Contribution ID: **21** Type: **Poster**

Topologically stable helices in exchange-coupled rare-earth/rare-earth multilayer with superspin-glass-like ordering

Tuesday, 18 September 2018 17:15 (15 minutes)

The magnetization process of a two-dimensional randomly anisotropical system is directly connected with topologically stable helices in the form of 2π-planar domain walls (DWs). These DWs are often reported for rare-earth/transition metal layered systems. In this paper, we investigate such DWs within a rare-earth/rare-earth system, viz. $[Dy/Tb]\times 10$ multilayers with two different anisotropic layers. Superspin-glass (SSG) type of behavior was revealed by DC magnetization and AC susceptibility measurements as a function of temperature and frequency. Interestingly, magnetic investigations on these samples revealed an exchange bias field upto -0.88 kOe which is commonly reported in rare-earth/transition-metal films, but not in rare-earth/rare-earth films. Using polarized neutron reflectometry (PNR) at the neutron reflectometer MARIA at FRM II in Germany, we find evidences of superimposed helical ferromagnetic magnetic configurations within both Dy and Tb. These 2π-DWs have lead to spin-frustrated interfaces. Off-specular neutron scattering indicates vertically correlated structure and fluctuations of the magnetization around the mean magnetization from vertically uncorrelated domains. Fundamentally, the helical ground states coexistent with superspin-glass-like ordering are topologically stable. In principle, such systems can therefore be exploited in all-spin-based technology.

Primary authors: Mr BALDAUF, Thomas; YE, Jingfan; MATTAUCH, Stefan (FZ-Juelich); PAUL, Neelima; PAUL, Amitesh

Presenter: YE, Jingfan

Session Classification: Poster session 2

Track Classification: P5 Thin films, 2D materials and surfaces