

Seminar: Hard Condensed Matter Theory

Room: Galilei Raum, 01-128 (Staudinger Weg 9)

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Motion of skyrmions and antiskyrmions driven by spin-orbit torques

Skyrmions are topologically stabilized spin structures on the nanometer scale. They can be manipulated with electric current densities that are orders of magnitude lower than those required for moving domain walls. Especially, isolated magnetic skyrmions can also occur in ultra-thin transition metal films at surfaces and interfaces.

We have shown previously that skyrmions exist in these systems due to a competition between magnetic interactions beyond the first nearest neighbour approximation. We have found that this competition can stabilize higher order skyrmions in Pd(fcc)/Fe/Ir(111) such as antiskyrmions ($S=-1$) and higher order antiskyrmions ($S=-2$).

Here, we present a study on the motion of these skyrmions via spin transfer torques. The displacement of skyrmions can be described in a rigid-body approximation, whereas the motions of antiskyrmions require to take internal degrees of freedom into account.

All interested are cordially welcome!