

Curriculum Vitae

PERSONAL INFORMATION

Name: Tomasz Szoldra
Year of birth: 1996
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INTERESTS

machine learning in quantum physics, many-body localization, quantum many-body scars, neural quantum states, ultracold atoms

PUBLICATIONS

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

EDUCATION

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

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

GRANTS

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

CONFERENCE TALKS

- *Propagation of avalanches in the disordered Heisenberg model: a computational study*,
APS March Meeting, Minneapolis (2024)
- *Machine learning parameters of femtosecond pulses based on photoelectron momentum distributions*, Molecular Ultrafast Science and Technology Conference, Grindelwald (2022) and Artificial Intelligence Photonics, San Sebastian (2023)

	<ul style="list-style-type: none"> • <i>Measuring topological invariants in optical lattices</i>, Majorana Modes and Beyond Conference, Institute of Physics of Polish Academy of Sciences, Warsaw (2019) (invited speaker) and 25th Young Atom Opticians Conference, Hamburg (2019) 	
SEMINARS	<ul style="list-style-type: none"> • University of Regensburg (2024) • Centre of Theoretical Physics of Polish Academy of Sciences, Warsaw, (2023 and 2022) • Institute of Photonic Sciences - ICFO, Barcelona (2022) 	
POSTERS	<ul style="list-style-type: none"> • <i>Unsupervised detection of decoupled subspaces: many-body scars and beyond</i>, Time Crystals Conference, Cracow (2023) - Best Poster Prize • <i>Time evolution of an interacting chain in cavity with artificial neural networks</i>, Open System Control of Atomic and Photonic Matter, Bad-Honnef (2022) • <i>Detecting ergodic bubbles at the crossover to many-body localization using neural networks</i>, Quantum Optics X, Toruń (2021) • <i>Determination of Chern numbers with a phase-retrieval algorithm</i>, Polish-German WE-Heraeus-Seminar, Bad-Honnef, (2019) and Time Crystals and Related Phenomena, Cracow (2019) 	
INTERNSHIPS	<p>Paul Scherrer Institut, Villigen, Switzerland Ultracold Neutrons Group</p> <p>KAIST, Daejeon, South Korea Center for Axion and Precision Physics</p>	<p>07-09.2017</p> <p>07.2016</p>
TEACHING	<p>Jagiellonian University in Cracow</p> <ul style="list-style-type: none"> • Physics of 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 	2020 – 2024
AWARDS	<ul style="list-style-type: none"> • Foundation for Polish Science START 2024 scholarship (100 scientists under 30 across 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • English - Cambridge English: Advanced (CAE), C1 Level • Programming: Python, C++, Git, Jax, Tensorflow, Mathematica, Singularity, Weights&Biases 	