Experimental evidence for an angular dependent transition of magnetization reversal modes in magnetic nanotubes

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We report on the experimental and theoretical investigation of the magnetization reversal in magnetic nanotubes that have been synthesized by a combination of glancing angle and atomic layer deposition. Using superconducting quantum interference device magnetometry the angular dependence of the coercive fields is determined and reveals a nonmonotonic behavior. Analytical calculations predict the crossover between two magnetization reversal modes, namely, the movement of different types of domain boundaries (vortex wall and transverse wall). This transition, already known in the geometrical dependences of the magnetization reversal in various nanotubes, is found within one type of tube in the angular dependence and is experimentally confirmed in this work.