# Chirality transitions in magnetic materials

Marco Cicalese

In magnetic compounds complex geometric structures may arise as a result of interactions of exchange nature. For lattice energies this phenomenon is strictly related to the so-called frustration mechanisms which refers to the presence of conflicting interatomic forces that result, for instance, from the competition between ferromagnetic (F) and antiferromagnetic (AF) interactions. This is the case of the classical F/AF spin system that we present in this seminar. In the two-dimensional setting we first characterize its global minima at the onset of the helimagnetic/ferromagnetic transition point. Then we show that the excess energy about the ground states can be rescaled to highlight the emergence of chirality transitions, i.e., transition between helical spin configurations having different direction and/or different chirality (handedness). Among the main ideas needed to prove the Gamma-limit of the discrete system as the lattice spacing vanishes, we discuss in particular the geometric rigidity of certain gradient fields which mirrors the frustration mechanism of the system. This results has been obtained in collaboration with M. Forster and G. Orlando.

M. Cicalese, Technische Universität München Zentrum Mathematik - M7 Boltzmannstrasse 3 85747 Garching

*E-mail address*: cicalese@ma.tum.de