PLASMA KINETIC EFFECTS ON INTERFACIAL MIX IN SETTINGS RELEVANT TO INERTIAL CONFINEMENT FUSION AND LABORATORY EXPERIMENTS

L. Yin[1], B. J. Albright[1], B. Bergen[1], K. J. Bowers[2], E. L. Vold[1], K. Molvig[1], J. C. Fernández[1]

[1]Los Alamos National Laboratory, Los Alamos, NM, USA
[2] Los Alamos National Laboratory Guest Scientist
lyin@lanl.gov

The mixing of high-Z/low-Z plasma interfaces in dense plasma media is a problem with far-reaching consequences for understanding mix in inertial confinement fusion (ICF) experiments. Recently, several authors have explored the nonlinear, diffusive, atomic mixing of interfaces through the application of reduced analytic models and hybrid kinetic simulations. [1,2]

In this presentation, we apply to this problem *ab initio* kinetic plasma modeling techniques that, in principle, retain all fundamental plasma length and time scales. Our simulations use the VPIC particle-in-cell code [3] with a binary collision model [4] to explore kinetic effects of the atomic mixing of plasma media in one and two spatial dimensions. Comparisons are made to published analytic theory and hybrid modeling results [2] and conditions are identified under which plasma kinetic behavior may contribute to anomalously rapid atomic mixing, both in inertial confinement fusion experiments and recent experiments at the LANL Trident facility.

Work performed under the auspices of the U.S. DOE by the LANS, LLC, Los Alamos National Laboratory under Contract No. DE-AC52-06NA25396. Funding provided by the Los Alamos National Laboratory Directed Research and Development Program.

[1] Haxhimali et al., *Phys. Rev. E*. **90**, 023104 (2014); G. Kagan and X. Z. Tang, *Phys. Plasmas* **19**, 092709 (2012); K. Molvig, A. N. Simakov, and E. L. Vold, *Phys. Plasmas* **21**, 092709 (2014).
[2] K. Molvig et al., *Phys. Rev. Lett*. **113**, 145001 (2014).
[3] K. J. Bowers et al., *Phys. Plasmas* **15**, 055703 (2008).
[4] T. Takizuka and H. Abe, *J. Computat. Phys*. **25**, 205 (1977).