MA 16 Hauptvortrag Hellwig

Zeit: Montag 09:45–10:15 Raum: TU H1028

Hauptvortrag MA 16.1 Mo 09:45 TU H1028

Magnetic domain structure and magnetization reversal in perpendicular AF coupled films — •Olav Hellwig[1], Andreas Berger[2], and Eric E. Fullerton[2] — [1]BESSY GmbH, Albert-Einstein-Str. 15, 12489 Berlin, Germany — [2]Hitachi San Jose Research Center, 650 Harry Road, San Jose, CA 95120, USA

We explored the magnetic properties of a model system for AF-coupled films with perpendicular anisotropy ([(Co/Pt)X Co/Ru]N multilayers). In the perpendicular geometry the dipolar fields and the interlayer exchange coupling compete with each other, thus resulting in novel phase transitions and a surprisingly rich array of domain structures not seen with in-plane systems. I will present Magnetic Force Microscopy (MFM) imaging studies of these domains together with corresponding energy calculations that explain our observations. I will show that the different magnetic energy contributions in perpendicularly AF coupled systems can be tuned to stabilize two very different magnetic ground states with similar total magnetic energy. Increasing the thickness of the AF-coupled layer stacks (X) we observe a transition from an exchange dominated laterally uniform antiferromagnetic state to ferromagnetic labyrinth stripe domains [1,2]. Finally I will demonstrate how our model system can also be used to learn more about the nature of AF domain walls [3].

[1] Olav Hellwig et al, Nature Materials 2 (2003) 112. [2] Olav Hellwig et al, J. Magn. Magn. Mater., in print (2004). [3] Olav Hellwig et al, Phys. Rev. Lett. 91 (2003) 197203.