [52] G. Barontini and M. Modugno, *Instabilities of a matter wave in a matter grating*, Phys. Rev. A **80**, 063613 (2009).
- [53] M. Modugno, *Exponential localization in one-dimensional quasiperiodic optical lattices*, New J. Phys. **11** 033023 (2009).
- [54] N. Fabbri, D. Clément, L. Fallani, C. Fort, M. Modugno, K. M. R. van der Stam, M. Inguscio, *Excitations of Bose-Einstein condensates in a one-dimensional periodic potential*, Phys. Rev. A **79**, 043623 (2009).
- [55] G. Roati, C. D’Errico, L. Fallani, M. Fattori, C. Fort, M. Zaccanti, G. Modugno, M. Modugno, and M. Inguscio, *Anderson localization of a non-interacting Bose-Einstein condensate*, Nature **453**, 895 (2008).
- [56] M. Fattori, C. D’Errico, G. Roati, M. Zaccanti, M. Jona-Lasinio, M. Modugno, M. Inguscio and G. Modugno, *Atom interferometry with a weakly-interacting Bose Einstein condensate*, Phys. Rev. Lett. **100**, 080405 (2008).
- [57] G. Barontini and M. Modugno, *Dynamical instability and dispersion management of an attractive condensate in an optical lattice*, Phys. Rev. A **76**, 041601(R) (2007).
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- [60] M. Modugno, C. Tozzo, and F. Dalfovo, *Detecting phonons and persistent currents in toroidal Bose-Einstein condensates by means of pattern formation*, Phys. Rev. A **74**, 061601(R) (2006).
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- [64] O. Morandi and M. Modugno, *A multi-band envelope function model for quantum transport in a tunneling diode*, Phys. Rev. B **71**, 235331 (2005).
- [65] J. E. Lye, L. Fallani, M. Modugno, D. Wiersma, C. Fort, and M. Inguscio, *A Bose-Einstein condensate in a random potential*, Phys. Rev. Lett. **95**, 070401 (2005).
- [66] L. De Sarlo, L. Fallani, C. Fort, J. E. Lye, M. Modugno, R. Saers, and M. Inguscio, *Unstable regimes for a condensate in an optical lattice*, Phys. Rev. A **72**, 013603 (2005).
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- [71] X.-J. Liu, M. Modugno, and H. Hu, *Finite temperature effects on the collapse of trapped Bose-Fermi mixtures*, Phys. Rev. A **68**, 053605 (2003).
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- [97] A. Barducci, R. Casalbuoni, M. Modugno, G. Pettini, and R. Gatto, *Thermodynamics of the massive Gross-Neveu model*, Phys. Rev. D **51**, 3042 (1995).

BOOKS & CONFERENCE PROCEEDINGS

- [1] Sh. Mardonov, M. Modugno, and E. Ya. Sherman, *Effects of Anomalous Velocity in Spin-orbit Coupled Systems*, in Spin Orbitronics and Topological Properties of Nanostructures (edited by V. Dugaev, I. Tralle, A. Wal, J Barnaś), 178-199 (World Scientific, 2018).
- [2] AA. VV., *Physics of Quantum Fluids: New Trends and Hot Topics in Atomic and Polariton Condensates*, A. Bramati and M. Modugno eds. (Springer, 2013).
- [3] E. Torrontegui *et al.*, *Shortcuts to adiabaticity*, in P. Berman, E. Arimondo, C. Lin, editors: Advances in Atomic, Molecular, and Optical Physics **62**, 117-169 (Academic Press, 2013).
- [4] G. Modugno, C. D'Errico, B. Deissler, E. Lucioni, M. Modugno, M. Moratti, G. Roati, L. Tanzi, M. Zaccanti, M. Inguscio, *Exploring disorder physics with Bose-Einstein condensates* Proceedings of the 20th International Conference on laser Spectroscopy, W. Ertmer and R. Scholz eds. (Logos Verlag, Berlin, 2011).
- [5] G. Roati, B. Deissler, C. D'Errico, L. Fallani, M. Fattori, C. Fort, M. Jona-Lasinio, M. Zaccanti, M. Modugno, G. Modugno, M. Inguscio, *An ideal Bose-Einstein condensate: From Anderson localization to precision measurements*, Physica E **42**, 425 (2010).
- [6] G. Roati, C. D'Errico, L. Fallani, M. Fattori, C. Fort, M. Zaccanti G. Modugno, M. Modugno, M. Inguscio, *Anderson localization of a non-interacting condensate*, in Proceedings of the XXI International Conference on Atomic Physics, R. Cotè, P. L. Gould, M. Rozman and W. W. Smith eds. (World Scientific, Singapore, 2009).
- [7] M. Fattori, B. Deissler, C. D'Errico, M. Jona-Lasinio, M. Modugno, G. Roati, L. Santos, A. Simoni, M. Zaccanti, M. Inguscio, and G. Modugno, *Atom interferometry with a weakly interacting BEC*, in Proceedings of the XXI International Conference on Atomic Physics, R. Cotè, P. L. Gould, M. Rozman and W. W. Smith eds. (World Scientific, Singapore, 2009).

- [8] G. Borgioli, O. Morandi, G. Frosali and M. Modugno, *Different approaches for multi-band transport in semiconductors*, Proceedings of the RTKTA Conference, Ukrainian Math. J. **57**, 742 (2005).
- [9] C. Fort, G. Modugno, F. S. Cataliotti, J. Catani, E. De Mirandes, L. Fallani, F. Ferlaino, M. Modugno, H. Ott, G. Roati, and M. Inguscio, *Quantum Degenerate Bosons and Fermions in a 1d Optical Lattice*, Proceedings of the XVI International Conference on “Laser Spectroscopy”, edited by P. Hannaford *et al.*, pp. 129-136 (World Scientific, Singapore, 2004).
- [10] M. Modugno, C. Fort, F. Minardi, M. Inguscio, and F. Dalfovo, *Experiments with two colliding Bose-Einstein condensates in an elongated magneto-static trap*, in *Trapped Particles and Fundamental Physics*, S. N. Atutov et al. (eds.) (Kluwer Academic Publishers, The Netherlands, 2002).
- [11] F. Minardi, C. Fort, P. Maddaloni, M. Modugno, M. Inguscio, *Time-domain Ramsey interferometry with Bose-Einstein condensates*, in “Atom optics and Interferometrie atomiques”, Comptes Rendus de l’Académie des Sciences Paris, t.2, Séries IV, N.4 2001, eds. A. Aspect, J. Dalibard. (Elsevier, 2001).
- [12] C. Fort, F. Minardi, M. Modugno, and M. Inguscio, *Experiments with rubidium Bose-Einstein condensates in a radio-frequency field: interaction, collisions and interference*, Proceedings of the International School of Physics “Enrico Fermi” Course CXLVI on “Recent advances in metrology and fundamental constant” edited by T.J. Quinn, S. Leschiutta and P. Tavella (IOS Press, Amsterdam, 2001).
- [13] M. Modugno, F. Dalfovo, C. Fort, M. Inguscio, P. Maddaloni, and F. Minardi, *Dynamics of two interacting Bose condensates in a magnetostatic trap*, in “Atomic Physics 17”, proceedings of the XVII International Conference ICAP 2000, Vol. 551 p.451-460, editors E. Arimondo, P. De Natale, M. Inguscio (AIP Melville, N.Y., 2001).
- [14] G. Modugno, D. Mazzotti, M. Modugno, N. Picqué, G. Giusfredi, P. C. Castor, P. De Natale, and M. Inguscio, *Spectroscopic test of the symmetrization postulate and of the statistics for nuclei in molecules*, in “Spin-Statistics Connection and Commutation Relations: Experimental Tests and Theoretical Implications”, Proceedings of AIP Conference, Anacapri, Capri Island, Italy, May 31-June 3, 2000, ed. by R. C. Hilborn and G. M. Tino (AIP Melville, N.Y. 2000).
- [15] L. Casetti, R. Gatto, and M. Modugno, *Chaos in effective classical and quantum dynamics of nonlinear oscillators*, in *Proceedings of the International Conference “Disorder and Chaos” in honour of Giovanni Paladin*, Roma, Italy, 22-24 September 1997, A. Vulpiani, M. Serva, G. Parisi, L. Peliti, and L. Pietronero, eds., Journal de Physique IV **8**, Pr6 - 203 (1998).
- [16] A. Barducci, M. Modugno and G. Pettini, *The massive Gross-Neveu model at finite temperature and density*, Proceedings of the Conference QCD ’94 (Montpellier), Nucl. Phys. B **39**, 459 (1995).

TALKS & CONFERENCES

- Invited talk at the “Cold Atom Workshop 2020” (online), October 2020.
- Seminar at the University of Trento (UB), Italy, February 2020.
- Seminar at the University of Barcelona (UB), Barcelona, November 2019.
- Talk in the Conference series “Physics and chill” organized by Zimatek, Faculty of Science and Technology, University of the Basque Country UPV/EHU, 6 November 2019.
- BEC 2019 Conference “Frontiers in Quantum Gases”, Sant Feliu de Guixols (Spain), 7-13 September 2019.
- Invited talk at the Conference “Dynamics and interactions in quantum gases”, Institut Menorquí d’Estudis, Maó (Spain), 4-6 September 2019.
- “Cold Atom Workshop”, University of the Basque Country UPV/EHU, Bilbao, 16-17 November 2018 (organizer).

- 26th International Conference on Atomic Physics, ICAP 2018, Barcelona, 22-27 July 2018.
- Seminar at the Institute for Quantum Optics and Quantum Information (IQOQI), Innsbruck, June 2018.
- Seminar at the University of Barcelona (UB), Barcelona, March 2018.
- Talk at the International Workshop on “Quantum Simulation & Computation”, University of the Basque Country UPV/EHU, Bilbao, 12 - 16 February 2018.
- International Workshop on “Quantum Information, Quantum Control, and Quantum Devices”, University of the Basque Country UPV/EHU, Bilbao (Spain) 28-29 September 2017 (organizer).
- BEC 2017 Conference “Frontiers in Quantum Gases”, Sant Feliu de Guixols (Spain), September 2-8 2017.
- Talk at the GGI Conference “Quantum science approaches to strongly correlated systems: from ultracold atoms to high-energy and condensed matter physics”, Florence (Italy), 29 May - 2 June 2017.
- Talk at the “42nd Conference of the Middle European Cooperation in Statistical Physics” (MECO42) ENS Lyon (France), 8-10 February 2017.
- Invited talk at the Workshop SEMODAY2016, Dipartimento di Matematica “U. Dini”, University of Florence (Italy), 18 November 2016.
- Seminar at the School of Physics and Astronomy, University of Birmingham (UK), 6 May 2016.
- 3rd International Workshop on “Quantum Information, Quantum Control, and Quantum Devices”, Bilbao, Bizkaia Campus UPV/EHU (Leioa) 14-17 September 2015 (organizer).
- Talk at the “International Workshop on Cold Gases in Quantum Information” (CGQI), Bilbao (Spain), 30 June-1 July 2015.
- ICE-2 workshop, Bilbao (Spain), 1-3 June 2015 (Organizing Committee).
- Talk at the workshop on “Complex Quantum System Dynamics and New Trends”, Cartagena (Spain), 25-29 May 2015.
- Seminar at BCAM Bilbao (Spain), 10 February 2015.
- Invited talk at the workshop “Quantum Days in Bilbao”, BCAM Bilbao (Spain), 15-16 July 2014.
- Seminar at the Stony Brook University, NY (USA), 3 September 2013.
- Talk at the AMMCS-2013 Conference, Wilfrid Laurier University - Waterloo, ON (Canada), 26-30 August, 2013.
- Seminar at Dipartimento di Fisica e Astronomia, University of Florence (Italy), 10 April 2013.
- Organizer of the LENS-QUINST Workshop on “Cold atoms and Quantum Simulations”, Department of Theoretical Physics and History of Science, UPV/EHU Bilbao (Spain), 3-4 December 2012.
- Talk at the workshop on “Quantum simulations”, UPV/EHU Bilbao (Spain), 22-25 October 2012.
- Invited talk at the “Conference in honor of Roberto Casalbuoni 70th Birthday”, Firenze (Italy), September 21, 2012.
- Workshop on “Shortcuts To Adiabaticity (STA)”, Bilbao (Spain), July 16-20, 2012.
- BEC 2011 Conference “Frontiers in Quantum Gases”, Sant Feliu de Guixols (Spain), September 10-16 2011.
- Invited to the Workshop on “Quantum transport in dilute gases”, Benasque (Spain), July 2011.
- Workshop on “Quantum Simulations”, Benasque (Spain), Feb 28th - Mar 5th, 2011

- Seminar at the Department of Theoretical Physics, UPV/EHU, Bilbao (Spain), February 3, 2011.
- “Frontiers in Atomic Physics”, Florence 9-10 April 2010.
- LENS Workshop on “Quantum Gases in Disordered Lattices”, University of Florence, 23-30 March 2010 (organizer).
- Seminar at the Ecole Normale Supérieure, Lyon (France), November 26, 2009.
- Invited talk at PEPS meeting on “Quantum gases and condensed matter”, Grenoble (France), November 23, 2009.
- Talk at JPN-ITA Workshop, LENS, Florence (Italy), September 13-14, 2009.
- BEC 2009 Conference “Frontiers in Quantum Gases”, Sant Feliu de Guixols (Spain), 5-11 Sept. 2009.
- Seminar at the University of the Basque Country, Bilbao (Spain), July 20, 2009.
- Seminar at Dipartimento di Fisica, Università di Padova, May 5, 2009.
- Invited talk at the Workshop “Anderson Localization in Nonlinear and Many-Body Systems”, Max Planck Institute for the Physics of Complex Systems, Dresden (Germany), 16-20 March 2009.
- Invited Talk at the workshop “Towards the observation of Hawking radiation in condensed matter systems”, Valencia (Spain), February 1-7, 2009.
- Seminar at USP São Carlos (Brasil), January 22, 2009.
- Invited talk at the workshop “75 anos da Universidade de São Paulo”, USP São Carlos (Brasil), January 15, 2009.
- “50 Years of Anderson Localization” Symposium, Institut Henri Poincaré, Paris, December 4-5, 2008.
- Talk at the 422nd WE-Heraeus Seminar, “Quo vadis BEC”, Bad Honnef (Germany) October 29 - 31, 2008.
- Seminar at the BEC-INFN Center - Trento (Italy), 3 October 2008.
- Talk at the International Laser Physics Workshop (LPHYS’08), Norwegian University of Science and Technology, Trondheim (Norway), 30 June - 4 July 2008.
- Workshop “Bosons and Fermions in optical lattices”, LENS, Florence (Italy), 28 September 2007.
- Talk on *BEC theory in Florence*, ICFO, Barcelona (Spain), 4 December 2007.
- BEC 2007 Conference “Frontiers in Quantum Gases”, Sant Feliu de Guixols (Spain), 15-20 September 2007.
- Joint Meeting Innsbruck-Firenze on “Ultracold Atomic Mixtures and Molecular States”, Innsbruck, 8-9 June 2007.
- Workshop on “Disorder in Quantum Gases”, Florence, 14-15 May 2007.
- ICREA Workshop on “Disorder in Cold Atoms”, Universitat Autònoma de Barcelona, 24-26 January 2007.
- Invited talk at “XI National Workshop of Statistical Physics and Complex Systems”, Parma (Italy), 21-23 June 2006.
- Talk at the “BEC Internal Meeting”, CRS CNR-INFN BEC, Trento (Italy), 2-3 May 2006.
- Third International Workshop on “Theory of Quantum Gases and Quantum Coherence”, Cortona (Italy) 29 October - 2 November 2005.
- Workshop on “Ultracold Fermi Gases”, Levico (Italy), 4-6 March 2004.

- “Workshop on the Theory of Quantum Gases and Quantum Coherence”, Levico (Italy), 12-14 June 2003.
- Invited talk at the “Inauguration Meeting & Celebration of Lev Pitaevskii’s 70th Birthday” BEC-INFM Center - Trento (Italy), 14-15 March 2003.
- Talk at the BEC-INFM Center - Trento (Italy), 3 March 2003.
- Invited talk at the Workshop “Vortices in Josephson Junctions and Nanostructures”, Acquafredda di Maratea (Italy), 20-25 September 2002.
- BEC Summer Programme ECT* - Trento (Italy), 15-26 July 2002.
- Workshop “Recent developments in the physics of cold atomic gases”, Trento (Italy), 15-18 July 2002.
- Benasque Meeting on “Physics of Ultracold Dilute Atomic Gases”, Benasque (Spain), 9-28 June 2002.
- Invited talk at the VI SIMAI Conference, Chia Laguna (Italy), 27-31 May 2002.
- ESF Conference: “Bose-Einstein Condensation”, Sant Feliu de Guixols (Spain), 15-20 September 2001.
- Seminar at the École Normale Supérieure, Laboratoire Kastler Brossel, Paris (France), 23 February 2001.
- Talk at CLEO/Europe-IQEC 2000, Nice (France), 10-15 September 2000.
- Workshop on “Rotating Bose-Einstein Condensates”, Trento (Italy), 11-13 June 2000.
- XVII International Conference on Atomic Physics, “ICAP 2000”, Firenze (Italy), 4-9 June 2000.
- Talk at the CECAM Workshop “Dynamics of attractive Bose condensates” Lione (France), 29-31 May 2000.
- “XIX Workshop of Theoretical Physics and Condensed Matter”, Fai della Paganella (Italy), 26-29 March, 2000.
- ESF Conference: “Bose-Einstein Condensation in Atomic Vapours”, Sant Feliu de Guixols (Spain), 11-16 September 1999.
- International School of Physics E. Fermi: “Bose-Einstein condensation in atomic gases”, Varenna (Italy), 7-17 July 1998.
- “Past and Future”: Theoretical Physics Conference in Honour of Raoul Gatto, Geneva (Switzerland), 17 January 1997.
- Talk at the “International Workshop on Disoriented Chiral Condensates”, ETC* Trento (Italy), 21-25 October 1996.
- “National School of Theoretical Physics”, Parma (Italy), 2-13 September 1996.
- “Quark Matter ’95”, Monterey (California, U.S.A.), January 1995.
- Talk at the ESF Conference “Complex Systems in Subatomic Physics: Thermodynamics of Quarks and Hadrons”, Seeheim (Germany), 19-25 September 1994.

GRANTS AND PROJECTS

- Red Tematica *COLD ATOM PHYSICS SPAIN*, (PI: Michele Modugno), 15k € (RED2018-102488-T, MCIU, Spain, 24 months)
- PROYECTOS DE I+D DE GENERACIÓN DE CONOCIMIENTO 2018, *Physics for quantum technologies* (PI: G Muga, J. Siewert), 199k € (PGC2018-101355-B-I00, MCIU/FEDER, Spain/UE , 36 months)
- Basque Government Grant *Quantum information, science, and technology*, (PI: G. Muga) 796k € (IT986-16, 2016-2021)
- Proyectos EXCELENCIA 2015, *Quantum matter: from principles to applications* (PI: G Muga, M. Modugno), 196k € (FIS2015-67161-P, MINECO/FEDER, Spain/UE , 36 months)
- Basque Government Grant *Quantum information, science, and technology*, (PI: G. Muga) 562k € (IT472-10, 2010-2015)
- Proyecto de Investigación Fundamental 2012 *Cuanticidad, control cuantico y apparatus* (PI: L. Wu), 40k € (FIS2012-36673-C03-03, MINECO Spain, 36 months)
- Ikerbasque Startup Grant, (PI: M. Modugno) 19k € (IKERBASQUE, 2011-2013)
- ERC Advanced Grant *Disorder physics with ultracold quantum gases* (PI: M. Inguscio), 2.5M € (ERC-2009-AdG 247371-DISQUA, 2010-2014)
- QuDEGPM *Quantum degenerate gases for precision measurements* (PI: H.-C. Naegerl, local PI: G. Modugno), 100k € (ESF-EuroQUASAR, 2009-2011)
- PRIN 2007 *Ultracold Atoms and Novel Quantum Phases* (PI: M. Inguscio), 500k € (MIUR, 2008-2010)
- Euroquam DQS *Quantum Simulation using Cold Atoms in Optical Lattices* PI: C. J. Foot, local PI: C. Fort) 33k €/year for the Florence group (ESF-CNR, 2007-2009)
- SCALA - *Scalable quantum computing with atoms* (PI: P.Zoller) 170k € (EU-FP7, 2007-2009)
- Azione Integrata Italia-Spagna *Experimental and Theoretical study of ultracold Bose-Fermi Mixtures in disordered systems* (PI: M. Inguscio, A. Sanpera) 10k € (MIUR, 2006-2007)
- PRIN 2005 *Gas di Fermi ultrafreddi e reticoli ottici* (PI: S. Stringari), 155k € (MIUR, 2006-2007)
- PRIN 2003 *Interazione bosone-fermione e superfluidità* (PI: M. Inguscio), 229k € (MIUR, 2004-2005)
- PRIN 2001 *Coerenza in gas degeneri intrappolati* (PI: M. Inguscio), 272k € (MIUR, 2002-2003)