Erik Kalz

Curriculum Vitae

erikkalz98@gmail.com
erikkalz.github.io
0000-0003-3294-7365
ErikKalz

Education

Dissertation — *Tracer transport in interacting odd-diffusive systems.* Through a combination of first-principles theory, kinetic approaches, and statistical mechanics in the dilute limit, as well as field-theoretic approaches for crowded systems, I show how such symmetries, or their deliberate breaking, manifest themselves in unconventional transport phenomena of tracer particles. The particular focus of this cumulative thesis lies on odd-diffusive (also chiral) systems, i.e., systems with a broken time-reversal and/or parity symmetry. The thesis was granted with **summa cum laude** ("highest honours"). Reviewers: Prof. Ralf Metzler, Prof. Abhinav Sharma and Prof. Holger Stark

09/2022-12/2025 — **Doctorate in theoretical physics**, *University of Potsdam*, Germany

Master Thesis — *Diffusion under the effect of Lorentz force.* Supervised by Prof. Jens-Uwe Sommer and Dr. Abhinav Sharma. Brownian particles under the effect of Lorentz force show an unexpected diffusive behaviour: Collisions can enhance the self-diffusion instead of reducing it, as ordinarily. The thesis was graded with **best mark 1.0** and published in the Springer-Nature book-series **BestMasters**. The research was published as a *Physical Review Letter* and selected as an **Editors' Suggestion**.

04/2020-05/2022 — **Master of physics**, *Technical University of Dresden*, Germany, Minor: philosophy

07/2019-12/2019 — **semester abroad**, *Norwegian University of Science and Technology*, Trondheim, Norway, enrolled as master student

Bachelor Thesis — *Entropy production in a non-equilibrium system of hard rods in confinement.* Supervised by Prof. Jens-Uwe Sommer and Dr. Abhinav Sharma. Density Functional Theory was used in equilibrium and in dynamics to study the entropy production of interacting particles. The thesis was graded with **best mark 1.0**

10/2016-01/2020 — **Bachelor of physics**, *Technical University of Dresden*, Germany, Minor: philosophy

07/2016 — **Abitur with best mark 1.0**, *diploma from german secondary school, qualifying for university admission or matriculation*

2010-2016 — **secondary school**, *Max-Steenbeck-Gymnasium Cottbus*, Germany, *secondary school with extended education in mathematics, science, computer science and technology*

Awards

IOP Impact Award — The publication "Field theory of active chiral hard disks: a first-principles approach to steric interactions" in *Journal of Physics A* has been recognised for the "impact [it has] achieved in such a short period of time".

Emergent Talent Speaker — Awarded to my talk "Subtle interactions in odd-diffusive systems" at the conference "Venice meeting on fluctuations in small complex systems VII" (2024) in Venice, Italy.

Best Communication — Awarded to my talk "Interactions enhance self-diffusion in odd-diffusive systems" at the conference "New Trends in Nonequilibrium Statistical Mechanics" (2023) in Erice, Sicily.

Springer BestMasters — Springer Nature awards publication to the best master's theses which have been completed at renowned Universities in Germany, Austria, and Switzerland (2022).

PRL Editors' Suggestion — The publication "Collisions enhance self-diffusion in odd-diffusive systems" in *Physical Review Letters* was selected as an "Editors' Suggestion" (2022).

Academic Metrics & Services

Publications	1 preprint under review, 6 peer-reviewed journal articles (4 first-authored, 2 as corresponding author), 1 book
Citations	155+ citations, h-index: 6 (Google Scholar)
Conferences	14 invited talks, 11 contributing talks, and 5+ contributing posters at international conferences
Organization	○ Guest-editing a *New Journal of Physics* 'Focus On' issue on "Broken symmetries and odd transport in statistical physics" together with R. Metzler and A. Sharma ○ DPG-SKM 2025 focus session "Broken symmetries in statistical physics: Dynamics of odd systems" together with R. Metzler and A. Sharma ○ 4 semester Metzler group seminar (50+ international speakers)
Supervision	6 Bachelor students (5 finished, 1 ongoing), 3 Master students (1 finished, 2 ongoing)
Teaching	○ undergraduate teaching assistant: 1 semester mathematics for physicists, 4 semesters mathematics for engineers, 4 semesters logic for philosophy, ○ graduate teaching assistant: 1 semester theoretical mechanics for physicists

Experience

Teaching	undergraduate teaching assistant: 1 semester mathematics for physicists, 4 semesters mathematics for engineers, 4 semesters logic for philosophy graduate teaching assistant: 1 semester theoretical physics
since 09/2022	**research assistant**, *Institute for Physics & Astronomy, University of Potsdam*, Germany
06/2022-03/2023	**assistance of tax consultancy**, *Agency of Ramona Kalz*, Finsterwalde, Germany
01/2022-03/2022	**research assistant**, *Leibniz-Institute for Polymer Research Dresden*, Germany
09/2021-02/2022	**script-writing**, *Institute of Analysis, Technical University Dresden*, Germany
01/2020-10/2020	**internship**, *Leibniz-Institute for Polymer Research Dresden*, Germany

Selected Talks and Conferences

11/2025	**Invited talk** at the "Physical Chemistry Seminar" (Tel Aviv University)
09/2025	**Invited talk** at the "Spintronics and Quantum Information Seminar" (AMU Poznań)
06/2025	**Invited talk** at the "Industrial and Applied Mathematics Seminar" (U Oxford)
06/2025	**Invited talk** in the group of Prof. M. Cates (U Cambridge)
10/2024	**Contributing talk** at the conference "Third Infinity 2024"(Göttingen)
09/2024	**Contributing talk & poster** at the "Venice meeting on fluctuations in small complex systems VII"
05/2024	**Invited talk** at the "Statistical Physics and Nonlinear Dynamics Seminar" (HU Berlin)
04/2024	**Invited talk** in the group of Prof. H. Stark (TU Berlin)
10/2023	**Contributing talk** at the conference "New Trends in Noneqquilibrium Statistical Mechanics" (Erice, IT)
07/2023	**Invited talk** at the seminar of DFG-TRR 146 (JGU Mainz)
04/2023	**Invited talk** in the group of Prof. C. Sellhuber-Unkel (RKU Heidelberg)
05/2022	**Invited talk** in the group of Prof. J. Brader (U Fribourg)
04/2022	**Invited talk** in the group of Prof. H. Löwen (HHU Düsseldorf)