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**Langmuir Monolayers of Superparamagnetic Nanoparticles**

GORAN DOJCINOSKI, PATRICK TRUITT, Montclair State University — The surfactant coating of the superparamagnetic nanoparticles found in ferrofluids enable them to form monolayers at the air/water interface. These monolayers can be considered quasi-two-dimensional systems where the particles are confined to a surface while their magnetizations are free to rotate in all directions. Confining the nanoparticles to a surface allows observation of structure formation that is difficult to see in a bulk, opaque ferrofluid. We investigate how different surfactants affect monolayer formation. We measure pressure-area isotherms of such systems under lateral compression in a Langmuir trough and find monolayers of oleic acid coated iron nanoparticles collapse at a surface pressure between 65-70 mN/m, while dodecanoic acid coated iron nanoparticles collapse around 50 mN/m. Other surfactants with varying lengths and structure are also investigated. Studies of monolayer stability and formation in the presence of an applied magnetic will also be presented. Finally, we transfer monolayers to solid substrates and examined their morphology via atomic force microscopy.

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