Dr. Masoud Bahari

CV

Persönliche Daten

Geburtsdatum:	20.11.1990
Anschrift:	Bergmannweg 15, 97204 Höchberg
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E-Mail:	mr.bahari.ph@gmail.com
Familienstand:	Verheiratet
Profile:	ORCID | Google Scholar | GitHub

Education

07/2019-03/2025 **PhD in Theoretical Solid-State Physics**, Julius Maximilian University of Würzburg
Final Grade: 1.0 (German grading system: mit Auszeichnung, Excellent)-Summa Cum Laude
Focus Areas:

- Analytical modeling of unconventional superconductivity
- Development of MATLAB, Mathematica, and Python-based algorithms to solve complex physical problems

09/2013-01/2016 **Master of Science in Theoretical Solid-State Physics**
Final Grade: 1.3 (Sehr Gut, Excellent) - Graduated with Distinction
Focus Areas:

- Analytical modeling of topological quantum systems
- Development of MATLAB and C++-based algorithms to solve complex physical problems

09/2009-07/2013 **Bachelor of Science in Theoretical Physics**
Final Grade: 2.5 (Good)

06/2005-08/2009 **General University Entrance Qualification**
Final Grade: Good

06/1997-05/2005 **Primary Education**
Final Grade: Sehr Gut (Excellent)

Publications

Regular, (1) Masoud Bahari, Kristian Mæland, Carten Timm, Björn Trauzettel, "Beyond spin-1/2: Multipolar spin-orbit coupling in noncentrosymmetric crystals with time-reversal symmetry", arXiv:2512.18449 (2025).

Regular, (2) Kristian Mæland, Masoud Bahari, Björn Trauzettel, "*Phonon-Mediated Intrinsic Topological Superconductivity in Fermi Arcs*", Phys. Rev. B 112, 104507 (2025).

Thesis, (3) Masoud Bahari, "*Spectral Properties of Unconventional Multiband Superconductors*", Doctoral Dissertation, Universität Würzburg (2025).

Letter, (4) Masoud Bahari, Song-Bo Zhang, Chang-An Li, Sang-Jun Choi, Philipp Rüßmann, Carsten Timm, and Björn Trauzettel, "*Helical Topological Superconducting Pairing at Finite Excitation Energies*", Physical Review Letters 132, 266201 (2024).

Regular, (5) Philipp Rüßmann, Masoud Bahari, Stefan Blügel, and Björn Trauzettel, "*Interorbital Cooper pairing at finite energies in Rashba surface states*", Physical Review Research 5, 043181 (2023).

Regular, (6) Philipp Rüßmann, Masoud Bahari, Stefan Blügel, and Björn Trauzettel, "*Proximity-induced Cooper pairing at low and finite energies in the gold Rashba surface state*", Quanten-Theorie der Materialien (2023).

Letter, (7) Masoud Bahari, Song-Bo Zhang, Björn Trauzettel, "*Intrinsic finite-energy Cooper pairing in $j = 3/2$ superconductors*", Physical Review Research 4, L012017 (2022).

Regular, (8) Masoud Bahari, Mir Vahid Hosseini, "*Topological properties of a generalized spin-orbit-coupled Su-Schrieffer-Heeger model*", Physica E: Low-dimensional Systems and Nanostructures 119, 113973 (2020).

Regular, (9) Masoud Bahari, Mir Vahid Hosseini, "*One-dimensional topological metal*", Physical Review B 99, 155128 (2019).

Regular, (10) Masoud Bahari, Mir Vahid Hosseini, "*The effect of uniform spin-orbit coupling and uniform Zeeman magnetic field on the topological properties of one-dimensional dimerized nano wire*", IJPR 17, 717 (2019).

Regular, (11) Masoud Bahari, Mir Vahid Hosseini, "*Zeeman-field-induced nontrivial topological phases in a one-dimensional spin-orbit-coupled dimerized lattice*", Physical Review B 94, 125119 (2016).

Thesis, (12) Masoud Bahari, "*Topological insulator in a 1D quantum nano wire*", Master of Science Dissertation (2016).

Research Interests

Theoretical condensed matter physics, particularly unconventional superconductivity

Topological materials: topological insulators and superconductors

Mesoscopic systems and quantum phases of exotic states of matter

Band theory and electronic properties of solids

Numerical methods and theoretical modeling

Awards

2025 **Röntgen Science Prize for Young Scientists**
Faculty of Physics and Astronomy, University of Würzburg, Germany
Nominated by the Physics Institute and Faculty management; award ceremony will take place on 15 Dec 2025.

Skills

IT Skills — Operating Systems: Windows, Linux (Ubuntu)

Programming: MATLAB, C++, Mathematica, Visual Basic, Python

Software Knowledge — Materials Science: Vesta, CrystalMaker

Video Editing: Adobe Premiere, Chroma Key Techniques

Other: Microsoft Office (Macros), LaTeX, Bash

Competencies — Analytical Thinking / Structured Approach

Excellent Team and Communication Skills

Strong Comprehension / Willingness to Learn

Languages — English (Fluent), German (B2)

Work Experience

03/2025-12/2025 **Research Associate (Postdoc)**
Julius Maximilian University of Würzburg
Responsibilities:

- Research in the field of unconventional superconductivity
- Presentation of current research results at conferences
- Supervision of tutorial groups in theoretical physics

Supervisor: Prof. Dr. Björn Trauzettel

07/2019-03/2025 **Research Associate (PhD)**
Julius Maximilian University of Würzburg
Responsibilities:

- Research in the field of unconventional superconductivity
- Presentation of current research results at conferences
- Supervision of tutorial groups in theoretical physics

Supervisor: Prof. Dr. Björn Trauzettel
PhD Defense: March 21, 2025

09/2018-06/2019 **Independent Education Consultant**
Consulting for students with a focus on international university applications via the social media
Responsibilities:

- Video production (green-screen) and marketing (concept development and implementation)
- Individual advising for students from various disciplines

08/2017-04/2019 **Research Assistant**
Focus: Research in the field of topological quantum systems

Practical Experience

04/2023 – 01/2024 **Internship – Experimental Physics**
University of Würzburg, Germany
Supervisor: Dr. A. Odobesko

- Familiar with: principles of scanning tunneling microscopy (STM) and ultra-high vacuum (UHV)
- Tip preparation and sample preparation
- Instrument calibration; data acquisition and analysis

Teaching Experience (University of Würzburg)

10/23-03/24 Quantum Mechanics 2 (Prof. Dr. Assad)
04/22-03/24 Mathematical Methods (Prof. Dr. Trauzettel)
10/21-03/22 Mathematics 3 (Prof. Dr. Hinrichsen)
04/21-09/21 Quantum Mechanics 2 (Prof. Dr. Sangiovani)
10/19-03/21 Statistical Mechanics (Prof. Dr. Erdmenger and Hinrichsen)

Conference Contributions

18-22/05/2025 WE-Heraeus-Seminar, Poster, (Bad Honnef, Germany)
24-28/03/2023 QMA Autumn School, Co-Organizer (Leipzig, Germany)

20-24/03/2023	DPG Spring Meeting, Talk (Dresden, Germany)
24-28/03/2023	Cluster Retreat, Talk (Bayreuth, Germany)
04-09/09/2022	DPG Meeting, Poster (Regensburg, Germany)
25-29/07/2022	International Conference on Topological Quantum Matter (Würzburg, Germany)
30/04-02/05/2022	Superconducting Heterostructures, Poster (Bad Honnef, Germany)
30-31/03/2022	Exotic Superconductivity, Online Workshop (Würzburg, Germany)
23-25/03/2022	Cluster Retreat, Poster (Merseburg, Germany)
13-15/10/2021	QMA Fall School, Poster (Erfurt, Germany)
10/11/2020	Quantum Alliance, Poster (Würzburg, Germany)
17/11/2020	Software Workshop (Unix, Python, Git) (Würzburg, Germany)
03/04/2017	Magnetic and Superconducting Materials, Poster
21/05/2016	IASBS Condensed Matter Physics, Poster
13/05/2015	IASBS Condensed Matter Physics, Poster
28/01/2015	Strongly Correlated Systems, Poster

References

Prof. Dr. Björn Trauzettel, Institute of Theoretical Physics and Astrophysics, University of Würzburg, Germany
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Prof. Dr. Carsten Timm, Institute of Theoretical Physics, TU Dresden, Germany
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Dr. Song-Bo Zhang, Hefei National Research Center for Physical Sciences at the Microscale, Hefei, China
Email: songbozhang@ustc.edu.cn