

Abstract Submitted
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Magnetic Vortices in Nanodisks: What are the implications in macroscopic magnetic properties?¹ CIRO FERNANDO GELVEZ PEDROZA, EDGAR J. PATINO, Universidad de los Andes, SUPERCONDUCTIVITY AND NANODEVICES LABORATORY TEAM² — The study of nanodevices is of great importance nowadays. In particular nanodisks present extraordinary properties when varying their size, shape and materials. One of the most interesting ones has been the presence of magnetic vortices which are normally not present in continuous films or bulk materials. For that reason, these constitute of great interest in potential applications such as data storage, binary logic gates or nano-plasmonics. Although there are many high cost methods for fabrication we have chosen a low cost technique based on Colloidal Lithography. Using Polystyrene Nanoparticles (100nm) nanodisks of about 180 nm in diameter have been grown using Electron Beam evaporation. The fabrication technique requires a number of steps such as spin coating, oxygen plasma and Ion Beam Etching. The samples obtained with this method were Ti/Co/Nb nanodisks with various thickness of the Co layer. Micromagnetic simulations were carried out in OOMMF giving magnetic domain structure and hysteresis loops which were later compared with those obtained experimentally using Vibrating Sample Magnetometry. Simulation results suggest a critical thickness for the appearance of magnetic vortices, revealed by hysteresis loops with substantially lower coercive fields.

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