TECHNISCHE UNIVERSITÄT DRESDEN

Bereich Mathematik und Naturwissenschaften Fakultät Physik

PHYSIKALISCHES KOLLOQUIUM

Referent: **Prof. Dr. István Kézsmárki**
Experimental Physics V
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Thema: **Skyrmions and antiskyrmions in crystals with axial symmetry**

Zeit und Ort: Dienstag, 10.4.2018, 16:40 Uhr
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

Leiter: Prof. Dr. Lukas M. Eng

Kurzfassung: Néel-type skyrmions [1] and antiskyrmions [2], recently realized in axially symmetric magnets, are substantially different from Bloch-type skyrmions, widely explored in chiral cubic magnets, in terms of their internal magnetic structure, their stability range, as well as their response to external stimuli. More specifically, the axial symmetry of the host gives rise to an extended stability range by restricting the wave vectors of magnetic modulations to the plane normal to the high-symmetry axis. Since such skyrmions and antiskyrmions do not co-align with external magnetic fields, instead their orientation keeps confined to the high-symmetry axis of the host, they become asymmetric in oblique magnetic fields [3, 4]. This distortion gives rise to an additional degree of freedom, which affects their dynamics. Moreover, it may result in either an attractive or a repulsive skyrmion-to-skyrmion interaction, depending on the relative orientation of the pair. Corresponding experimental results on lacunar spinel and Heusler alloys hosting Néel-type skyrmions and antiskyrmions, respectively, will also be reviewed together with the magnetoelectric nature of these new skyrmion prototypes [1, 2, 5, 6].

Biographie: István Kézsmárki is professor in solid state physics, spectroscopy and magnetism. Current research interest: i) magnetic and spectroscopic studies on skyrmion host compounds; ii) optical properties of multiferroic materials, optical magnetoelectric effect, unidirectional light transmission; iii) magneto-optical spectroscopy of collective excitations in itinerant and insulating magnets; iv) spectroscopic study of correlated electron systems; v) magneto-optical diagnosis of malaria and biomedical applications of magnetic nanoparticles.

[1] I. Kézsmárki et al., *Nat. Mater.* **14**, 1116 (2015).
[2] A. K. Nayak et al., *Nature* **548**, 561 (2017).
[3] A. O. Leonov and I. Kézsmárki, *Phys. Rev. B* **96**, 014423 (2017).
[4] A. O. Leonov and I. Kézsmárki, *Phys. Rev. B* **96**, 214413 (2017).
[5] E. Ruff et al., *Sci. Adv.* **1**, e1500916 (2015).
[6] S. Bordács et al., *Sci. Rep.* **7**, 7584 (2017).