Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

**Transport of microspheres across liquid-liquid interfaces** STEFFEN HARDT, ASHOK SINHA, Center of Smart Interfaces, TU Darmstadt, Germany, AMLAN MOLLAH, RANJAN GANGULY, Department of Power Engineering, Jadavpur University, India — Experiments with magnetic microspheres crossing the interface between two immiscible polymer solutions under the influence of a magnetic field are reported. The liquids form a bilaminated configuration in a microchannel, allowing a detailed inspection of the liquid-liquid interface. The trajectories of the particles close to the interface are examined using bright-field microscopy and a high-speed camera. During the interaction phase the interface gets deformed and the particles "snap in," indicating that a three-phase contact line is formed. The dependence of the particle-interface interaction on the size of the microspheres is studied, showing that via transfer across a liquid-liquid interface a size separation of particles can be achieved. Comparing the results for 1.29 micron diameter spheres with those for 4.69 micron spheres, it is found that the small particles are able to cross the interface more easily than what is expected from a simple scaling analysis taking into account the balance between magnetic and interfacial forces on the particles. The most likely explanation for this phenomenon involves the line tension that destabilizes smaller particles adsorbed to a liquid-liquid interface more than larger particles.

Steffen Hardt
Center of Smart Interfaces, TU Darmstadt

Date submitted: 09 Jul 2013 Electronic form version 1.4