Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Entire-target, Particle-In-Cell Modeling of Ultra-Intense Laser Experiments with Cone-Coupled Wire Targets[1] CHRIS ORBAN, KRAMER AKLI, ROBERT MITCHELL, VLADIMIR OVCHINNIKOV, DOUGLASS SCHUMACHER, RICHARD FREEMAN, The Ohio State University, MILAD FATENEJAD, DONALD LAMB, ASC Flash Center for Compuational Science at the University of Chicago — Ultra-intense laser-matter interactions with cone-wire target geometries have been extensively studied both experimentally and theoretically. We present some of the most physically-motivated Particle-In-Cell (PIC) simulations of these experiments to date using the LSP code. These simulations allow us to self-consistently model, everywhere and and over long (15 ps) timescales, the laser-generated E & B fields and sheath fields that arise on entire mm-scale cone-wire targets. Using FLASH radiative-hydrodynamic simulations of the pre-pulse interaction with the target, these PIC simulations illuminate key trends in total Cu $K\alpha$ fluence in recent experiments performed at the Titan laser without any free parameters. The match between our simulations and the observed $K\alpha$ trends is qualitatively good and we discuss the implications of our results which indicate a critical role played by refluxing through the cone walls.

[1]This work was supported by the US Department of Energy under contract DE-FG02-05ER54834 (ACE) and allocations of computing time from the Ohio Supercomputer Center.

Chris Orban
The Ohio State University, Department of Physics

Date submitted: 13 Jul 2012 Electronic form version 1.4