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Magnetostatic Interactions in Partially Shielded Polyaniline-Ferromagnet Composite Nanowire Arrays ADAM FRIEDMAN, DERRICK BRITTAIN, LATIKA MENON, Northeastern University Dept. of Physics — Ferromagnetic nanowires have remarkable magnetic properties including high coercivities and strong magnetic shape anisotropy. These unique properties have been theoretically studied and various models attribute the observed characteristics to inter- and intra- wire magnetostatic interactions, which are a function of the structure of the nanowires and their coupling with the applied magnetic field. In this study, we use porous alumina templates and electrodeposition to fabricate Fe, Ni, and Co nanowires. We also use the same techniques to grow polyaniline nanotubes and then fill them with Fe, Ni, and Co nanowires, creating magnetically shielded ferromagnet structures. We measure the magnetic properties of these structures as a function of their diameter and temperature in order to better understand the magnetic interactions that arise in ferromagnetic nanowire arrays. By partially shielding the wires with PAni, we are able to better discern the effects of these interactions. Results will be presented and compared to theoretical models.

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