Maximilian Schemmer

Curriculum Vitae

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Researcher in Cold Atom Physics

Professional positions

2023 **Project Leader**, *Istituto Nazionale di Ottica (CNR-INO)*, Project on p-wave superfluidity and topology in ultracold Fermi-mixture experiment

2019 – 2022 **Lecturer & Marie-Skłodowska Curie fellow**, *Humboldt Universität (HU) zu Berlin*, Germany, Group of Arno Rauschenbeutel
First three months at the Atominstitut of Technical University Vienna, Austria with subsequent move of the group to HU Berlin.

Educational background

2015 – 2019 **Ph.D. Cold Atom Physics**, *Institut d'Optique*, Palaiseau, France
1D systems with an Atomchip experiment.

2013 – 2015 **Master Science de la Matière in Physics**, *École Normale Supérieure (ENS) de Lyon*, France

2009 – 2013 **Bachelor of Science in Physics**, *Albert-Ludwigs Universität*, Freiburg, Germany

July 2012 – 2012 **Exchange Semester**, *King's College*, London, Great Britain

2008 **Abitur**, *Geschwister Scholl-Gymnasium*, Waldkirch, Germany

Theses and research projects

PhD Thesis

Title Out-of-equilibrium dynamics of one-dimensional Bose gases
Advisor Isabelle Bouchoule
Institution Laboratoire Charles Fabry, Palaiseau, France
Main topics
- Test of Generalized Hydrodynamics with an Atomchip experiment[1].
- Theoretical description and experimental test of cooling by three-body losses.
- Interaction quenches in 1D systems.

Master II Project

Title Geometrical pumping with a Bose-Einstein condensate
Advisor Ian Spielman
Institution National Institute of Standards and Technology (NIST), Gaithersburg, USA

[1] Details also in Journal Club for Condensed Matter Physics Selection: https://doi.org/10.36471/JCCM_July_2021_01.

Master I Project

Title Dynamics of chiral Bose-Einstein condensates in optical lattices
Advisor Tommaso Roscilde
Institution ENS de Lyon, France

ESA Traineeship

Title Correlation between space weather events and anomalies on ESA satellites
Advisor Alexi Glover
Institution European Space and Astronomy Centre ESAC, European Space Agency

Bachelor Thesis

Title Detection of emerging sunspots with Fourier-Hankel spectral decomposition
Advisor Markus Roth
Institution Kiepenheuer Institute for Solar Physics, Freiburg, Germany

Teaching Experience

2019 – 2022 **Humboldt University**, *Berlin*, Germany
Tutorials and lecture in Bachelor and Master level, including preparation of exercise sheets and exams

2016 – 2019 **Institut d'Optique**, *Palaiseau*, France
143.5h courses in electronics, laser, Matlab and optical laboratory courses (third year students).

2012 – 2013 **Albert-Ludwigs-Universität**, *Freiburg*, Germany
Teaching assistant for lecture on experimental physics I (first year students).

Other occupation

2008 – 2009 **Mandatory civil service**, *Am Bruckwald*, Waldkirch, Germany, Work integration of disabled persons

Awards, Grants and Scholarships

2022 **Young Researcher MSCA**, *Grant by Italian Ministry (MIUR) for MajorSuperQ project (3 years)*, [redacted]

2021 **Poster Prize**, *PostDocDay Berlin*, Interdisciplinary conference

2020 **Marie Skłodowska-Curie Individual Fellowship**, *European Union*, [redacted]

2020 **Nominated for thesis prize**, *Nominated by University Paris-Saclay for the Prix Solennels de thèse 2020 of the Chancellerie des Universités de Paris*

2019 **Thesis Prize**, *Department Onde de la Matière, University Paris-Saclay*

2016 **Springer Poster Prize**, *JDOC Lille*

2016 **PhD Scholarship**, *German Academic Scholarship Foundation*, [redacted]

2013 **Ampère Excellence Scholarship**, *ENS de Lyon*, [redacted]

2008 **Award in Physics**, *German Physical Society*

Languages

German	native
English	fluent
French	fluent
Spanish	moderate
Italian	beginner

TOEFL iBT: 112/120 (7.12.2012)

Skills

Programming Python, Matlab, Mathematica, LaTeX

Invited Talks

2023 **Observing quantum interferences between coherent and incoherent light in the photon statistics**, *Center of Quantum Science seminar*, University Tübingen, Germany

2022 **Engineering the photon statistics by destructive and constructive two-photon interference**, *NonGauss workshop*, Sorbonne University, Paris, France

2022 **Engineering the photon statistics by destructive and constructive two-photon interference**, *LENS*, Laboratorio Europeo di Spettroscopia Non Lineare, Florence, Italy

2021 **Antibunched light and entangled photon pairs from the collectively enhanced non-linear response of a dense atomic medium**, *Laboratoire Charles Fabry*, Paris-Saclay, Palaiseau, France

2021 **Testing Generalized Hydrodynamics on an Atomchip and non-classical states of light from nanofiber coupled atoms**, *Institut für Laserphysik*, Universität Hamburg, Germany

2019 **Generation of correlated photons using non-interacting atoms weakly coupled to a guided optical mode**, *Laboratoire Charles Fabry*, Paris-Saclay, Palaiseau, France

2019 **Generalized Hydrodynamics on an Atom Chip**, *Brockhouse Institute for Materials Research*, McMaster, Hamilton, Canada

2019 **Generalized Hydrodynamics on an Atom Chip**, *Laboratoire de Physique et Chimie Théoriques*, Université de Lorraine, Nancy, France

2018 **Interaction quenches and three-body cooling in a 1D Bose gas**, *Atominstitut*, Technische Universität Wien, Vienna, Austria

Publications

2022 M. Cordier, M. **Schemmer**, P. Schneeweiss, J. Volz, and A. Rauschenbeutel. *Tailoring Photon Statistics with an Atom-Based Two-Photon Interferometer*. arXiv: arXiv:2212.09592.

K. Kusmierek, S. Mahmoodian, M. Cordier, J. Hinney, A. Rauschenbeutel, M. **Schemmer**, P. Schneeweiss, J. Volz, and K. Hammerer. *Higher-Order Mean-Field Theory of Chiral Waveguide QED*. arXiv: 2207.10439.

L. Masters, X. Hu, M. Cordier, G. Maron, L. Pache, A. Rauschenbeutel, M. **Schemmer**, and J. Volz. *Will a Single Two-Level Atom Simultaneously Scatter Two Photons?* arXiv: 2209.02547.

2021 J. Hinney, A. S. Prasad, S. Mahmoodian, K. Hammerer, A. Rauschenbeutel, P. Schneeweiss, J. Volz, and M. **Schemmer**. "Unraveling Two-Photon Entanglement via the Squeezing Spectrum of Light Traveling through Nanofiber-Coupled Atoms". In: *Physical Review Letters* 127.12, p. 123602.

2020 I. Bouchoule and M. **Schemmer**. "Asymptotic Temperature of a Lossy Condensate". In: *SciPost Physics* 8.4, p. 060.

2019 M. **Schemmer**, I. Bouchoule, B. Doyon, and J. Dubail. "Generalized Hydrodynamics on an Atom Chip". In: *Physical Review Letters* 122.9, 090601,
Featured in: Physics, Editors' suggestion, Physics Today & Journal Club for Condensed Matter Physics.

2018 I. Bouchoule, M. **Schemmer**, and C. Henkel. "Cooling Phonon Modes of a Bose Condensate with Uniform Few Body Losses". In: *SciPost Physics* 5.5, p. 043.

M. **Schemmer** and I. Bouchoule. "Cooling a Bose Gas by Three-Body Losses". In: *Physical Review Letters* 121.20, p. 200401.

M. **Schemmer**, A. Johnson, and I. Bouchoule. "Monitoring Squeezed Collective Modes of a One-Dimensional Bose Gas after an Interaction Quench Using Density-Ripple Analysis". In: *Physical Review A* 98.4, p. 043604.

2017 A. Johnson, S. S. Szigeti, M. **Schemmer**, and I. Bouchoule. "Long-Lived Nonthermal States Realized by Atom Losses in One-Dimensional Quasicondensates". In: *Physical Review A* 96.1, p. 013623.

M. **Schemmer**, A. Johnson, R. Photopoulos, and I. Bouchoule. "Monte Carlo Wave-Function Description of Losses in a One-Dimensional Bose Gas and Cooling to the Ground State by Quantum Feedback". In: *Physical Review A* 95.4, p. 043641.

2016 H.-I. Lu, M. **Schemmer**, L. M. Aycock, D. Genkina, S. Sugawa, and I. B. Spielman. "Geometrical Pumping with a Bose-Einstein Condensate". In: *Physical Review Letters* 116.20, p. 200402.

2015 S. Hettrich et al. "Atmospheric Drag, Occultation 'N' Ionospheric Scintillation (ADONIS) Mission Proposal: Alpbach Summer School 2013 Team Orange". In: *Journal of Space Weather and Space Climate* 5, A2.