

Seminar: Hard Condensed Matter Theory

Room: Galilei room, 01-128 (Staudinger Weg 9) Time: Tuesday, 07.02.2017, 14:00

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Effects of curvature in low-dimensional ferromagnetic nanosystems

Geometrical curvature results in new physical effects in low-dimensional ferromagnetic systems. For 1D systems we predict that: (i) a torsion induced symmetry breaking appears in dispersion relation for magnons in a helix shaped wire; (ii) a local wire bend creates a pinning potential for a domain wall; (iii) the spin-current driven domain wall motion experiences the curvature induced shift of the Walker limit and the torsion induced shift of the nonadiabatic constant, the latter can result in negative domain wall mobility. For 2D systems we predict that: (i) magnetic skyrmion can be stabilized on a surface of revolution by curvature effects only, even when the intrinsic DMI is absent; (ii) topological charge of a skyrmion experiences a shift, which is determined by genus of the surface, the latter results in topological triviality of magnetic skyrmion on a closed spherical shell; (iii) chirality symmetry breaking takes place in the vortex polarity switching process for the case of a hemispherical shell. Most of these effects can be treated as a result of the action of curvature induced DMI and anisotropy, which effectively appear in exchange energy of a curvilinear system.

All interested are cordially welcome!

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