

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Slip at the liquid-liquid interface JOEL KOPLIK, City College of New York, JAYANTH R. BANAVAR, Pennsylvania State University — The conventional boundary conditions at the interface between two flowing liquids include the continuity of the velocity field. As in the liquid-solid case, continuity of the tangential component of velocity is not obvious, and we have undertaken molecular dynamics simulations of the Couette and Poiseuille flows of two-layered liquid systems with various molecular structures and interactions. In all cases, the average velocity is found to vary continuously across the interface. However, when the total liquid density in the interfacial region drops significantly compared to the bulk values, the tangential velocity varies very rapidly there, and would appear discontinuous at a coarse or continuum resolution. The value of this apparent slip varies linearly with the shear stress at the interface, with a constant of proportionality depending on the nature of both liquids but not the flow configuration. Thus, a version of the Navier boundary condition appears to apply in this situation.

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Date submitted: 10 Aug 2005

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