Physikalisches Kolloquium

Universität Konstanz

Di 22.01.19
15:15 Uhr
14:45 Uhr, Kaffee/Tee
R 513

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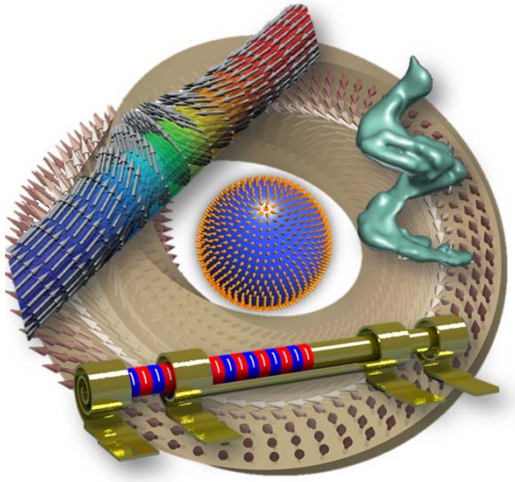
From curvilinear magnetism to shapeable magnetoelectronics



Extending 2D structures into 3D space has become a general trend in multiple disciplines, including electronics, photonics, plasmonics and magnetics. This approach provides means to modify conventional or to launch novel functionalities by tailoring curvature and 3D shape. We study 3D curved magnetic thin films and nanowires where new fundamental effects emerge from the interplay of the geometry of an object and topology of a magnetic sub-system [1,2]. On the other hand, we explore the application potential of these 3D magnetic architectures for the realization of mechanically shapeable magnetoelectronics [3] for automotive but also virtual and augmented reality appliances [4,5]. The balance between the fundamental and applied inputs stimulates even further the development of new theoretical methods and novel fabrication/characterization techniques [6-8].

[1] R. Streubel et al., Magnetism in curved geometries. J. Phys. D: Appl. Phys. (Review) 49, 363001 (2016).
[2] D. Sander et al., The 2017 magnetism roadmap. J. Phys. D: Appl. Phys. (Review) 50, 363001 (2017).
[3] D. Makarov et al., Shapeable Magnetoelectronics. Appl. Phys. Rev. (Review) 3, 011101 (2016).
[4] G. S. Cañón Bermúdez et al., Magnetosensitive e-skins with directional perception for augmented reality. Science Advances 4, eaao2623 (2018).
[5] G. S. Cañón Bermúdez et al., Electronic-skin compasses for geomagnetic field driven artificial magnetoception and interactive electronics. Nature Electronics 1, 589 (2018).
[6] R. Streubel et al., Retrieving spin textures on curved magnetic thin films with full-field soft X-ray microscopies. Nature Communications 6, 7612 (2015).
[7] T. Kosub et al., All-electric access to the magnetic-field-invariant magnetization of antiferromagnets. Phys. Rev. Lett. 115, 097201 (2015).
[8] T. Kosub et al., Purely antiferromagnetic magnetoelectric random access memory. Nature Communications 8, 13985 (2017).