

VA 5: Gaede-Prize Talk Kirsten von Bergmann

Time: Wednesday 13:15–13:55

Location: H15

Prize Talk

VA 5.1 Wed 13:15 H15

Complex magnetic order on the atomic scale — •KIRSTEN VON BERGMANN — Institute of Applied Physics, University of Hamburg

Magnetism in low-dimensions is a versatile topic and broken inversion symmetry due to the presence of a surface can induce the formation of complex magnetic order. Here the driving force for the canting of adjacent magnetic moments is the spin-orbit induced Dzyaloshinskii-Moriya interaction. Thin magnetic films on heavy substrates are good candidates for this kind of surface-induced non-collinear magnetic states with unique rotational sense.

Spin-polarized scanning tunneling microscopy (SP-STM) combines magnetic sensitivity with high lateral resolution and therefore grants access to such complex magnetic order with unit cells on the nanome-

ter scale. Several non-collinear magnetic ground states, such as spin spirals where the spin rotates from one atom to the next, have been observed [1-3]; while in uniaxial systems only one propagation direction is found, in biaxial systems rotational domains of spin spirals are present. In the case of the monolayer Fe on Ir(111) a combination of different magnetic interactions, including higher-order interactions, leads to a two-dimensional lattice of magnetic skyrmions on the atomic scale [4,5].

[1] M. Bode et al., *Nature* 447, 190 (2007).

[2] P. Ferriani et al., *Phys. Rev. Lett.* 101, 27201 (2008).

[3] M. Menzel et al., *Phys. Rev. Lett.* 108, 197204 (2012).

[4] K. von Bergmann et al., *Phys. Rev. Lett.* 96, 167203 (2006).

[5] S. Heinze et al., *Nature Phys.* 7, 713 (2011).