Abstract Submitted
for the SHOCK11 Meeting of
The American Physical Society

Chemical processes in the interior of giant planets SEBASTIEN HAMEL, ALFREDO CORREA, ERIC SCHWEGLER, Lawrence Livermore National Lab — The unusual magnetic fields of the planets Uranus and Neptune represent important observables for constraining and developing deep interior models. Models suggests that the non-dipolar and non-axial magnetic fields of these planets originate from a thin convective and conducting shell of material around a stably stratified fluid core. We present a computational study of the physical properties of a fluid compositionally similar to what is expected in the interior of Uranus and Neptune. Our diffusivity and conductivity results suggest that the core cannot be well mixed if it is to generate non-axisymmetric magnetic fields. The simulations highlight the importance of chemistry on the properties of this complex mixture, including the possible formation of carbon and nitrogen clusters. We present results concerning the overall phase stability of the mixture under conditions relevant to the planetary interiors.

Sebastien Hamel
Lawrence Livermore National Lab

Date submitted: 23 Feb 2011 Electronic form version 1.4