



Andreas Haller

Postdoctoral Researcher

Born 30, September 1991 in Trier

Nationality: German

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About me

I am a theoretical physicist finishing the first year of postdoc and ever since I first lay hands on it during my Master thesis, fascinated by topological quantum matter. Besides the passion for my job, I love to cook for my friends, as well as [composing](#) and [performing music](#).

Computer skills

Mathematica & L^AT_EX

Fortran, Python & Julia

C++ & matlab

PHP, HTML & Javascript

Java

Languages

German (mother tongue)

English (fluent)

Latin (Latinum)

Education

- 2021 PhD in Theoretical Physics (summa cum laudae) JGU Mainz
Title: "[On the tuning of particle transport, strongly correlated helical phases and the measurement of topological invariants](#)".
- 2014–2016 M.Sc. \emptyset 1.2 (thesis 1.0) JGU Mainz
Advanced courses in solid state physics, quantum computation and software engineering. Title of M. Sc. thesis: "Signatures of topological phases in ultracold fermionic ladders".
- 2011–2014 B.Sc. \emptyset 2.0 (thesis 1.0) JGU Mainz
Optional courses in mathematics and software engineering. Title of B. Sc. thesis: "Matrix Product States: a variational approach to strongly correlated systems".
- 2011 Abitur \emptyset 1.8 St. Willibrord Gymnasium Bittburg
General higher education entrance qualification with major subjects Physics, Chemistry and German.

Publications and preprints

- in prep R. Teixeira, L. G. Dias, E. Idrisov, S. Groenendijk, A. Haller, A. Mathew, R. Singh, T. L. Schmidt: "Finite Size Effects of the Ground-State Degeneracy Splitting in Quasi-One-Dimensional Parafermion Systems"
- in prep P. Paduval, T. L. Schmidt, A. Haller: "Sweet spot limits of chiral higher order topological superconductors with Majorana corner modes"
- Dec 2021 A. Haller, S. Groenendijk, A. Habibi, A. Michels, T. L. Schmidt: "Quantum Skyrmion Lattices in Heisenberg Ferromagnets"
- Dec 2020 A. Haller, A. Matsoukas-Roubeas, Y. Pan, M. Rizzi, M. Burrello: "Exploring helical phases of matter in bosonic ladders" [PRR 2, 043433](#)
- June 2020 A. Haller, P. Massignan, M. Rizzi: "Detecting topology through dynamics in interacting fermionic wires" [PRR 2, 033200](#)
- Apr 2020 A. Haller, M. Rizzi, M. Filippone: "Drude weight increase by orbital and repulsive interactions in fermionic ladders" [PRR 2, 023058](#)
- May 2019 P. Schmoll, A. Haller, M. Rizzi, R. Orús: "Quantum criticality on a ladder: An SU(2) iDMRG study" [PRB 99, 205121](#)
- May 2018 A. Haller, M. Rizzi, M. Burrello: "The resonant state at filling factor 1/2 in chiral fermionic ladders" [New J. Phys. 20, 053007](#)

Grants

- 2017-2021 Member of the [Max Planck Graduate Center \(MPGC\)](#), scholarship of the [Graduate School of Excellence Materials Science](#)
- 2019 Travel grant of the COST AtomQT initiative ([CA16221](#))

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KODE[®] Competence profiling

Expertise

Decision-making and responsibility

Social-communicative competency

Other

Trombone

Trumpet

Piano

Bouldering

Squash

Biking

Yoga

Work and teaching experience

- Since 2021 Postdoctoral Researcher University of Luxembourg
Member of **TMQS**: Study of mesoscopic quantum systems.
- 2018–2020 Lecturer JGU Mainz
Assistant lecturer: "Praktikum der Physik für Medizin, Zahnmedizin und Pharmazie".
- 2017–2021 Associate JGU Mainz
Member of "KOMET7": fundamental research of quantum many-body systems.
- 2016–2017 Tutor JGU Mainz
Exercise group supervision of the lecture: "Introduction to quantum computation".
- 2016 Student Associate Deutsche Telekom AG Darmstadt
Actively supported the department of Prototyping for the realisation and debugging of internal products such as Telekom Smart Speaker und Magenta SmartHome.
- 2014 Tutor JGU Mainz
Assistant tutor for theoretical physics - classical mechanics.
- 2012–2015 Operateur JGU Mainz
Supervised part of the operations and maintenance at the particle accelerator of the University Mainz and trained new operators.

Invited visits

- Feb 2022 Department of condensed matter Technical University Catalonia
Scientific exchange with presentation in the group meeting.
- Feb 2020 Department of condensed matter Niels Bohr institute Copenhagen
Start of a new collaboration with Prof. Michele Burrello. Scientific exchange with presentation in the group meeting.
- Dec 2019 Department of condensed matter University Trient
Scientific exchange with presentation in the group meeting.
- Nov 2019 Department of condensed matter Technical University Catalonia
Completion of a collaboration with Prof. Pietro Massignan.
- Jan 2019 Department of condensed matter Technical University Catalonia
Start of a new collaboration with Prof. Pietro Massignan. Scientific exchange with presentation in the group meeting.
- Oct 2018 Department of theory of quantum matter University Geneva
Start of a new collaboration with Dr. Michele Filippone. Scientific exchange with presentation in the group meeting.

International conferences

- July 2020 Munich Conference on Quantum Science and Technology Online
Poster: "Detecting topology through dynamics"
- Mar 2019 Deutsche Physikalische Gesellschaft (DPG) Regensburg
Talk: "Quantum criticality on a chiral ladder"
- Mar 2018 Deutsche Physikalische Gesellschaft (DPG) Berlin & Erlangen
Talk: "The resonant state at filling factor 1/2"
- Mar 2017 Deutsche Physikalische Gesellschaft (DPG) Erlangen
Talk: "Signatures of topological phases"

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Workshops

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| Feb 2022 | Interacting Topological Matter: Atomic, Molecular and Optical Systems | Online |
| Jul 2021 | KITP: Interacting Topological Matter: Atomic, Molecular and Optical Systems | Online |
| Feb 2019 | Entanglement in strongly correlated systems | Benasque |
| Jan 2019 | Quantum Simulation 2019 | Brüssel |
| Aug 2018 | Topological matter school | San Sebastian |
| Feb 2018 | Topological matter in artificial gauge fields | Dresden |
| Nov 2017 | European Tensor Network School | Gent |
| Aug 2017 | Topological matter school | San Sebastian |

Mainz, April 22, 2022

