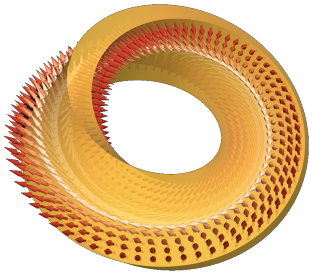

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Micromagnetic studies of ferromagnetic nanotubes

Thursday, 23 May 2019 14:00 (30 minutes)

A review of recent theoretical research in ferromagnetic nanotubes is presented. The focus is on the basic physical behavior that emerges from the micromagnetic theory, from which interesting properties appear [1-6]. Depending on the size parameters, magnetic material, external driving agents, and proper experimental conditions, particular properties are expected, where one can highlight (i) an almost uniform equilibrium state with vortex domains at the tube ends [2], (ii) ultra-fast and chiral domain-wall dynamics [4-5], (iii) ferromagnetic nanorings/nanotubes for magnetic hyperthermia applications [6], where the flux-closure vortex state may be useful to avoid particle agglomeration, while reasonable high values of the specific absorption rate (SAR) are expected. Most of these properties arises from the interplay between the exchange and the magnetostatic energy in the curved ferromagnetic structure. The magnetostatic energy also induces chiral features, which early reported in the motion of a vortex domain wall [4].

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