INTERDISCIPLINARY CENTRE FOR
ADVANCED MATERIALS SIMULATION

The ICAMS Seminar presents

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Interactions and frustrations in lateral magnetic nanostructures

In ferromagnetic thin films the domain structure in remanence and the magnetization reversal are determined by the interplay between different contributions to the total free energy: exchange energy, magneto-crystalline, shape, and interface anisotropies. By reducing the size and controlling the shape, only the dipolar contribution to the anisotropy remains. We have investigated patterned magnetic nanostructures consisting of magnetic dipoles arranged on lattices with different symmetries: square, kagomé, and honeycomb. Those lattices are representations of dipolar spin ice. Dipolar spin ice has recently attracted much theoretical and experimental attention because of their intriguing ground state ordering and elementary excitation properties. After providing a more general overview on magnetic nanostructures and research activities at the Institute EPIV, I will present experimental realizations of magnetic dipolar spin ice on periodic lattices and will discuss the spin and charge order in the ground state, as well as metastable configurations during magnetization reversal [1]. The nanostructures were prepared by means of e-beam lithography and the dipole configurations were imaged by magnetic force microscopy at room temperature.

[1] Thesis work of Dipl. Phys. Alexandra Schumann