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Field Manipulation of Magnetization States in Nanoscale Ferromagnetic Rings Through Geometric Design[1] TIANYU YANG, UMass Amherst, ABBY GOLDMAN, Mount Holyoke College, MOUREEN KEMEI[2], UMass Amherst, KATHY AIDALA, Mount Holyoke College, MARK TUOMINEN, UMass Amherst — In this work, conduct a systematic study of field evolution of small magnetic rings with the aim of determining stable magnetized states as a function of geometric parameters. Such rings may be a foundation for novel data storage applications. In these experiments, ferromagnetic cobalt and permalloy nanorings, with diameter in range of 300 nm to 800 nm, are fabricated by electron beam lithography, development, thin-film deposition and lift-off. Magnetic force microscopy (MFM) is used to observe magnetic states of nanorings having different geometry. We will discuss the different magnetic configurations that result when an in-plane magnetic field, either homogeneous or inhomogeneous on a scale compared to the dimension of the ring, is used to manipulate the magnetization.

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