Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Numerical modeling of bidensity suspensions in gravity-driven, thin-film flows JEFFREY WONG, UCLA, SUNGYON LEE, Texas A&M, ALIKI MAVROMOUSTAKI, ANDREA BERTOZZI, UCLA — We present an equilibrium model for bidisperse suspensions consisting of negatively buoyant particles with two different densities that flow down an incline. In the case of monodisperse suspensions, it has been shown experimentally and theoretically that particles either settle to the substrate or accumulate at the fluid surface (these are referred to as the "settled" and "ridged" regimes, respectively), depending on the inclination angle and total particle volume fraction. When there are two species, the heavier particles settle to the substrate while the lighter particles exhibit a similar transition between settled and ridged regimes, which now also depends on the relative concentration. We investigate the model numerically and compare the predicted transition between settled and ridged regimes with experimental results. In addition, we discuss the effect of shear-induced self-diffusion in the model, which leads to some mixing of the particle layers.

Aliki Mavromoustaki
UCLA

Date submitted: 01 Aug 2013 Electronic form version 1.4