

Steffen Säubert

Contact

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Education

- 03/2014 **DOCTORAL STUDIES**, *Technical University of Munich*, Munich, Germany.
- 11/2018 University degree: **Doctor of Science (Dr. rer. nat.)**
- 10/2011 **MASTER STUDIES**, *Technical University of Munich*, Munich, Germany.
- 10/2013 University degree: **Master of Science – passed with high distinction**
- 09/2007 **BACHELOR STUDIES**, *Heidelberg University*, Heidelberg, Germany.
- 08/2011 University degree: **Bachelor of Science**

PhD Thesis

- title *Experimental Studies of Ultraslow Magnetisation Dynamics*
- supervision Prof. Dr. Christian Pfleiderer – Chair for the Topology of Correlated Systems – Physics Department, Technical University of Munich
- description Investigation of ultraslow magnetization dynamics in the vicinity of magnetic phase transitions. Namely, low-temperature magnetization processes in the pyrochlore oxide $\text{Yb}_2\text{Ti}_2\text{O}_7$, spin wave excitations and dispersions in the archetypal ferromagnet Fe, and spin relaxation processes in the spin-glass $\text{Fe}_x\text{Cr}_{1-x}$. The spin dynamics in these systems were addressed by means of vibrating coil magnetometry and neutron resonance spin echo spectroscopy in the MIEZE mode (modulation of intensity with zero effort).

Master's Thesis

- title *Isothermal Transformation Kinetics in Uranium Molybdenum Alloys*
- supervision Prof. Dr. Winfried Petry – Heinz Maier-Leibnitz Zentrum (MLZ) – Chair for Functional Materials E13 – Physics Department, Technical University of Munich
- description Study of the γ -UMo decomposition during temperature treatment in the research reactor fuel candidate U-8wt%Mo. The transformation kinetics were investigated by means of metallurgical methods, static neutron and X-ray diffraction on pre-annealed samples, as well as on samples annealed in-situ during neutron diffraction. Sample preparation as well as sample characterization had to be performed in radiologically controlled areas.

List of Publications

S. Säubert, J. Kindervater, F. Haslbeck, C. Franz, M. Skoulatos, and P. Böni. Dipolar Interactions in Fe: A Study with the Neutron Larmor Precession Technique MIEZE in a Longitudinal Field Configuration. *Physical Review B*, **99**:184423, 2019.

C. Franz, S. Säubert, A. Wendl, F. Haslbeck, O. Soltwedel, J. K. Jochum, L. Spitz, J. Kindervater, A. Bauer, P. Böni, and C. Pfleiderer. MIEZE Neutron Spin-Echo Spectroscopy of Strongly Correlated Electron Systems. *Journal of the Physical Society of Japan*, **88**:081002, 2019.

C. Franz, O. Soltwedel, C. Fuchs, S. Säubert, F. Haslbeck, A. Wendl, J. K. Jochum, P. Böni, and C. Pfleiderer. The Longitudinal Neutron Resonant Spin Echo Spectrometer RESEDA. *Nuclear Inst. and Methods in Physics Research A*, **939**:22-29, 2019.

F. Haslbeck, S. Säubert, M. Seifert, C. Franz, M. Schulz, A. Heinemann, T. Keller, P. Das, J. D. Thompson, E. D. Bauer, C. Pfleiderer, and M. Janoschek. Ultrahigh-Resolution Neutron Spectroscopy of Low-Energy Spin Dynamics in UGe_2 . *Physical Review B*, **99**:014429, 2019.

A. Scheie, J. Kindervater, S. Säubert, C. Duvinage, C. Pfeiderer, H.J. Changlani, S. Zhang, L. Harriger, K. Arpino, S.M. Koohpayeh, O. Tchernyshyov, and C. Broholm. Reentrant Phase Diagram of $\text{Yb}_2\text{Ti}_2\text{O}_7$ in a $\langle 111 \rangle$ Magnetic Field. *Physical Review Letters*, **119**:127201, 2017.

J. Kindervater, S. Säubert, and P. Böni. Dipolar Effects on the Critical Fluctuations in Fe: Investigation by the Neutron Spin-Echo Technique MIEZE. *Physical Review B*, **95**:014429, 2017.

S. Säubert, R. Jungwirth, T. Zweifel, M. Hofmann, M. Hoelzel, and W. Petry. Neutron and Hard X-ray Diffraction Studies of the Isothermal Transformation Kinetics in the Research Reactor Fuel Candidate U-8wt%Mo. *Journal of Applied Crystallography*, **49**:923–933, 2016.

S. Säubert, R. Jungwirth, T. Zweifel, M. Hofmann, M. Hoelzel, and W. Petry. Isothermal Transformation Kinetics in Uranium Molybdenum Alloys. *Transactions RRFM 2014*. Paper presented at the European Research Reactor Conference 2014, Ljubljana, Slovenia, 30 Mar - 3 Apr 2014, 52-62, 2014.

Experience

- since 03/2019 **Postdoctoral Research Scholar**, *Colorado State University*, Fort Collins, CO, USA.
Department: Physics Department, Condensed Matter Experiment, Frustrated and Quantum Magnetism Group (Ross Lab)
- sample preparation and characterization
 - laboratory-based bulk measurements
 - neutron scattering
- 03/2019 **Research Stay:** Spallation Neutron Source, Oak Ridge National Laboratory, Oak Ridge, TN, USA.
- • preparation of sample environment
- 07/2019 • development of pulsed magnet technology
- 03/2014 **Research Associate**, *Technical University of Munich, Heinz Maier-Leibnitz Zentrum (MLZ)*,
- Munich, Germany.
- 02/2019 **Department:** Physics Department, Chair for the Topology of Correlated Systems
- neutron scattering at large scale facilities
 - laboratory-based bulk measurements of materials under extreme conditions (ultralow temperatures; high magnetic fields)
 - instrumental developments/advancements of the neutron spin echo spectrometer RESEDA (hardware: reconstructions and installation of various aspects of the instrument; software: data analysis and instrumental control)
- 10/2012 **Research Assistant**, *Technical University of Munich, Heinz Maier-Leibnitz Zentrum (MLZ)*,
- Munich, Germany.
- 11/2013 **Department:** Nuclear Fuel Development
- assisting in construction of new laboratory set ups
 - sample preparation, organization, and data evaluation of experiments
- 10/2011 **Study Project Member**, *Technical University of Munich*, Munich, Germany.
- **Department:** Institute of Astronautics
- 09/2012 • developing concepts for attitude determination and control systems (ADCS)
- 11/2010 **Working Student**, *SAP AG*, Walldorf, Germany.
- **Department:** Quality Engineering GTS
- 08/2011 • quality engineering tests for SAP Global Trade Services (GTS) - Compliance Management

Professional Activities

Authored and co-authored over 20 successful proposals for neutron beam time. The allocated beam time consists of approximately 120 days. Considering that one day of beam time costs about 10.000 Eur, this amounts to 1.200.000 Eur of obtained third-party funding.

Member of the Further Training Unit (FTU) board of the collaborative research center TRR80. July 2017 - February 2019.

Member of the German Physical Society (DPG). Since February 2016.

Participation in the 2017 Gordon Research Conference on Neutron Scattering (GRC) in Hong Kong, China. 6-11 August 2017.

Judge for the poster presentations at the 7th Energy Colloquium of the Munich School of Engineering (MSE) in Munich, Germany. 7 July 2017.

Organizational team for the 2016 Young Researchers Workshop of the collaborative research center TRR80 in Riva del Garda, Italy. 11-14 October 2016.

Organizational team for the PhD Symposium at the 2015 Spring Meeting of the German Physical Society titled “*Quantum Phase Transitions – Emergent Phenomena Beyond Elementary Excitations*” in Berlin, Germany. 17 March 2015.

Participation in the Higher European Research Course for Users of Large Experimental Systems (HERCULES) in Grenoble, France. 1 March - 1 April 2015.

Teaching

- 2016 - 2019 **Supervisor**, *Chair for the Topology of Correlated Systems*.
- supervision of several bachelor and master projects
- 2016 - 2017 **Lecture Assistant**, *Reactor Physics and Applications of Nuclear Technology*.
- organization of exercise groups; script writing of lecture notes
- 2016 **Lecture Assistant**, *Basic Concepts for Neutron Instrumentation*.
- script writing of lecture notes
- 2014 - 2016 **Lecture Assistant**, *Introduction to Condensed Matter Physics*.
- organization of exercise groups, exercise sheets, and final exams; teaching exercise groups
- 2012 - 2015 **Laboratory Course Assistant**, *Physics Laboratory Course for Students*.
- introductory lecture; correction of the lab report and final colloquium

Additional Skills

languages	German (native - C2) English (fluent - C1) French (intermediate - B1)
computer	programming: Python (very good knowledge) scientific: FullProf Suite, IGOR Pro, Origin (very good knowledge) CAD: Solid Works (good knowledge) CAS: Matlab, Maple, Mathematica (general knowledge)
technical expertise	sample preparation: metallurgical methods as grinding/polishing/etching; preparation of alloys investigation methods: structure analysis via SEM/EDX, X-ray-/neutron diffraction; neutron spectroscopy; magnetization/susceptibility sample environment: magnetic fields; high temperatures; dilution refrigerator; pressure cells

Presentations and Posters

In Search of Microscopies of Quantum Annealing, poster presented at the 5th Front Range Advanced Magnetism Symposium, Boulder, USA. 15 August 2019.

Magnetization Dynamics in Yb₂Ti₂O₇ and Ho₂Ti₂O₇, poster presented at the CIFAR Quantum Materials Summer School and Program Meeting, Vancouver, Canada. 8-13 April 2019.

Magnetisation Dynamics in Iron and Iron-Chromium Studied by the Longitudinal MIEZE Setup at RESEDA, poster presented at the 7th NHMFL Theory Winter School in Tallahassee, Florida, USA. 7-11 January 2019.

Experimental Studies of Ultraslow Magnetisation Dynamics, talk presented at the CSU Condensed Matter Physics Seminar Series in Fort Collins, Colorado, USA. 23 October 2018.

Strong Quantum Character of the Magnetic Phase Diagram of Yb₂Ti₂O₇, talk presented at the 2018 International Conference on Magnetism (ICM2018) in San Francisco, California, USA. 15-20 July 2018.

Spin Relaxation Processes in Fe_xCr_{1-x} Investigated by the Neutron Spin Echo Technique MIEZE, talk presented at the 2018 Polarised Neutrons for Condensed Matter Investigations (PNCMI) conference in Milton Hill, UK. 3-6 July 2018.

Orientation Dependence of the Magnetic Phase Diagram of Yb₂Ti₂O₇, talk presented at the 2018 Spring Meeting of the German Physical Society (DPG) in Berlin, Germany. 11-16 March 2018.

Dipolar Effects on the Critical Fluctuations in Fe: Investigation by MIEZE, talk presented at the 2017 Spring Meeting of the German Physical Society (DPG) in Dresden, Germany. 19-24 March 2017.

Critical Dynamics in Fe: Investigation by the Neutron Spin Echo Technique MIEZE, poster presented at the 2017 Gordon Research Conference on Neutron Scattering (GRC) in Hong Kong, China. 6-11 August 2017.

Spin Relaxation Processes in $\text{Fe}_x\text{Cr}_{1-x}$, talk presented at the 2016 Spring Meeting of the German Physical Society (DPG) in Regensburg, Germany. 6-11 March 2016.

Investigation of the Spin Relaxation Processes in $\text{Fe}_x\text{Cr}_{1-x}$ by Means of Neutron Spin Echo, poster presented at the 2015 International Conference on Magnetism (ICM2015) in Barcelona, Spain. 5-10 July 2015.

Investigating the Reentrant Spin Glass $\text{Fe}_x\text{Cr}_{1-x}$ by means of Neutron Spin Echo, poster presented at the 2015 Higher European Research Course for Users of Large Experimental Systems (HERCULES) in Grenoble, France. 1 March - 1 April 2015.

Neutron Techniques at FRM II, talk presented at the 2014 Young Researchers Forum of the collaborative research center TRR80 (YRF-TRR80) in Munich, Germany. 5 May 2014.

Isothermal Transformation Kinetics in Uranium Molybdenum Alloys, talk presented at the 2014 European Research Reactor Conference (RRFM) in Ljubljana, Slovenia. 30 March - 3 April 2014.