

Abstract Submitted  
for the DFD15 Meeting of  
The American Physical Society

**Reverse drainage of a particle-laden thin film.** ANTONIO MASTROBERARDINO, Penn State University, Erie, JAVED SIDDIQUE, Penn State University, York — Gravity driven flow of a thin film on a solid surface is a critical aspect of numerous industrial applications including the production of foams, wire and optical coating applications, and more recently, the coating of medicines. In particular the system in consideration is influenced by competing forces, such as gravity, surface tension, and viscous forces, to name a few. Recently, several researchers have investigated the control of thin film flow by adding a controlling agent that allows for manipulation of the fluid via an external field. In this talk, we investigate the case in which the controlling agent is an aqueous suspension of magnetic nanoparticles and the external field is a nonuniform magnetic field. We formulate a mathematical model based on lubrication theory, present numerical solutions for the evolution of the film, and discuss the roles played by the key parameters of the system.

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Date submitted: 31 Jul 2015

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