Magnetic domains in ultrathin cobalt films

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Technology of ultrathin film preparation gives new opportunities for tuning samples magnetic properties [1] especially magnetic anisotropy characterized by the quality factor, Q. Such nanostructures opened *new* area for magnetization distribution studies. Review of magnetic domain structure (**DS**) investigations in Co nanostructures is presented. In a typical ultrathin film, with perpendicular anisotropy, DS sizes are large and DS geometry peculiarities can be described by a model of a patchy inhomogeneous media with realistic distribution of local coercivities, neglecting magnetostatic forces [2]. Drastic DS size decrease was observed while approaching the reorientation phase transition from perpendicular to in-plane magnetization, driven by either magnetic anisotropy decrease or in-plane applied magnetic field [3,4]. Combined both analytical study and numerical simulations were performed for description of magnetization distribution. For stripe-like DS the minimal period p_{min}/d is a function of l_{ex}/d (where l_{ex} is the exchange length, d - film thickness). A minimal $8\pi l_{ex}$ DS period is predicted. Micromagnetic simulations [5] are based on real magnetic material parameters [1].

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