

PERSONAL DATA

NAME AND SURNAME	Carlo Sias
NATIONALITY	Italian
YEAR AND PLACE OF BIRTH	1979, Cagliari, Sardinia (Italy)
ADDRESS	Istituto Nazionale di Ricerca Metrologica c/o LENS Via Nello Carrara 1, 50019 Sesto Fiorentino (FI) Italy
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LANGUAGES	Italian – Mother tongue English – Fluent French – Fluent Spanish – Fluent German – Basic

EDUCATION

2004-2008	Ph.D. in Applied Physics Universita' degli studi di Pisa (Italy) Supervisor: Prof. Ennio Arimondo.
1997-2002	Master (Laurea) in Physics Università degli studi di Roma "La Sapienza" (Italy) Mark: 110/110 cum laude Supervisor: Prof. Francesco De Martini.

RESEARCH EXPERIENCE

01/05/2015 – PRESENT	Senior Researcher (Primo Ricercatore) at the Istituto Nazionale di Ricerca Metrologica (INRIM)
01/06/2012 – 30/04/2015	Researcher (Ricercatore III livello) at the Istituto Nazionale di Ottica, Consiglio Nazionale delle ricerche (INO-CNR), Sesto Fiorentino, Italy
01/01/2008 – 31/05/2012	Research associate at the AMOP group of the Cavendish Laboratory, University of Cambridge (United Kingdom) in the research group of Prof. Michael Köhl
01/01/2004 – 31/12/2007	Ph.D. Student at the Università' di Pisa (Italy). Supervisor: Prof. Ennio Arimondo.
01/01/2003- 31/12/2003	Research assistant at the Istituto Nazionale per la Fisica della Materia (INFN), UDR di Roma I, Rome (Italy). Principal investigator: Prof. Francesco De Martini.
01/07/2001 – 18/07/2002	Diploma Student in the Quantum Optics group of the Università' di Roma"La Sapienza", Italy. Supervisor: Prof. Francesco De Martini

FELLOWSHIPS AND AWARDS

- 2014 “**ERC Starting Grant**” – project title: “An ultracold gas plus one ion: advancing Quantum Simulations of in- and out-of-equilibrium many-body physics”
- 2012 **PAMO prize** for the best poster presentation, International Conference of Atomic Physics (ICAP), Palaiseau (France), 23-27 July 2012.
- 2011 “**The Leverhulme Trust Early Career Fellowship**” at the University of Cambridge (United Kingdom)
- 2008 “**Herchel-Smith Fellowship**” at the University of Cambridge (United Kingdom)
- 2007 “**Assegno di ricerca**” at the INFN-CNR, UdR di Pisa – bando INFN AR 57/2006 (Italy). Research title: “Condensati di Bose-Einstein per Computazione Quantistica” (Bose-Einstein condensates for Quantum Computation).

PUBLICATION LIST

Researcher ID: D-1317-2014

PEER REVIEWED JOURNALS

- [21] G. Cappellini, M. Mancini, G. Pagano, P. Lombardi, L. Livio, M. Siciliani de Cumis, P. Cancio, M. Pizzoccaro, D. Calonico, F. Levi, C. Sias, J. Catani, M. Inguscio, L. Fallani
Direct Observation of coherent interorbital spin-exchange dynamics
Phys. Rev. Lett. **113**, 120402 (2014) – Editors’ suggestion and selected for APS Physics viewpoint
- [20] G. Pagano, M. Mancini, G. Cappellini, P. Lombardi, F. Schäfer, H. Hu, X.J. Liu, J. Catani, C. Sias, M. Inguscio, L. Fallani
A one-dimensional liquid of fermions with tunable spin
Nature Phys. **10**, 198 (2014)
- [19] L. Ratschbacher, C. Sias, L. Carcagnì, J. Silver, C. Zipkes, M. Köhl
Decoherence of a Single-Ion Qubit Immersed in a Spin-Polarized Atomic Bath
Phys. Rev. Lett. **110**, 160402 (2013)
- [18] L. Ratschbacher, C. Zipkes, C. Sias, M. Köhl (Corresponding Author)
Controlling chemical reactions of a single particle
Nature Phys. **8**, 649 (2012)
- [17] C. Zipkes, L. Ratschbacher, C. Sias, M. Köhl
Kinetics of a single trapped ion in an ultracold buffer gas
New J. Phys. **13**, 053020 (2011)
- [16] C. Zipkes, S. Palzer, L. Ratschbacher, C. Sias, M. Köhl (Corresponding Author)
Cold heteronuclear atom-ion collisions.
Physical Review Letters **105**, 133201 (2010)
- [15] C. Zipkes, S. Palzer, C. Sias, M. Köhl
A trapped single ion inside a Bose-Einstein condensate.
Nature **464**, 388 (2010).
- [14] S. Palzer, C. Zipkes, C. Sias, M. Köhl (Corresponding Author)
Quantum transport through a Tonks-Girardeau gas
Physical Review Letters **103**, 150601 (2009)

- [13] A. Zenesini, C. Sias, H. Lignier, Y. Singh, D. Ciampini, O. Morsch, R. Mannella, E. Arimondo, A. Tomadin, S. Wimberger
Resonant tunneling of Bose-Einstein condensates in optical lattices.
New Journal of Physics 10, 053038 (2008).
- [12] C. Sias, H. Lignier, Y. Singh, A. Zenesini, D. Ciampini, O. Morsch, E. Arimondo
Observation of photon assisted tunneling in optical lattices.
Physical Review Letters 100, 040404 (2008).
- [11] H. Lignier, C. Sias, D. Ciampini, Y. Singh, A. Zenesini, O. Morsch, E. Arimondo
Dynamical Control of Matter-Wave Tunneling in Periodic Potentials.
Physical Review Letters 99, 220403 (2007).
- [10] C. Sias, A. Zenesini, H. Lignier, S. Wimberger, D. Ciampini, O. Morsch, E. Arimondo
Resonantly Enhanced Tunneling of Bose-Einstein Condensates in Periodic Potentials.
Physical Review Letters 98, 120403 (2007).
- [9] R. Franzosi, M. Cristiani, C. Sias, E. Arimondo
Coherent transport of cold atoms in angle-tuned optical lattices.
Physical Review A 74, 013403 (2006).
- [8] D. Ciampini, E. Courtade, C. Sias, D. Cossart, G. Carelli, F. Mango, O. Morsch, E. Arimondo
Manipulation of ultracold atomic mixtures using microwave techniques.
Optics Communications 257, 340 (2006).
- [7] M. Anderlini, D. Ciampini, D. Cossart, E. Courtade, M. Cristiani, C. Sias, O. Morsch, E. Arimondo
Model for collisions in ultracold-atom mixtures.
Physical Review A 72, 033408 (2005).
- [6] M. Anderlini, E. Courtade, M. Cristiani, D. Cossart, D. Ciampini, C. Sias, O. Morsch, E. Arimondo
Sympathetic cooling and collisional properties of a Rb-Cs mixture.
Physical Review A 71, 061401(R) (2005).
- [5] F. Sciarrino, C. Sias, M. Ricci, F. De Martini
Realization of universal optimal quantum machines by projective operators and stochastic maps.
Physical Review A 70, 052305 (2004).
- [4] F. Sciarrino, C. Sias, M. Ricci, F. De Martini
Quantum cloning and universal NOT gate by teleportation.
Physics Letters A 323, 34 (2004).
- [3] M. Ricci, F. Sciarrino, C. Sias, F. De Martini
Teleportation Scheme Implementing the Universal Optimal Quantum Cloning Machine and the Universal NOT Gate.
Physical Review Letters 92, 047901 (2004).
- [2] D. Pelliccia, V. Schettini, F. Sciarrino, C. Sias, F. De Martini
Contextual realization of the universal quantum cloning machine and of the universal-not gate by quantum-injected optical parametric amplification.
Physical Review A 68, 042306 (2003).

[1] F. De Martini, V. Buzek, F. Sciarrino, C. Sias
Experimental realization of the quantum universal NOT gate.
Nature 419, 815 (2002).

CONTRIBUTIONS TO BOOKS

[1] C. Sias, M. Köhl
Hybrid quantum systems of ions and atoms
Chapter 12 in "Quantum gas experiments - exploring many-body states", edited by P. Törmä and K. Sengstock, Imperial College Press, London (2014)
arXiv.1401.3188

CONFERENCES PROCEEDINGS
IN PEER REVIEWED JOURNALS

[5] C. Zipkes, L. Ratschbacher, S. Palzer, C. Sias, M. Köhl
Hybrid quantum systems of atoms and ions
J. Phys.: Conf. Ser. **264**, 012019 (2011)

[4] A. Zenesini, H. Lignier, C. Sias, O. Morsch, D. Ciampini, E. Arimondo
Tunneling control and localization for Bose-Einstein condensates in a frequency modulated optical lattice.
Laser Physics 20, 1182 (2010).

[3] F. De Martini, V. Buzek, F. Sciarrino, C. Sias
Flipping qubits.
Physics of Particles and Nuclei Letters, **1** (116), 36 (2003).

[2] C. Sias, F. Sciarrino, F. De Martini
Realization of the Universal Quantum Cloning Machine and of the Universal-NOT gate by Optical Parametric Amplification.
Fortschritte der Physik **51**, 349-358 (2003).

[1] F. De Martini, C. Sias, F. Sciarrino
Experimental implementation of optimal quantum machines.
Proceedings of the Wigner Centennial Conference Pécs, Hungary, 8-12 July, 2002, contribution 27-1; Acta Physica Hungarica A **20**, 3 (2004)

CONFERENCE PROCEEDINGS

[4] F. Sciarrino, C. Sias, F. De Martini
Universal NOT gate and Optimal Quantum Cloning.
"Quantum Computing and Quantum Bits in Mesoscopic Systems" Eds. A. Leggett, B. Ruggiero, and P. Silvestrini, Kluwer Academic, 2004.

[3] M. Ricci, F. Sciarrino, C. Sias, F. De Martini
Teleportation scheme implementing the Universal Optimal Quantum Cloning Machine and the Universal NOT gate .
proceedings of the conference "ICCSUR: Eighth International Conference on Squeezed States and Uncertainty Relations", Rinton Press 2003.

[2] F. De Martini, F. Sciarrino, C. Sias
Universal NOT gate and Quantum Cloning.
proceedings of the sixth conference "Quantum Measurement, Computing and Communication", Rinton Press 2003

[1] F. Sciarrino, C. Sias, F. De Martini
The Quantum Universal-NOT Gate.
Highligh INFM 2002

COMMUNICATIONS

- TALKS
- [17] C. Sias, J. Catani, G. Pagano, M. Mancini, P. Lombardi, G. Cappellini, F. Schaefer, M. Inguscio, L. Fallani
A one-dimensional liquid of fermions with tunable spin
45th Annual Meeting of the APS Division of Atomic, Molecular and Optical Physics, Madison, WI (USA) 02-06/06/2014
- [16] C. Sias (**INVITED**)
A one-dimensional liquid of fermions with tunable spin
553. Heraeus Workshop – Discrete and Analogue Quantum Simulator Bad Honnef (Germany) 10-12/02/2014
- [15] C. Sias (**INVITED**)
A single ion qubit immersed in a spin-polarized atomic bath
IOTA-COST Workshop on Cold Molecular Ions, Arosa (Switzerland), 02-05 September 2013
- [14] C. Sias
Decoherence of a single ion qubit immersed in a spin-polarized atomic bath
QUIPC, Florence (Italy) 30 June – 5 July 2013
- [13] C. Sias, L. Ratschbacher, D. Sigle, C. Zipkes, M. Köhl
Cold atom-ion collisions
IOTA-COST workshop on Cold Molecular Ions, Sandbjerg Estate (Denmark), 23-25 November 2011
- [12] C. Sias, L. Ratschbacher, C. Zipkes, M. Köhl
A hybrid quantum system of ultracold atoms and trapped ions
Damop 2011 – 42nd Annual Meeting of the Division of Atomic Molecular and Optical Physics of the American Physical Society, Atlanta (USA), 13-17 June 2011
- [11] C. Sias, C. Zipkes, S. Palzer, L. Ratschbacher, M. Köhl (**INVITED**)
Impurities in a Bose gas.
Dynamics of quantum gases in one dimension, Orsay (France), 28-29 September 2010
- [10] C. Sias, C. Zipkes, S. Palzer, L. Ratschbacher, M. Köhl
A trapped single ion inside a Bose-Einstein condensate
Euroquam 2010, Cold Quantum Matter: Achievements and Prospects, Ischgl (Austria), 12-16 September 2010
- [9] C. Sias, C. Zipkes, S. Palzer, L. Ratschbacher, M. Köhl
A trapped single ion inside a Bose-Einstein condensate
Photon10, University of Southampton (UK), 23-26 August 2010
- [8] C. Sias, S. Palzer, C. Zipkes, M. Köhl (**INVITED**)
Exploring transport in a Tonks Girardeau gas
Theory of Quantum Gases and Quantum Coherence - 5th International Workshop, Nice (France), 2-4 June 2010
- [7] C. Sias, S. Palzer, C. Zipkes, M. Köhl
A trapped single ion inside a Bose-Einstein condensate
Damop 2010 – 41st Annual Meeting of the Division of Atomic Molecular and Optical Physics of the American Physical Society, Houston (USA), 25-29 May 2010

[6] C. Sias, S. Palzer, C. Zipkes, M. Köhl
A trapped single ion inside a Bose-Einstein condensate
Interfacing matter and light by cavity-QED, University of Oxford (UK), 22nd March 2010.

[5] C. Sias, S. Palzer, C. Zipkes, M. Köhl
Impurities in a Bose gas.
443. Wilhelm und Else Heraeus Seminar “Quantum Simulators”, Bad Honnef (Germany) 12-15 October 2009

[4] C. Sias, S. Palzer, C. Zipkes, M. Köhl
Impurities in a Bose gas.
Annual Meeting of the UK Cold-Atom/Condensed Matter Physics Network, Durham (UK) 17-18 September 2009.

[3] C. Sias, H. Lignier, A. Zenesini, Y.P. Singh, D. Ciampini, O. Morsch, E. Arimondo
Observation of nonlinearity-induced suppression of resonant tunneling in the Wannier-Stark problem.
CATS meeting, Oxford (UK) 22-23 November 2006.

[2] M. Cristiani, C. Sias, E. Arimondo, R. Franzosi
Transport in Angle-Tuned Lattices.
OLAQUI workshop, Innsbruck (Austria) 21st October 2005.

[1] C. Sias, R. Franzosi, M. Cristiani, E. Arimondo
Entanglement and quantum control of cold atoms confined in an optical lattice.
Scuola di Fisica “Enrico Fermi”, “Quantum Computers, Algorithms and Chaos”, Varenna (Italy) 4-15 July 2005.

SEMINARS

[6] *A one-dimensional liquid of fermions with tunable spin*
INO-CNR, sezione di Pisa, 22 May 2014

[5] *Multi-component one-dimensional liquids of fermions*
University of Rome “La Sapienza”, 30 October 2013

[4] *A trapped single ion inside a Bose-Einstein condensate*
LENS, Florence (Italy), 10st January 2011

[3] *Impurities in a Bose gas.*
Universita’ di Trento (Italy), 21st June 2010.

[2] *Control of matter wave tunneling in an optical lattice.*
Universita’ di Roma “La Sapienza” (Italy), 16th April 2008.

[1] *Observation of nonlinearity-induced suppression of resonant tunneling in the Wannier-Stark problem.*
University of Cambridge (UK), 20th August 2007.