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**Exploring 360 domain walls in ferromagnetic nanostructures using circular magnetic fields**[1] ANANDAKUMAR SARELLA, F. I. KAYA, K. E. AIDALA, Mt Holyoke Coll — Ferromagnetic nanostructures can exhibit intriguing magnetic states, such as the metastable 360 domain wall (DW), in which two 180 DWs combine to form a nearly flux closed state in sufficiently thin structures. These composite structures have potential to maximize storage densities due to their minimal stray fields. We study a straightforward method to nucleate 360 DWs in nanorings, nanowires, using in-plane circular fields, as if from a current carrying wire passing through the substrate in close proximity to the nanostructures. Our simulations, using OOMMF, predict that the vortex state of a ring with appropriate geometry will reverse from CW to CCW through an intermediate state consisting of pairs of 360 DWs. We examine the dependence of the switching field and intermediate states on geometric properties such as the diameter, thickness, and width of the ring. Using the local circular field, we can also nucleate 360 DWs in nanowires, pinning the location of the DWs at notches spaced as close as 100 nm apart, suggesting high density storage. We are currently studying these structures experimentally using AFM/MFM. We generate the circular field by passing current through AFM tip and image the resulting magnetic states with MFM.

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