

Abstract Submitted  
for the DFD05 Meeting of  
The American Physical Society

**Dynamic self-assembly of paramagnetic beads for microdevices**

ERIC KEAVENY, MARTIN MAXEY, Brown University — Paramagnetic beads, about 1 micron in diameter, suspended in a liquid will aggregate to form chains when an initially random dispersion is subject to a steady magnetic field. An important issue is to accurately calculate the particle-particle forces as the chain forms, and within the chain. This governs the stability of the chain in shear flows or rotating magnetic fields and determines conditions under which the chain fragments. We have developed new methods to efficiently calculate the magnetic dipole interactions of the particles and to compute the forces between particles accurately. Examples will be given of the hydrodynamic interactions between chains in response to these forces. For a rotating field the chains tend to deform and depending on rotation rates will form S-shaped chains or aggregate clusters.

Martin Maxey  
Brown University

Date submitted: 09 Aug 2005

Electronic form version 1.4