Linus Kautzsch

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Personal

Date of birth: April 18th 1996.
Place of birth: Zwickau, Germany.
Citizenship: German.

Current Research Topic

My research is centered around the synthesis of nitride compounds and the exploration of the physics of these materials. Within the UC Santa Barbara Quantum Foundry, I explore quantum magnetism in nitrides as a base for entangled states suitable for the upcoming age of quantum information science. I use data-driven approaches to select promising materials. In addition, as a member of the IRG-1: Magnetic Intermetallic Mesostructures group, I am working on magnetic nitride compounds as skyrmion host systems.

Academic Track

1/2020 - current — **Ph.D. Student**
University of California, Santa Barbara
Materials Department
Research topic: Quantum magnetism in nitride materials
Advisors: Prof. S. Wilson, Prof. R. Seshadri
UC Santa Barbara Quantum Foundry Fellowship

10/2017 - 12/2019 — **Master's**
Technical University of Dresden, Germany
Chemistry, final grade: 1.2 (with distinction)

05/2019 - 12/2019 — **Master's Thesis**
Materials Research Laboratory, University of California, Santa Barbara
Subject: *Magnetic intermetallic compounds in the β-manganese crystal structure as skyrmion hosts*
Supervisors: Prof. C. Felser, Prof. R. Seshadri
Grade: 1.0 (very good)

10/2018 - 04/2019 **Research Internship**
Materials Research Laboratory, University of California, Santa Barbara
Subject: *Magnetic intermetallic compounds as skyrmion host systems*
Supervisors: Prof. C. Felser, Prof. R. Seshadri
Funding: PROMOS-Scholarship

10/2016 - 09/2018 **Research Student**
Max Planck Institute for Chemical Physics of Solids, Dresden, Germany
Subject: *Superconducting Heusler compounds*
Supervisor: Prof. C. Felser

10/2014 - 09/2017 **Bachelor's**
Technical University of Dresden, Germany
Chemistry, final grade: 1.7 (good) and ECTS-grade: A (best 10 %)
Bachelor's thesis: *A search for superconducting Heusler compounds without inversion symmetry in the AuPdTM set (T=Sc, Y and M=Al, Ga, In)*
Supervisors: Prof. C. Felser, Prof. T. Doert, grade: 1.3 (very good)

07/2006 - 06/2014 **High School**
Dr.-Wilhelm-Andre-Gymnasium, Chemnitz, Germany
Advanced courses: Physics and Mathematics
University-entrance diploma: 1.4 (very good)

Skills

Scientific data analysis, data-driven materials discovery, data mining
Python (advanced level).

App development for iOS
Swift (intermediate level).
MTRLcalc: A Materials Science calculator. Available on the **App Store**.
FruitDude: A game using SpriteKit and CoreMotion. Available on the **App Store**.

Sample preparation
Solid-state powder synthesis including reduction-nitridation gas flow synthesis for nitride compounds, arc melting, induction melting, single crystal preparation: vapor transport, flux growth, and floating zone crystal growth.

Measurement techniques
X-ray difraction (laboratory and synchrotron X-ray), wavelength-dispersive X-ray fluorescence, scanning electron microscopy with energy-dispersive X-ray spectroscopy, vibrating sample magnetometry at low temperatures.

Research equipment development
Design and fabrication of an ultra high pressure laser floating zone furnace.

Languages
English (fluent, C1 level), German (native speaker).

Publications

[1] Are AuPd*TM* (*T* = Sc, Y and *M* = Al, Ga, In), Heusler Compounds Superconductors without Inversion Symmetry?
L. Kautzsch, F. Mende, G.H. Fecher, J. Winterlik, C. Felser
Materials **2019**, *12*(16), 2580 **[doi]**

[2] Controlling Dzyaloshinskii-Moriya interactions in the skyrmion host candidates $FePd_{1-x}Pt_xMo_3N$
L. Kautzsch, J.D. Bocarsly, C. Felser, S.D. Wilson, R. Seshadri
Phys. Rev. Mater. **4**, (2020) 024412. **[doi] [arXiv]**

[3] Robust metastable skyrmions with tunable size in the chiral magnet $FePtMo_3N$
A.S. Sukhanov, A. Heinemann, **L. Kautzsch**, J.D. Bocarsly, S.D. Wilson, C. Felser, D.S. Inosov
in press at Phys. Rev. B **[arXiv]**

[4] High Capacity Li^+ Storage through Multielectron Redox in the Fast-Charging Wadsley–Roth Phase $(W_{0.2}V_{0.8})_3O_7$
K. Wyckoff, D. Robertson, M. Preefer, S. Teicher, J. Bienz, **L. Kautzsch**, T. Mates, J. Cooley, S. Tolbert, R. Seshadri
in press at Chem. Mater.

[5] Chemical Control of Spin-Orbit Coupling and Charge Transfer in Vacancy-Ordered Ru(IV) Halide Perovskites
P. Vishnoi, J.L. Zuo, J.A. Cooley, **L. Kautzsch**, A. Gómez-Torres, J. Murillo, S. Fortier, S.D. Wilson, R. Seshadri, A.K. Cheetham
submitted

Poster

[1] A search for superconducting Heusler compounds without inversion symmetry in the AuPd*TM* set (*T* = Sc, Y and *M* = Al, Ga, In).
L. Kautzsch, G.H. Fecher, W. Schnelle, C. Felser
German Physical Society - Condensed Matter Conference, Berlin, **2018**.

[2] A family of bulk skyrmion hosts in the filled β-manganese structure, $FePd_{1-x}Pt_xMo_3N$.
L. Kautzsch, J.D. Bocarsly, C. Felser, R. Seshadri
North American Solid State Chemistry Conference, Golden, Colorado, **2019**.

[3] From nitride skyrmions hosts to nitride quantum materials using THOR
L. Kautzsch, J.D. Bocarsly, J. Plumb, R. Seshadri, S.D. Wilson
Materials Research Outreach Program Symposium, UC Santa Barbara, **2020**.

Further Interests

UCSB ScienceLine
Answering of science questions for K-12 students.

FLAM 2019 - Future Leaders in Advanced Materials
Mentoring of a summer intern within the FLAM program.

Mentoring program at TU Dresden
Mentoring undergrad students in chemistry.

Sports
Hiking, weight training, running.