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Remanent states of Cobalt nanostructures KEVIN WINN — Properties of ferromagnetic nanostructures are vital for the production of high density magnetic data storage. To increase density and reliability of magnetic data storage, understanding of the magnetization of these structures must be better understood. Cobalt nanostructures have been studied recently, finding that shape of the structure strongly determines the magnetization of the remnant state. Reliable data storage has created a need for a reliable and stable remnant states. To create structures of reliable remnant states more unique shapes have been investigated. Micro magnetic simulations of 30nm thick Cobalt structures were conducted and matched with data from off-axis electron holography. The Cobalt structures are 600 x 400 nm ellipse with slots and rings cut out, deforming the ellipse. The simulations provide values of total energy, exchange energy and energy density. Values of energies, paired with magnetic configurations (domain walls, vortexes and flux closer) allow details of the effect shape have on remnant states. These play a vital role in both reliability and reproducibility of the nanomagnet. Investigation of the effects caused by rings and slots in Cobalt ellipses, by use of magnetic simulations, creates a visual understanding, aiding in the formation of new and better magnetic structures.

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