Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Ionic transport in strongly asymmetric mixtures: A crossover between classical and Lorentz diffusion[1] ALEXANDER WHITE, CHRISTOPHER TICKNOR, JOEL KRESS, LEE COLLINS, Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, USA, JEAN CLEROUIN, ALAIN DECOSTER, NICOLAS DESBIENS, PHILIPPE ARNAULT, CEA, DAM, DIF 91297 Arpajon, France — We study how concentration changes transport properties along isobars-isotherms for a mixture of hydrogen and heavier elements, representative of turbulent layers relevant to inertial confinement fusion (ICF) and astrophysics. We perform large first principles orbital free molecular dynamics (OFMD) simulations and analyze the transport properties. Comparisons are made with transport theory in the kinetic and coupled regime. We demonstrate that the addition of a small amount of the heavy element in a light material has a dramatic effect on the correlation structure and on viscosity and diffusion in the mixture. This effect is explained through kinetic theory as a manifestation of a crossover between classical diffusion and Lorentz diffusion.

[1]This work has been performed under the NNSA/DAM collaborative agreement P184 "Basic Science".

Jean Clerouin
CEA, DAM, DIF 91297 Arpajon

Date submitted: 12 Jul 2016 Electronic form version 1.4