Contribution ID: **250** Type: **Talk (25 + 5 min)**

Proximity effect in DyCo thin films investiagted by Polarized Neutron Reflectometry

Monday, 20 March 2023 14:30 (30 minutes)

Amorphous Rare-Earth - 3d Transition Metal alloys (RE-3d TM) are fascinating magnetic materials due to the easy, straight-forward tunability of their magnetic properties, depending on temperature and the concentration ratio between the RE and 3d TM components. In this presentation, DyCox thin films sandwiched by two thin Ta layers are discussed that show various intriguing phenomena, e.g. a novel atomic exchange bias effect [1] or the appearance of compact skyrmions [2]. Previous XMCD measurements in transmission and TEY on the samples demonstrates that the bulk and the most upper surface moments of the DyCo films behaving differently in these samples. This results into a coupling between the both regimes. The detailed knowledge of the coupling behavior is crucial for the explanation of the observed phenomena, however, by the XMCD techniques only the upper surface (TEY) and the an average through the complete film (transmission) could be probed. Here, we will present comprehensive polarized neutron reflectivity studies carried out on MARIA of JCNS at the FRM-II (MLZ) that enabled us to probe the complete magnetic depth profile gaining a much better detailed view of the coupling behavior between surface/interface and the bulk parts. The study of the magnetic profile in dependence on temperature and magnetic field allowed us to gain important information about the magnetic states, particularly at the proximity to the Ta layers that are crucial for our understanding and may help us on the way to tailor the magnetic properties in this simple but magnetically very versatile system.

[1] K. Chen, D. Lott, F. Radu, F. Choueikani, E. Otero, P. Ohresser, “Observation of an atomic exchange bias effect in DyCo4 film”, Scientific Reports 5, 18377 (2015)
[2] K. Chen, D. Lott, A. Philippi-Kobs, M. Weigand, C. Luo and F. Radu, “Observation of compact ferromagnetic skyrmions in DyCo3 film”, Nanoscale, (2020),12, 18137-18143,

Primary author: Dr LOTT, Dieter (Helmholtz-Zentrum Hereon)

Presenter: Dr LOTT, Dieter (Helmholtz-Zentrum Hereon)

Session Classification: Magnetic Thin Films & Nano

Track Classification: Magnetism, Superconductivity, Topological Systems, Magnetic Thin Films an other electronic phenomena