Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Particle Size Effect on Wetting Kinetics of a Nanosuspension Drop: MD Simulations BAIOU SHI, EDMUND WEBB, Lehigh University — The behavior of nano-fluids, or fluid suspensions containing nanoparticles, has garnered tremendous attention recently for applications in advanced manufacturing. In our previous results from MD simulations, for a wetting system with different advancing contact angles, cases where self-pinning was observed were compared to cases where it was not and relevant forces on particles at the contact line were computed. To advance this work, the roles of particle size and particle loading are examined. Results presented illustrate how particle size affects spreading kinetics and how this connects to dynamic droplet morphology and relevant forces that exist nearby the contact line region. Furthermore, increased particle size in simulations permits a more detailed investigation of particle/substrate interfacial contributions to behavior observed at the advancing contact line. Based on changes in spreading kinetics with particle size, forces between the particle and liquid front are predicted and compared to those computed from simulations. At high loading, particle/particle interactions become relevant and forces computed between particles entrained to an advancing contact line will be presented.

Baiou Shi
Lehigh University

Date submitted: 05 Nov 2015 Electronic form version 1.4