

Abstract Submitted  
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**Field Directed Ordering in Magnetic Nanocrystal Structures**

STUART LAWSON, ROBERT MEULENBERG, University of Maine — Iron oxide nanocrystals (NCs) have been the focus of intense research owing to the observation of tunable magnetic properties which could lead to advances in many fields including magnetic storage devices and medicine. We have been targeting the use of iron oxide NCs as magnetoresistance (MR) based sensors using ordered NC arrays. In this work, we will present our efforts toward using external magnetic fields to induce intraparticle ordering in iron oxide NC drop cast films. We use x-ray diffraction to analyze effects of the external fields on the NC array structure, while using SQUID magnetometry to probe the effects of NC interactions on the magnetic properties of iron oxide NCs ranging from 5 - 20 nm in diameter. MR measurements suggest large changes in the MR ratio can be achieved using the directed ordering approach for NC arrays. Our work could provide new avenues towards the fabrication of new magnetic devices.

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