Abstract Submitted
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Topology of composite domain walls in magnetic nanostrips[1] O. TCHERNYSHYOV, O. TRETIAKOV, Johns Hopkins University, YA. B. BAZALIY, Leiden University & University of South Carolina, D. CLARKE, Johns Hopkins University — We discuss the internal structure of domain walls in thin magnetic nanostrips of submicron width. The walls are composite objects made from elementary topological defects. These defects are characterized by two topological charges: the O(2) vortex winding number [1] and the O(3) skyrmion number. The defects are ordinary vortices and antivortices in the bulk and fractional vortices with half-integer winding numbers at the edge. Topology and energetics restrict the allowed compositions of a domain wall to a halfvortex and an antihalfvortex (a transverse wall) or a vortex and two antihalfvortices (a vortex wall). We present a variational model [2] that reproduces quite well the major features of a vortex wall. Despite the apparent complexity, the wall has a rigid structure. Its main degrees of freedom are the location of the vortex core and the out-of-plane magnetization of the core, which is related to the skyrmion number of the vortex. [1] O. Tchernyshyov and G.-W. Chern, Phys. Rev. Lett. **95**, 197204 (2005). [2] H. Youk *et al.*, J. Appl. Phys. **99**, 08B101 (2006).

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