Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Shock Dynamics for particle-laden thin film LI WANG, ANDREA BERTOZZI, Department of Math, UCLA — We study the shock dynamics for a recently proposed system of conservation laws (Murisic et. al [J. Fluid Mech. 2013]) describing gravity-driven thin film flow of a suspension of particles down an incline. When the particle concentration is above a critical value, singular shock solutions can occur. We analyze the Hugoniot topology associated with the Riemann problem for this system, describing in detail how the transition from a double shock to a singular shock happen. We also derive the singular shock speed based on a key observation that the particles pilling up at the maximum packing fraction near the contact line. These results are further applied to constant volume case to generate a rarefaction-singular shock solution. The particle/fluid front are shown to move linearly to *the leading order* with time to the one-third power as predicted by the Huppert solution for clear fluid.

Li Wang
Department of Math, UCLA

Date submitted: 28 Jul 2013 Electronic form version 1.4