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Hysteresis Design of Magnetic Materials for Efficient Energy Conversion

Tuesday, 29 June 2021, 9:00 s.t., TU Darmstadt, Zoom



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University of Luxembourg

Magnetic Small-Angle Neutron Scattering - A Probe for Mesoscale Magnetism Analysis

Abstract:

Small-angle neutron scattering (SANS) is a powerful technique for the investigation of magnetic materials, since it provides information from within the bulk of magnetic media and on the mesoscopic length scale, i.e., the size regime between a few nanometers and a few micrometers. In this talk we give an introduction into the basics of magnetic SANS and we summarize recent theoretical and experimental work. This includes the study of the effect of the Dzyaloshinskii-Moriya interaction in microstructural-defect-rich materials, investigations of the spin structure of Nd-Fe-B nanocomposites and Mn-Bi magnets, and the usage of micromagnetic simulations for understanding the spin structure of nanoparticles beyond the single-domain form-factor concept.

About the speaker:

Andreas Michels received his doctoral degree in 2001 from the Universität des Saarlandes, Germany. After postdoctoral stays at the Forschungszentrum Karlsruhe, Germany, the Paul Scherrer Institute, Switzerland, and Monash University, Australia, he obtained his habilitation degree in 2008 from the Universität des Saarlandes. Within the framework of an ATTRACT research fellowship of the National Research Fund of Luxembourg, he then built up a neutron scattering and magnetic materials group in the Department of Physics and Materials Science at the University of Luxembourg. His research interests are centered around the technique of magnetic small-angle neutron scattering (SANS). On the one hand side SANS is used for experimentally studying the spin structures of magnetic materials, e.g., Nd-Fe-B or Mn-Bi-based permanent magnets, shape-memory alloys, or magnetic nanoparticles, and on the other hand side theoretical and simulation work is carried out in order to understand and develop the fundamentals of magnetic SANS.

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