Univ-Prof. Dr. Jure Demsar
Univ.-Prof. Dr. Hans-Joachim Elmers
Univ.-Prof. Dr. Mathias Kläui
Univ.-Prof. Dr. Thomas Palberg

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Seminar über die Physik der kondensierten Materie (SFB/TRR173 Spin+X und SFB/TR288 Kolloquium, TopDyn-Seminar)

June 29, 2023 at 2 p.m.
01-122 Newton Raum

Oleksandr V. Pylypovskyi
Helmholtz-Zentrum Dresden-Rossendorf e.V.

Curvilinear magnetic nanoarchitectures

The geometry of magnetic objects at the nanoscale plays a crucial role in their properties. Conventionally, the respective phenomena were considered for a long time as a result of sample boundaries leading, e.g., to the formation of closed-flux magnetization distributions and the interaction of magnetic solitons with notches in racetracks. However, such a simplified picture omits the topological properties and symmetries of the sample. A quantitative approach to predict magnetic responses based on the geometry of magnetic nanoarchitectures is provided by the theory of curvilinear magnetism.
In this talk, we will discuss analytical approaches and some experimental validations of theoretical predictions for curvilinear nanomagnets. The local bends and twists of low-dimensional ferromagnets enable chiral and anisotropic responses stemming from the exchange interaction. For the particular sample scale, these responses are complemented by the magnetostatics-induced symmetry breaks and the respective formation of multiple magnetochiral characteristics of the magnetic textures. Antiferromagnetic nanoobjects inherit particular properties of curvilinear ferromagnets and complement them with more complex properties of the Neel order parameter and field-induced spin-reorientation transitions.

Contact:
Univ-Prof. Dr. Jure Demsar
Univ.-Prof. Dr. Hans-Joachim Elmers
Univ.-Prof. Dr. Mathias Kläui
Univ.-Prof. Dr. Thomas Palberg

SPIN+X SFB/TRR 173 Kaiserslautern • Mainz