Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

**Molecular Dynamics Investigations of the Ablator/Fuel Interface during Early Stages of Inertial Confinement Fusion**[1] LIAM STANTON, JAMES GLOSLI, Lawrence Livermore National Laboratory, MICHAEL MURILLO, CMSE, Michigan State University — At the National Ignition Facility, high-powered laser beams are used to compress a small target to generate fusion reactions. A critical issue in achieving this is the understanding of mix at the ablator/fuel interface. Mixing occurs at various length scales, ranging from atomic inter-species diffusion to hydrodynamic instabilities. Because the interface is preheated by energy from the incoming shock, it is important to understand the dynamics before the shock arrives. The interface is in the warm dense matter phase with a deuterium/tritium fuel mixture on one side and a plastic mixture on the other. We would like to understand various aspects of the evolution, including the state of the interface when the main shock arrives, the role of electric field generation at the interface, and the character and time scales for diffusion. We present a multiscale approach to model these processes, which combines molecular dynamics to simulate the ionic degrees of freedom with orbital-free density functional theory to calculate the electronic structure. Simulation results are presented and connections to hydrodynamic models are discussed.

[1]This work is 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: 15 Jul 2016 Electronic form version 1.4