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Metall entspannen mit Vibration

BERICHT WM 886 SPANNUNGEN MESSEN

POLDI Neutronen Diffractometer

1 POLDI: «NEUTRONEN DIFFRACTOMETER»

Neutronen Spannungen Messen

POLDI: A Materials Science Time-Of- Flight Neutron Diffractometer

POLDI (Pulse OverLap Diffractmeter) is a time-of-flight thermal neutron diffractometer, dedicated to materials science applications. In particular POLDI is well suited for:

- Spatially resolved measurements of residual stresses in engineering components
- Study of stress/temperature induced phase transformations

- In-situ deformation studies of metallic systems

POLDI is operated by the [NIAG group](#) of the [Laboratory for Neutron Scattering and Imaging](#).

POLDI: Ein Materialwissenschaftliches Flugzeit-Neutronen-Diffraktometer

POLDI (Pulse OverLap Diffractmeter) ist ein thermisches Neutronen Diffraktometer, das speziell für Anwendungen in der Materialwissenschaft entwickelt wurde. Insbesondere ist POLDI gut geeignet für:

- Ortsaufgelöste Messungen von Eigenspannungen in technischen Bauteilen
- Untersuchung von stress- / temperaturinduzierten Phasenumwandlungen

• In-situ-
Verformungsuntersuchungen
metallischer Systeme

POLDI wird von der NIAG-Gruppe
des Labors für
Neutronenstreuung und
Bildgebung betrieben

1.1.1 CONTACT

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The Laboratory for Neutron Scattering and Imaging (LNS) at the Paul Scherrer Institute is responsible for the scientific exploitation, operation and development of neutron scattering and imaging instruments at the Swiss Spallation Neutron Source (SINQ). The team of 50 senior scientists, postdoctoral researchers and PhD students further collaborates on diverse research projects ranging from modern topics in condensed matter physics and materials science to pressing questions in energy research and health care. [read more](#)

1.2 PhD, Master, Bachelor or Semester projects at the LNS

We offer students the possibility to do their PhD or educational research in our lab. See [Teaching and Education](#) for detailed information on Master/Diploma thesis, Bachelor/Semester work and practical courses at the LNS. Currently we have open positions for

- [Semester projects](#) on several topics
- [Master project](#) - Elastic properties in **low dimensional quantum systems**
- [Master project](#) - Spontaneous magnon decay in **non-collinear antiferromagnets**
- [Master project](#) - **Geometrical magnetic frustration** beyond insulating ionic compounds
- [Master project](#) - Magnetic order in **anisotropic triangular materials**
- [Master project](#) - Magnetic structure of the **quantum trimer compound** $\text{Cs}_3\text{Cu}_3\text{Cl}_8\text{OH}$

1.3 News

12. February 2018

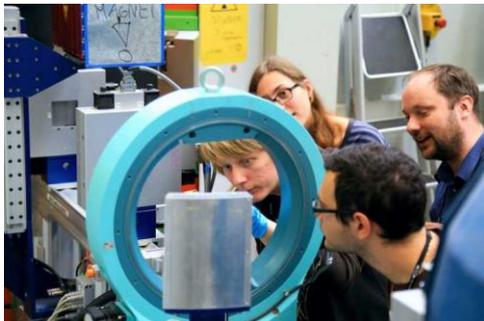


1.3.1 *IMAGING AT PAUL SCHERRER INSTITUTE HELPS TO INCREASE PRODUCTION AT ABB SITE IN AARGAU*

The ABB facility in Wettingen, Aargau, got practical recommendations on increasing output in the manufacture of ceramic components. The ceramics in question are

voltage-dependent resistors used in overvoltage protectors – a kind of lightning protection system – for example in electrical transmission lines. Researchers of the Laboratory for Neutron Scattering and Imaging at the Paul Scherrer Institute PSI examined the components by means of neutron imaging. With the help of these images, ABB employees were able to see where there was potential for further process optimisation. This investigation took place within the framework of a feasibility study funded by Hightech Zentrum Aargau. [PSI Media Release](#)

11. December 2017



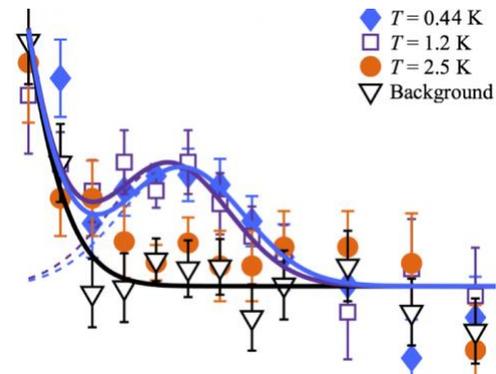
1.3.2 SWEDNESS STUDENTS VISIT PSI FOR HANDS-ON TRAINING IN NEUTRON SCATTERING

To take full advantage of the upcoming European Spallation Source facility ESS, strategic funding has been allocated to rebuild and expand the Swedish neutron scattering community. One of the most important actions is the establishment of the Swedish national graduate school in neutron scattering (SwedNess). Up to 40 PhD students will be fully funded, employed and trained within this school. In the end of September 2017, the first 20 PhD students arrived at the Paul Scherrer Institute (PSI) and the Swiss Spallation Neutron Source (SINQ) for their very first hands-on training in neutron scattering. During their week at PSI the SwedNess students obtained specific training in neutron reflectometry as well as

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neutron and x-ray imaging. The training was very much appreciated by the students and PSI looks forward to welcoming them back in a near future as scientific users of the SINQ neutron facility.

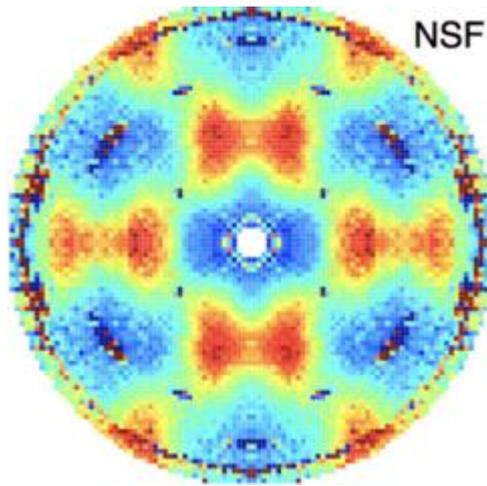
15. November 2017



1.3.3 SPIN RESONANCE AND MAGNETIC ORDER IN AN UNCONVENTIONAL SUPERCONDUCTOR

D.G. Mazzone et al., [Physical Review Letters 119, 187002 \(2017\)](#). Unconventional superconductivity in many materials is believed to be mediated by magnetic fluctuations. It is an open question how magnetic order can emerge from a superconducting condensate and how it competes with the magnetic spin resonance in unconventional superconductors. Here we study a model d-wave superconductor that develops spin-density wave order, and find that the spin resonance is unaffected by the onset of static magnetic order. This result suggests a scenario, in which the resonance in $\text{Nd}_{0.05}\text{Ce}_{0.95}\text{CoIn}_5$ is a longitudinal mode with fluctuating moments along the ordered magnetic moments.

17. October 2017



1.3.4 COULOMB SPIN LIQUID IN ANION-DISORDERED PYROCHLORE $Tb_2Hf_2O_7$

R. Sibille et al., [Nature Communications 8, 892 \(2017\) \(full article\)](#). The charge ordered structure of ions and vacancies characterizing rare-earth pyrochlore oxides serves as a model for the study of geometrically frustrated magnetism. The organization of magnetic ions into networks of corner-sharing tetrahedra gives rise to highly correlated magnetic phases with strong fluctuations, including spin liquids and spin ices. It is an open question how these ground states governed by local rules are affected by disorder. Here we demonstrate in the pyrochlore $Tb_2Hf_2O_7$, that the vicinity of the disordering transition towards a defective fluorite structure translates into a tunable density of anion Frenkel disorder while cations remain ordered. Quenched random crystal fields and disordered exchange interactions can therefore be introduced into otherwise perfect pyrochlore lattices of magnetic ions. We show that disorder can play a crucial role in preventing long-range magnetic order at low temperatures, and instead induces a strongly fluctuating Coulomb spin liquid with defect-induced frozen magnetic degrees of freedom.

13.03.2018 11:00 - 12:00 WHGA/121

1.3.5 [SUPERCONDUCTIVITY IN TWISTED BILAYER GRAPHENE](#)

Seminar CMT
Jyong-Hao Chen (CMT)



14.03.2018 14:00 - 15:00 WHGA/121

1.3.6 [HYPERFINE STRUCTURE OF HEAVY MUONIC ATOMS](#)

Seminar LTP
Niklas Michel (MPI Heidelberg)

Noch zu integrieren [Neue Methode zur Vermessung von Neutronen | Paul Scherrer Institut ...](#)

<https://www.psi.ch/media/neue-methode-zur-vermessung-von-neutronen>

02.10.2015 - Klaus Kirch, Laborleiter Teilchenphysik am PSI, an einem **Testaufbau** zur Messung des elektrischen Dipolmoments des Neutrons. Die Forschenden haben eine neue Methode entwickelt, ultrakalte **Neutronen** zu vermessen. Diese kann womöglich bei der Erklärung helfen, weshalb beim Urknall deutlich

2 QUELLENVERZEICHNIS

Int_ Nasser Kanani

<http://de.stresstechgroup.com/content/de/1041/1671/Barkhausenrauschen%20Analyse.html>

Praktikumsanleitung Versuch - Lehrstuhl
Metallische Werkstoffe

[http://www.mat-
tec.ch/de/services/eigenstressungen.html](http://www.mat-tec.ch/de/services/eigenstressungen.html)

<https://www.psi.ch/sing/poldi/>

[http://wiap.ch/Diverse%20Sprachen/Deut
sch/1.%20Inhalt%2000/Inhalt%2000.htm](http://wiap.ch/Diverse%20Sprachen/Deutsch/1.%20Inhalt%2000/Inhalt%2000.htm)

Wikipedia NDE

<http://stressvision.com/>

*Ende Bericht WM 886, Spannungen
messen
Hpw 07_11_2018*