Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Electrical Conductivity of Synthetic Uranus SEBASTIEN HAMEL, ERIC SCHWEGLER, LLNL — Mixtures of accreted water, ammonia, and methane at high pressures and temperatures are thought to be major components of the giant planets such as Uranus and Neptune. The pressures and temperatures in their deep interiors can reach several Mbar and several thousands Kelvin, conditions corresponding to the fluid phase. At such extreme interior conditions it is expected that these molecules react chemically to produce a complex mixture. Observables properties such as the magnetic field of these planets are thought to be determined by the physical and chemical properties of matter within this water mixture layer. Using quantum molecular dynamics, we explore the properties of water mixtures at planetary conditions. In particular we discuss the electrical conductivity at high pressure and high temperature of those mixtures in comparison to pure water. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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Date submitted: 21 Nov 2008 Electronic form version 1.4