Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Slip flow: How slip occurs on a two-dimensional surface TAEIL YI, Q. JANE WANG, SETH LICHTER, Northwestern University — The relative interfacial velocity between a liquid and solid is called slip. Though there are physical measurements and numerical computations of the amount of slip, the mechanics of slip remain unclear. For 2D flows (i.e. over a 1D surface) slip occurs by the propagation of defects along the surface.[1] Here, we show how slip occurs in 3D flow using molecular dynamics (MD) simulation. We study slip in a long Couette channel of fixed height with molecules of size σ. We carry out a sequence of MD simulations beginning with a 2D computational geometry, i.e. width = σ, and incrementally increase the width of the computational domain. By examining the dynamics at the liquid/solid interface, we can follow the propagation of interfacial defects, as they evolve from their well-understood 1D form into fully 2D slip. Does slip on 2D surfaces also occur through the propagation of defects as it does over a 1D surface? We hope to answer that question in this presentation. The results of this work have application to optimizing surfaces for slip and to flows in small geometries, such as carbon nanotubes and in tribological flows.

[1]A. Martini, A. Roxin, R. Q. Snurr, Q. Wang & S. Lichter. *J. Fluid Mech.* **600**: 257-269 (2008).

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Date submitted: 02 Aug 2008 Electronic form version 1.4