

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Surface Layering Near Room Temperature in a Nonmetallic Liquid¹ SUDESHNA CHATTOPADHYAY, BENJAMIN STRIPE, PATRICK SHIVELY, GEUNNADI EVMENENKO, PULAK DUTTA, Dept. of Physics & Astronomy, Northwestern Univ., STEVEN EHRLICH, HAIDING MO, Brookhaven National Laboratory — Oscillatory density profiles (layers) have been observed at the free surfaces of many liquid metals at and above room temperature [1]. A surface-layered state has been previously reported only in one dielectric liquid, tetrakis(2-ethylhexoxy)silane (TEHOS), and only at lower temperatures [2]. We have used x-ray reflectivity to study a molecular liquid, pentaphenyl trimethyl trisiloxane. Below $T \sim 267\text{K}$ (well above the freezing point for this liquid), density oscillations appear at the surface. This liquid has a higher T_c ($\sim 1200\text{K}$) than TEHOS ($\sim 950\text{K}$), so that layers appear at $T/T_c \approx 0.2$ in both cases. Our results indicate that surface order is a universal phenomenon in both metallic and dielectric liquids, and that the underlying physics is likely to be the same since layers always appear at $T < \sim 0.2T_c$ as theoretically predicted [3]

REFERENCES:

- [1]. e.g. O. M. Magnussen *et al.*, Phys. Rev. Lett. **74**, 4444 (1995)
- [2]. H. Mo et al. *Phys. Rev. Lett.* **96**, 096107 (2006); *Phys. Rev. B* **76**, 024206 (2007)
- [3]. e.g. E. Chacón et al., Phys. Rev. Lett. **87**, 166101 (2001)

¹Supported by NSF grant no. DMR-0705137.

Pulak Dutta
Northwestern University

Date submitted: 23 Nov 2008

Electronic form version 1.4