Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Observation of surface layering in a nonmetallic liquid HAIDING MO, GUENNADI EVMENENKO, SUMIT KEWALRAMANI, KYUNGIL KIM, PULAK DUTTA, Dept. of Physics & Astronomy, Northwestern University, STEVEN EHRLICH, Brookhaven National Laboratory — Non-monotonic density profiles (layers) have previously been observed at the free surfaces of many metallic liquids, but not in isotropic dielectric liquids. Whether the presence of an electron gas is necessary for surface layering has been the subject of debate. Until recently, MD simulations have suggested that layering at free liquid interface may be a generic phenomenon and is not limited to the metallic liquids[1]. The theories predict that if normal liquids can be cooled down to temperatures low enough, layering structure should be observed experimentally. However, this is difficult for most molecular liquids because these liquids freeze well above the temperature necessary for observing the layering structure. By studying the surface structure of liquid TEHOS (tetrakis(2-ethylhexoxy)silane), which combines relatively low freezing point and high boiling point compared to that of most molecular liquids, we have observed the evidence of layering at the free interface of liquid TEHOS using x-ray reflectivity. When cooled to T/T_c $\approx$0.25 (well above the bulk freezing point, Tc is the critical temperature of TEHOS), the surface roughness drops sharply and density oscillations appear near the surface. Lateral ordering of the surface layers is liquid-like, just as at liquid metal surfaces. 1. E. Chacón and P. Tarazona, Phys. Rev. Lett. **91** 166103-1 (2003)

Haiding Mo
Department of Physics & Astronomy
Northwestern University, Evanston, IL 60208, USA

Date submitted: 23 Nov 2005 Electronic form version 1.4