Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Numerical Investigation of a New Electrostatic Double-Layer Driven Kinetic Mix Mechanism for an Omega Plastic Ablator Capsule WILLIAM TAITANO, DANA KNOLL, LUIS CHACON, ANDREI SIMAKOV, Los Alamos National Laboratory — The primary mix mechanisms considered so far by the ICF community are hydrodynamic processes such as Rayleigh-Taylor and Richtmeyer-Meshkov instabilities. However, recent experiments on the Omega facility indicate that mix is happening both deeper and earlier than what the hydrodynamic models predict [1]. Additionally, there have been observations of a strong electric field within the ICF capsule on the Omega facility that cannot be explained by quasi-neutral fluid theory alone. A recent theoretical study of a new kinetic mix mechanism for an Omega plastic ablator capsule, based on an electrostatic double-layer field at the fuel-pusher interface has predicted a mix amount and electric field strength that are consistent with some experiments [2]. We have pursued a careful computational study to further refine and expand these theoretical results. We seek to obtain better estimates of the strength of the double-layer electric field and its effect on mix in an Omega plastic ablator capsule. We show numerically the existence of the postulated double-layer electric field, and quantify its impact on mix. We also show preliminary result of mix on an Omega plastic ablator capsule with titanium tracer.

[1] J.A.Baumgaertel et al., PoP,21, 052706, 2014
[2] D.A.Knoll et al., PRL,2014, under review

William Taitano
Los Alamos National Laboratory

Date submitted: 09 Jul 2014 Electronic form version 1.4