Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Ion distribution in the hot spot of an inertial confinement fusion plasma[1] XIANZHU TANG, ZEHUA GUO, Los Alamos National Laboratory, HERB BERK, UT-Austin — Maximizing the fusion gain of inertial confinement fusion (ICF) for inertial fusion energy (IFE) applications leads to the standard scenario of central hot spot ignition followed by propagating burn wave through the cold/dense assembled fuel. The fact that the hot spot is surrounded by cold but dense fuel layer introduces subtle plasma physics which requires a kinetic description. Here we perform Fokker-Planck calculations and kinetic PIC simulations for an ICF plasma initially in pressure balance but having large temperature gradient over a narrow transition layer. The loss of the fast ion tail from the hot spot, which is important for fusion reactivity, is quantified by Fokker-Planck models. The role of electron energy transport and the ambipolar electric field is investigated via kinetic simulations and the fluid moment models. The net effect on both hot spot ion temperature and the ion tail distribution, and hence the fusion reactivity, is elucidated.

[1]Work supported by LANL LDRD.

Xianzhu Tang
Los Alamos National Laboratory

Date submitted: 20 Jul 2012 Electronic form version 1.4