

Abstract Submitted  
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**Fabrication and Magneto-optical Characterization of Magnetic Nanostructures on 2-D Self Assembled Colloidal Crystals<sup>1</sup>** XIAOYU ZOU, HUNG NGO, JOSH MENDEZ, JIYEONG GU, California State University, Long Beach — Patterned ferromagnetic thin films show different magnetic behaviors than flat ones. Corrugated permalloy (Py) thin films were fabricated using self assembly of colloidal polystyrene nanospheres on Si wafers followed by sputter deposition of Py, which introduces periodic curvature. To study the effect of discontinuities, Py was also deposited on nanospheres treated with RF substrate biasing to yield a discontinuous thin film. Magneto-optical Kerr effect (MOKE) magnetometry was used to measure the magnetic switching behavior. The total MOKE signal was separated into longitudinal and quadratic MOKE components to measure the surface magnetization, which are inaccessible to traditional magnetometry. The coercivity of the samples increased as the thin films increased in discontinuity. Flat Py thin films have coercivity at around 5 Oe, while the corrugated thin film has coercivity around 15 Oe. However, the substrate biased nanosphere thin film showed a much greater coercivity around 80 Oe. Finally, the symmetry properties of the hysteresis loop of both the corrugated Py thin film and the substrate biased thin film were significantly different. While the flat sample has almost no QMOKE signal, the patterned samples showed moderate QMOKE signals with peaks near the coercivity.

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