

*Curriculum Vitae of*  
**MASSIMO INGUSCIO**

## **Personal data**

Born in Lecce (Italy) on 26<sup>th</sup> January 1950.  
Married, 3 children. Italian citizenship.

## **Education**

1976            PhD in Physics (Perfezionamento) “cum laude” from the Scuola Normale Superiore, Pisa.  
1972            Degree in Physics (Laurea) “cum laude” from the University of Pisa.

## **Academic positions**

1986 – now    Full Professor at University of Florence (90-now) and University of Napoli (86-90)  
                  (Structure of Matter, Atomic Physics, Optics and Photonics).  
1980 – 1986    Associated Professor at University of Pisa.  
1977 – 1980    Assistant Professor at University of Pisa.  
1976 – 1977    Assistant Professor at University of Lecce.  
1973 – 1976    Postdoctoral scholar at University of Pisa.

## **Management activity** (selection)

2016 – now    President of the Italian National Research Council (CNR).  
2014 – 2016    President of the Italian National Institute for Metrological Research (INRIM).  
2014 – now    International Committee for Weights and Measure (CIPM) – Member;  
                  Consultative Committee for Length (CCL) – President.  
2009 – 2014    Director of Departments of the Italian National Research Council (CNR):  
                  Director of CNR Department of Materials and Devices (DMD, 2009-2012)  
                  Director of CNR Department of Physics and Technologies of Matter (DSFTM, 2012-2014).  
2004 – 2006    Member of the Fundamental Physics Advisory Group of the European Space Agency (ESA).  
1998 – 2004    Director of the European Laboratory for Nonlinear Spectroscopy (LENS), Florence.  
1992 – 1998    Director of INFN (National Institute for Physics of Matter) – Florence Section.  
1992 – 1998    Member of the Board of the Quantum Electronics and Optics Division of EPS.  
1987 – 1992    Member of the Board of the European Group of Atomic Spectroscopy of EPS.  
1984 – 1987    Coordinator of the Italian Group of Atomic and Molecular Physics.

## **International scientific prizes** (selection)

2014            “Herbert Walther” Award of the Deutsche Physikalische Gesellschaft (DPG) and the Optical  
                  Society (OSA).  
2010            International Prize “Tomassoni” for physics and scientific medal (Fondation Caterina Tomassoni e  
                  Felice Pietro Chisesi), Sapienza University, Roma.  
2005            Grand Prix Scientifique de l’Academie des Sciences de l’Institut de France (Fondation Simone e  
                  Cino Del Duca), Paris, France.  
2004            “Enrico Fermi” Prize of the Italian Physical Society.  
2004            Humboldt Research Award.

## **Fellowship of international societies and academies** (selection)

2015 – now	Member of Accademia delle Scienze, Torino ( <i>socio nazionale</i> ).
2012 – now	Member of Academia Europaea.
2012 – now	Member of Accademia Pontaniana, Napoli.
2008 – now	Member of Accademia Nazionale dei Lincei, Roma ( <i>socio corrispondente</i> ).
2008 – now	Fellow of European Optical Society (EOS).
2006 – now	Fellow of American Physical Society (APS).
2005 – now	Member of Istituto Lombardo (Accademia di Scienze e Lettere), Milano.
2002 – now	Fellow of Optical Society of America (OSA).

## **Research experiences in foreign institutions** (selection)

2005	Humboldt Fellow, University of Munich, Max Planck Institut für Quantenoptik (MPQ) (with Nobel Prize winner T. W. Haensch).
2004	Visiting Scientist at the Institut d'Optique, Orsay.
1999	Visiting Scientist at the Joint Institute for Laboratory Astrophysics (JILA) - NIST, Boulder, Colorado (with Nobel Prize winner E. A. Cornell).
1993	Visiting Scientist at the “Laboratoire de Spectroscopie Hertzienne” of the Ecole Normale Supérieure (ENS), Paris, France.
1986	Visiting Professor at the “Université de Provence”, Marseille, France.
1982–1983	Fullbright Visiting Scientist and NATO Senior Fellow at the National Bureau of Standards (NBS), Boulder, Colorado.

## **Short summary of scientific activity**

M. I. has a long-standing experience of experimental research in: atomic, molecular and optical physics; quantum optics; light-matter interaction; spectroscopy and metrology; laser cooling; quantum simulation with ultracold quantum gases; development of spectroscopic and metrological instrumentation for physics and chemistry.

His most important achievements include: experimental tests of Quantum Electro-dynamics theory of the helium fine structure (for the high-precision determination of the fine structure constant) and of symmetry properties of molecules; first Italian Bose-Einstein condensation (BEC) with Rubidium atoms; invention of the sympathetic cooling technique with different atomic species; first Bose-Einstein condensation of Potassium atoms ( $^{41}\text{K}$  and  $^{39}\text{K}$ ); pioneering studies of bosonic and fermionic gases in optical lattices and demonstration of their application as accurate force sensors with high spatial resolution; first investigation of disorder physics with ultracold gases and demonstration of Anderson localization of matter waves; pioneering experimental demonstrations of quantum simulation and, more in general, of the new revolution of atom-based quantum technologies; development of instrumentation for spectroscopy, metrology and cross-fertilization of frontier and interdisciplinary fields in science.

## **Publications**

M. I. is author of more than 280 publications on international journals and books (including 5 Science, 1 Nature, 4 Nature Physics, 1 Nature Photonics, 1 Nature Communications, 47 Physical Review Letters, 1 Reviews of Modern Physics) and author/editor of more than 10 books. His last book on “Atomic Physics: Precision Measurements and Ultracold Matter” has been published in 2013 by Oxford University Press. He is also author of a number of focus/review papers in Nature, Science, Physics Today.

The impact of his scientific works for the decade 2004-2014 has motivated the inclusion of M. I. in the list of the 144 “*World’s Most Influential Scientific Minds*” in Physics by Thomson Reuters. Indeed, his publications received more than 10500 citations, with an average of more than 800 citations/year in the last 7 years, including 3 papers with more than 500 citations each and 10 more papers with more than 200 citations each. His h-index is 51 (source: ISI Web of Science).

In 2009 he has been awarded with an Advanced Grant of the European Research Council (ERC).

### **Selected publications:**

1. Josephson effect in fermionic superfluids across the BEC-BCS crossover  
G. Valtolina et al., *SCIENCE* **350**, 1505 (2015)
2. Observation of chiral edge states with neutral fermions in synthetic Hall ribbons  
M. Mancini et al., *SCIENCE* **349**, 1510 (2015)
3. Measurement of the mobility edge for 3D Anderson localization  
G. Semeghini et al., *NATURE PHYSICS* **11**, 554 (2015)
4. A one-dimensional liquid of fermions with tunable spin  
G. Pagano et al., *NATURE PHYSICS* **10**, 198 (2014)
5. Spatial entanglement of bosons in optical lattices  
M. Cramer et al., *NATURE COMMUNICATIONS* **4**, 2161 (2013)
6. Quantum-limited frequency fluctuations in a terahertz laser  
M. S. Vitiello et al., *NATURE PHOTONICS* **6**, 525 (2012)
7. Delocalization of a disordered bosonic system by repulsive interactions  
B. Deissler et al., *NATURE PHYSICS* **6**, 354 (2010)
8. Observation of an Efimov spectrum in an atomic system  
M. Zaccanti et al., *NATURE PHYSICS* **5**, 586 (2009)
9. Anderson localization of a non-interacting Bose-Einstein condensate  
G. Roati et al., *NATURE* **453**, 895 (2008)
10. <sup>39</sup>K Bose-Einstein Condensate with tunable interactions  
G. Roati et al., *PHYSICAL REVIEW LETTERS* **99**, 010403 (2007)
11. Sensitive measurement of forces at the micron scale using Bloch oscillations of ultracold atoms  
I. Carusotto et al., *PHYSICAL REVIEW LETTERS* **95**, 093202 (2005)
12. Observation of dynamical instability for a Bose-Einstein condensate in a moving 1D optical lattice  
L. Fallani et al., *PHYSICAL REVIEW LETTERS* **93**, 140406 (2004)
13. Collapse of a Degenerate Fermi Gas  
G. Modugno et al., *SCIENCE* **297**, 2240 (2002)
14. Bose-Einstein Condensation of Potassium Atoms by Sympathetic Cooling  
G. Modugno et al., *SCIENCE* **294**, 1320 (2001)
15. Josephson Junction Arrays with Bose-Einstein Condensates  
F. S. Cataliotti et al., *SCIENCE* **293**, 843 (2001)

### **Books (selection)**

- M. I. and L. Fallani, *Atomic Physics: Precise Measurements and Ultracold Matter* (Oxford Univ. Press, 2013).
- M. I., W. Ketterle and C. Salomon (eds.), *Ultracold Fermi Gases* (IOS Press, 2008).
- E. Arimondo, P. De Natale, M. I. (eds.), *Atomic Physics XVII* (AIP, 2001).
- S. Karshenboim, F. S. Pavone, F. Bassani, M. I., T.W. Hänsch (eds.), *The Hydrogen Atom: Precision Physics with Simple Atomic Systems* (Springer Verlag, 2001).
- S. Martellucci, A.N. Chester, A. Aspect and M. I. (eds.), *Bose-Einstein Condensates and Atom Lasers* (Kluwer/Plenum, 2000).
- M. I., S. Stringari and C.E. Wieman (eds.), *Bose-Einstein Condensation in Atomic Gases* (IOS Press, 1999).
- M. I., M. Allegrini and A. Sasso (eds.), *Laser Spectroscopy* (World Scientific, 1996).
- T.W. Hänsch and M. I. (eds.), *Frontiers in Laser Spectroscopy* (Elsevier, 1994).
- W. Demtröder and M. I. (eds.), *Applied Laser Spectroscopy* (Plenum, 1990).
- F. Bassani, M. I., T.W. Hänsch (eds.), *The Hydrogen Atom* (Springer Verlag, 1989).

## Organization of conferences and international schools (selection)

- 1986 Co-Chairman of the XI International Conference on Infrared and Millimeter Waves, Pisa.
- 1987 Director of NATO ASI: XIII Course of the Europhysics School of Quantum Electronics.
- 1988 Co-organizer of the International Symposium on "The Hydrogen Atom", Scuola Normale Superiore, Pisa (with F. Bassani and T. W. Hänsch).
- 1989 Director of NATO ASI: XIV Course of the Europhysics School of Quantum Electronics.
- 1992 Director of NATO ASI: XV Course of the Europhysics School of Quantum Electronics.
- 1992 Co-Director of the International "Enrico Fermi" Summer School on "Frontiers in Laser Spectroscopy", Varenna (with T. W. Hänsch).
- 1995 Chairman of the XII International Conference on Laser Spectroscopy, Capri (with M. Allegrini and A. Sasso).
- 1998 Co-Director of the International "Enrico Fermi" Summer School on "Bose-Einstein Condensation in Atomic Gases", Varenna (with S. Stringari and C. E. Wieman).
- 1999 Organizer of the Quantum Electronics School Course on "Bose-Einstein Condensates and Atom Lasers", Erice.
- 2000 Co-Chairman of the XVII International Conference on Atomic Physics (ICAP), Firenze (with E. Arimondo).
- 2006 Co-Director of the International "Enrico Fermi" Summer School on "Ultracold Fermi Gases", Varenna (with W. Ketterle and C. Salomon).
- 2007 Chairman of the International Conference "Bose-Einstein Condensation", Sant Feliu de Guixols.
- 2014 Co-Director of the International "Enrico Fermi" Summer School on "Quantum Matter at Ultralow Temperatures", Varenna (with W. Ketterle and S. Stringari).

M. I. is active member of Program and Steering Committees of the most important international conferences in atomic and laser physics, e.g. International Conference on Laser Spectroscopy (ICOLS), International Conference on Atomic Physics (ICAP), International Conference "Bose-Einstein Condensation".

## Plenary invited talks at major conferences (selection, since 1999)

- 1999 Int. Conf. on Laser Spectroscopy (ICOLS) 14<sup>th</sup>, Innsbruck (Austria) (*with proceedings*)
- 2001 ICOLS 15<sup>th</sup>, Snowbird (USA) (*with proceedings*)
- 2002 Int. Conf. on Atomic Physics (ICAP) 18<sup>th</sup>, Cambridge (USA) (*with proceedings*)
- 2003 ESF BEC Conference, San Feliu de Guixols (Spain)
- 2003 ICOLS 16<sup>th</sup>, Palm Cove (Australia) (*with proceedings*)
- 2004 KITP Conference on Quantum Gases, Santa Barbara (USA)
- 2005 Gordon Research Conference in Atomic Physics, Tilton (USA)
- 2005 ESF BEC Conference, San Feliu de Guixols (Spain)
- 2006 ICAP 16<sup>th</sup>, Innsbruck (Austria) (*with proceedings*)
- 2006 NPL "Optical frequency comb for space metrology" Teddington, UK
- 2007 Conference "Quantum-atom optics down under", Wollongong (Australia)
- 2007 Conference "Recent progress in the studies of quantum gases", Institut Poincaré, Paris (France)
- 2007 KITP Conference on Strongly correlated phases, Santa Barbara (USA)
- 2008 Conference "Quantum noise in correlated systems", Weizmann (Israel)
- 2008 Conference "Frontiers of degenerate quantum gases", Beijing (China)
- 2008 Symposium "50 years of Anderson localization", Institut Poincaré, Paris (France)
- 2008 ICAP 18<sup>th</sup>, Storrs (USA) (*with proceedings*)
- 2009 ESF BEC Conference, San Feliu de Guixols (Spain)
- 2009 QIPC Conference, Roma (Italy)
- 2010 KITP Conference on "Frontiers of ultra-cold atoms and molecules", Santa Barbara (USA)
- 2010 Advanced Workshop on Anderson localization, ICTP, Trieste (Italy)
- 2010 ECAMP "European Conference on Atomic and Molecular Physics", Salamanca (Spain)
- 2011 ERATO "Macroscopic Quantum Control on Ultracold Atoms and Molecules", Tokyo (Japan)
- 2012 Poincaré Institut workshop on "Disordered quantum systems", Paris (France)
- 2012 International School on "Low-dim materials and quantum technologies", Windsor (UK)
- 2013 NORDITA conference on "Pushing the boundaries with cold atoms", Stockholm (Sweden)

- 2013 Conference " Quantum Many Body Systems out of Equilibrium", Dresden (Germany)
- 2013 Humboldt colloquium on the centenary of the Bohr atom, Bonn (Germany)
- 2014 DFG meeting, Berlin (Germany)
- 2015 Hamburg Photon Science Colloquium (Germany)
- 2016 Solvay Conference on "Quantum Simulation with Cold Matter and Photons", Brussels (Belgium)

Furthermore, M. I. has given several colloquia in prestigious scientific institutions including College de France, Boulder, Harvard, MIT, Vienna, Oxford, Cambridge, Geneve, Hamburg, Wien.

He has been lecturer in important International Schools including Varenna (2000 Course on "Recent Advances in Metrology and Fundamental Constants", directed by S. Leschiutta and T. Quinn; 2001 Course on "Experimental Quantum Computation and Information", directed by F. De Martini and C. Monroe; 2009 Course on "Nano optics and atomics: transport of light and matter waves", directed by D. S. Wiersma and R. Kaiser), Erice (2006 "Complex Optics in Mesoscopic Materials"), ICTP Trieste (2007 "Novel Quantum Phases"), Forth-Heraklion (2007, Onassis Foundation Lectures in Physics on "Bose-Einstein condensation"), Bad Honnef (2011, DPG School "Quantum Gases in Dilute Atomic Vapour").