

Physikalisches Kolloquium



Thursday, 13.02.2020, 16:15, HS 100
Reception with coffee & cookies 15:45
 (For university staff: please bring your own cup for sustainability reasons)

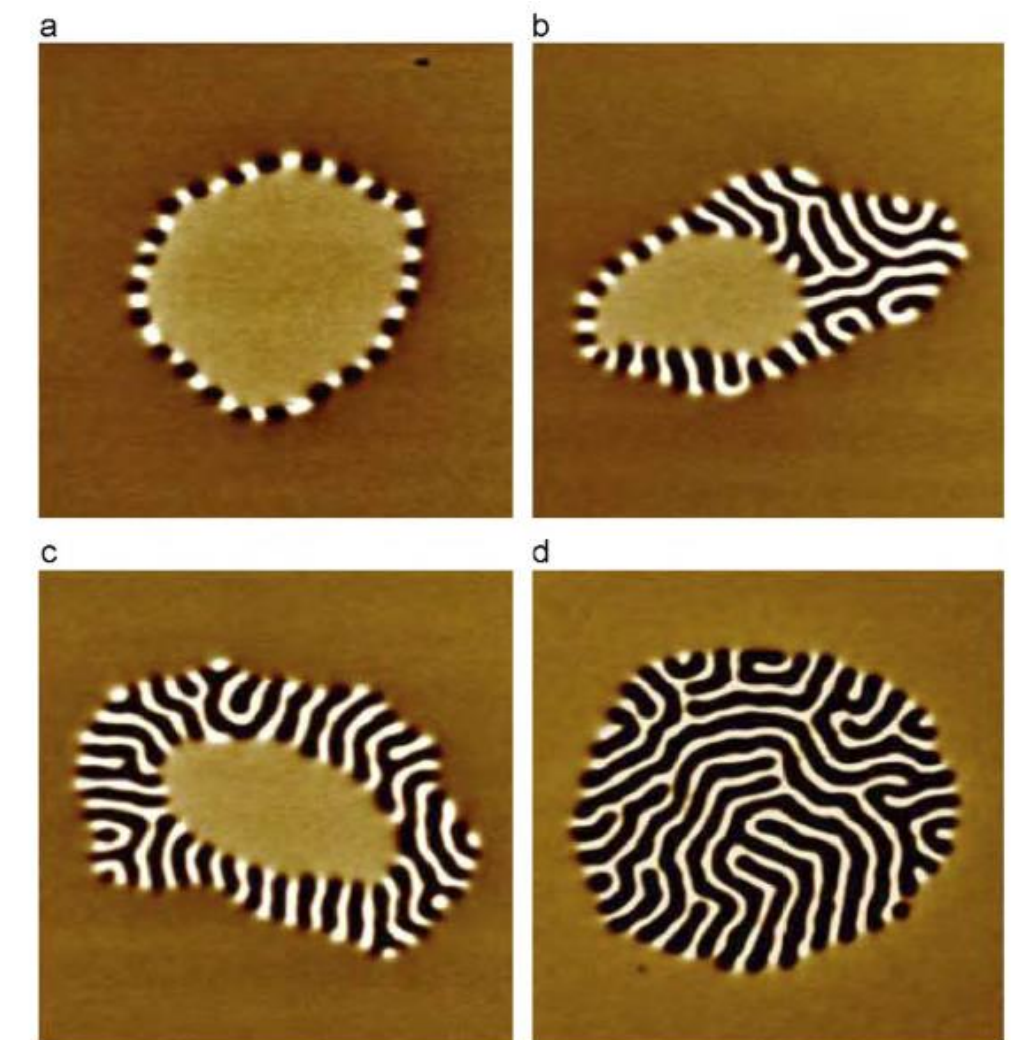
Prof. Dr. Olav Hellwig, Technische Universität Chemnitz:

The Physics of Perpendicular Anisotropy Layered Synthetic Antiferromagnets

Abstract

Magnetic storage technologies exploit antiferromagnetic (AF) interlayer exchange coupling (IEC) in various magnetoresistive sensor devices. While historically the magnetization was within the film plane, nowadays a magnetization perpendicular to the plane is achievable as well. Motivated by this, we explore the properties of synthetic layered antiferromagnets (SAFs) with perpendicular magnetic anisotropy (PMA), namely $\{[Co/TM]X-1 Co/IL\}N [Co/TM]X$ multilayers) [1-4], where TM is a transition metal, like Pt, Pd or Ni, and IL is a non-magnetic metal, like Ru or Ir. Due to the PMA, dipolar fields and AF-IEC compete with each other, resulting in surprisingly complex and rich domain structures, not observed for in-plane systems. Field reversal and domain imaging [1-3] will be presented with corresponding energy considerations that help understanding our observations.

- [1] O. Hellwig, T. L. Kirk, J. B. Kortright, A. Berger, and E. E. Fullerton, *Nature Materials* 2 (2003) 112.
- [2] O. Hellwig, A. Berger and E. E. Fullerton, *Phys. Rev. Lett.* 91 (2003) 197203.
- [3] O. Hellwig, J. B. Kortright, A. Berger and E. E. Fullerton, *J. Magn. Magn. Mater.* 319 (2007) 13.
- [4] B. Böhm, L. Fallarino, D. Pohl, B. Rellinghaus, K. Nielsch, N. S. Kiselev and O. Hellwig, *Phys. Rev. B* 100 (2019) 140411(R).



All of you interested in physics are cordially invited!