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Novel Behavior in Self-Assembled Superparamagnetic Nanoparticle Monolayers at the Air-Water Interface JACOB STANLEY, LEANDRA BOUCHERON, YELING DAI, Department of Physics, University of California, BINHUA LIN, MATI MERON, Argonne National Lab and University of Chicago, OLEG SHPYRKO, Department of Physics, University of California — Iron oxide nanoparticles, coated with an oleic acid ligand, have been found to form self-assembled monolayers when deposited at the air-water interface. Even for low particle densities these particles aggregate into hexagonally close-packed islands which merge into a uniform layer at higher densities. Using Grazing Incidence Small Angle X-Ray Scattering (GISAXS) we were able to measure the first through fifth order diffraction peaks. By analyzing the positions and shapes of these peaks we investigated the in-plane structure of these monolayers and characterized how the structure changes as a function of compression in a Langmuir-Blodgett trough. Since iron oxide nanoparticles are known to be super-paramagnetic, we sought to investigate the role magnetic effects may have on the interparticle interactions and ordering within the film. We performed Grazing Incidence Diffraction (GID) measurements on the film while varying an external magnetic field. We will discuss the results of our findings.

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