Curriculum Vitae

Personal Information

Name:	Tomasz Szołdra
Year of birth:	1996
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Interests

machine learning in quantum physics, many-body localization, quantum many-body scars, open quantum systems, ultracold atoms

Publications

- T. Szołdra, P. Sierant, M. Lewenstein, and J. Zakrzewski, *Catching thermal avalanches in the disordered XXZ model*, Phys. Rev. B **109**, 134202 (2024) - Editors' Suggestion
- T. Szołdra, M. F. Ciappina, N. Werby, P. H. Bucksbaum, M. Lewenstein, J. Zakrzewski, A. M. Maxwell, *Femtosecond pulse parameter estimation from photoelectron momenta using machine learning*, New J. Phys. **25** 083039 (2023)
- T. Szołdra, P. Sierant, M. Lewenstein, J. Zakrzewski, *Tracking locality in the time evolution of disordered systems*, Phys. Rev. B **107**, 054204 (2023)
- T. Szołdra, P. Sierant, M. Lewenstein, J. Zakrzewski, *Unsupervised detection of decoupled subspaces: many-body scars and beyond*, Phys. Rev. B **105**, 224205 (2022)
- T. Szołdra, P. Sierant, K. Kottmann, M. Lewenstein, J. Zakrzewski, *Detecting ergodic bubbles at the crossover to many-body localization using neural networks*, Phys. Rev. B **104**, L140202 (2021)
- T. Szołdra, K. Sacha, A. Kosior, *Determination of Chern numbers with a phase-retrieval algorithm*, Phys. Rev. A **99**, 043611 (2019)

Education

Jagiellonian University, Cracow, Poland **2020 –**
PhD studies in theoretical physics
Thesis *Ergodicity breaking in quantum systems: from exact time evolution to machine learning*
Expected graduation: Jan 2025.

Jagiellonian University, Cracow, Poland **2018 – 2020**
Master studies in theoretical physics
Thesis *Anderson localization in time*,
Grade: 5/5 (with distinction)

Jagiellonian University, Cracow, Poland **2015 – 2018**
Bachelor studies in theoretical physics
Thesis *Retrieval of Chern numbers from experimental data*,
Grade: 5/5 (with distinction)

Grants

- *Detecting many-body quantum scars using neural networks*
  Mini-grant from POB Digiworld at JU (05.2021-05.2022), 20 000 PLN

Conference talks (selected)

- *Propagation of avalanches in the disordered Heisenberg model: a computational study*, APS March Meeting, Minneapolis, USA (2024)
- *Machine learning parameters of femtosecond pulses based on photoelectron momentum distributions*,
  Molecular Ultrafast Science and Technology Conference, Grindelwald, Switzerland (2022)
- *Unsupervised detection of decoupled subspaces: many-body scars and beyond*,
  BEC Seminar at the Centre of Theoretical Physics of Polish Academy of Sciences, Warsaw, Poland (2022)

- *Measuring topological invariants in optical lattices*,
  Majorana Modes and Beyond conference, Institute of Physics of Polish Academy of Sciences, Warsaw, 2019 (as an *"invited speaker"*)
- *Measuring topological invariants in optical lattices*,
  25th Young Atom Opticians Conference, Hamburg, Germany, 2019

Posters

- *Unsupervised detection of decoupled subspaces: many-body scars and beyond*,
  Time Crystals Conference, Cracow, 2023 - Best Poster Prize
- *Time evolution of an interacting chain in cavity with artificial neural networks*,
  Open System Control of Atomic and Photonic Matter, Bad-Honnef, Germany, 2022
- *Detecting ergodic bubbles at the crossover to many-body localization using neural networks*,
  Quantum Optics X, Toruń, Poland, 2021
- *Determination of Chern numbers with a phase-retrieval algorithm*, Polish-German WE-Heraeus-Seminar, Bad-Honnef, Germany, 2019, and Time Crystals and Related Phenomena, Cracow, Poland, 2019

Internships

Paul Scherrer Institut, Villigen, Switzerland **07-09.2017**
Ultracold Neutrons Group

KAIST, Daejon, South Korea **07.2016**
Center for Axion and Precision Physics

Teaching

Jagiellonian University, Cracow, Poland **2020 – 2024**

- Ultracold atoms (exercise classes), advanced MSc. level course in theoretical physics
- Selected topics in theoretical physics 2 (exercise classes), MSc. level course in experimental physics (mainly quantum optics)
- Atomic physics (exercise classes), BSc. level course for physics
- Electromagnetism (exercise classes), BSc. level course for biophysics
- Physics laboratory 1 (laboratory classes), high school and BSc. level course

Awards

- Foundation for Polish Science START 2024 scholarship (100 scientists under 30 years old from all disciplines)
- International theoretical physics competition PLANCKS 2018 in Zagreb, 3rd place
- The University Physics Competition 2017 and 2016, silver medal
- Polish Physics Olympiad, finalist in 2014 and 2015

Scholarships

- Doctoral student scholarship in the NCN OPUS project "Many-body localization – cold atoms approach 2", 2020-2024
- Master student scholarship in the NCN OPUS project "Time crystals", 2018-2020
- Minister of Science and Higher Education scholarship, 2017/18, 2018/19, 2019/20
- Rector of Jagiellonian University Scholarship for 10% best students, 2015-2020
- GRAND scholarship, 2017-2020
- Fundusz Talenty scholarship, 2015-2020

Skills

- English - Cambridge English Advanced CAE certificate at C1 level
- Programming: python, C++, git, numpy, scipy, jax, tensorflow, mathematica, singularity, wandb.