Julian Léonard

Assistant Professor of Physics, IST Austria
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RESEARCH INTERESTS

- Quantum simulation of strongly correlated systems
- Quantum information in many-body systems
- Quantum optics, open quantum systems
- Physics of AMO systems

PROFESSIONAL EXPERIENCE

2024 – **Assistant Professor in Experimental Physics**
IST Austria, Klosterneuburg, Austria

2021 – 2024 **Assistant Professor in Experimental Physics**
Department of Physics, TU Wien, Austria

2017 – 2021 **Postdoctoral fellow**
Department of Physics, Harvard University, USA
Faculty advisor: Markus Greiner, Professor of Physics

2017 **Postdoctoral fellow**
Department of Physics, ETH Zürich, Switzerland
Faculty Advisor: Tilman Esslinger, Professor of Physics

EDUCATION

2011 – 2017 **PhD in Physics**
ETH Zürich**,** Switzerland
Title: *A supersolid of matter and light*
Thesis advisor: Tilman Esslinger, Professor of Physics

2010 – 2011 **M.Sc. in Physics**
École Normale Supérieure and Sorbonne Université, Paris
Title: *Creation of a moveable defect in a two-dimensional bose gas*
Thesis advisor: Jean Dalibard, Professor of Physics

2009 – 2010 **Undergraduate research**
Max Planck Institute of Quantum Optics, Garching
Site-resolved imaging of a Mott insulator
Head of research group: Immanuel Bloch, Professor of Physics

2007 – 2010 **Diploma studies in Physics**
TU München, Germany

HONORS AND AWARDS

2024	Cardinal Innitzer Award
2023	ERC Starting grant
2021	START Award of the Austrian Science Foundation (FWF)
2017	Early Postdoc.Mobility Fellowship of the Swiss National Science Foundation (SNSF)
2010	Fellowship award of the German National Academic Foundation Fellowship

PUBLICATIONS

13 publications published in peer-reviewed journals, in total >2300 citations (Google scholar, 11/2024)

Top 5 publications

- J. Léonard, S. Kim, J. Kwan, P. Segura, F. Grusdt, C. Repellin, N. Goldman, and M. Greiner, *Realization of a fractional quantum Hall state with ultracold atoms*, **Nature** 619, 495 (2023)
- J. Léonard, M. Rispoli, A. Lukin, R. Schittko, S. Kim, J. Kwan, D. Sels, E. Demler, and M. Greiner, *Probing the onset of quantum avalanches in a many-body-localized system*, **Nature Physics** 19, 481 (2023)
- A. Lukin, M. Rispoli, R. Schittko, M. E. Tai, A. M. Kaufman, S. Choi, V. Khemani, J. Léonard, and M. Greiner, *Probing entanglement in a many-body-localized system*, **Science** 364, 256-260 (2019)
- J. Léonard, A. Morales, P. Zupancic, T. Donner, and T. Esslinger, *Monitoring and manipulating Higgs and Goldstone modes in a supersolid quantum gas*, **Science** 358, 1415-1418 (2017)
- J. Léonard, A. Morales, P. Zupancic, T. Esslinger, and T. Donner, *Supersolid formation in a quantum gas breaking a continuous translational symmetry*, **Nature** 543, 87-90 (2017)

TEACHING EXPERIENCE

Lecturer

2023/24	*Quantum optics*, TU Wien, 24 lectures, graduate course
2023	*Quantum simulation with optical lattices*, TU Wien, 4 lectures, graduate course
2022	*Advanced quantum optics*, TU Wien, 6 lectures graduate course
2020	*Quantum optics*, Harvard University, 10 lectures (substitute for Markus Greiner), graduate course
2019	*Quantum optics*, Harvard University, 4 lectures (substitute for Markus Greiner), graduate course

Teaching Assistant

- 12 semesters of teaching assistance at ETH Zürich at the Bachelor and Master level: introductory physics courses (1-4), quantum optics and advanced quantum mechanics (theory); supervision of an advanced student lab on entangled photons
- 1 semester of teaching assistance at TU Wien at the Bachelor level: introductory physics 2

Advisor

- Supervision of 2 Postdocs and 5 PhD students
- Supervision of 9 master students and 5 undergraduate students

PROFESSIONAL SERVICE

Refereeing

- Referee for Nature, Nat. Phys, Physical Review Letters, Phys. Rev. X, Phys. Rev. A, Phys. Rev. B, New Journal of Physics, European Journal of Physics
- Member of the FWF board (since 2023)

Conference organization

- *Frontiers of Quantum Gas Microscopy, April 2022,* Heraeus Seminar at Physikzentrum Bad Honnef
- *Multi-Point Correlations in Quantum Many-Body Systems*, April 2019, Workshop at University of Heidelberg
- *Young Atom Opticians (YAO)*, April 2015, ETH Zürich

Outreach

- Outreach talk at VHS Wien (4/2024)
- Youtube podcast on quantum simulations in optical lattices (10/2023)
- High school internship exchange with South Tyrol (1/2023)
- High-school outreach in Cambridge, MA (3/2019)
- Scientifica science exhibition at Zurich, development, and demonstration of the experiment *Fiber coupling contest*, (2011-2017, yearly)