Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

A new tool for efficient full density scale modeling of fast ignition[1] FREDERICO FIUZA, MICHAEL MARTI, RICARDO FONSECA, JONATHAN DAVIES, LUIS SILVA, GoLP/IPFN-LA, Instituto Superior Tecnico, JOHN TONGE, JOSHUA MAY, WARREN MORI, Department of Physics & Astronomy, University of California, Los Angeles — Fast ignition modeling presents a grand challenge due to the different spatial and temporal scales involved and the need to accurately model relativistic laser absorption and inward and return current patterns across collisionless and collisional regions. Recently, Cohen et al. proposed a novel framework for fast ignition simulations that merges accurate collisional PIC models between regions where only the field solver is reduced in the collisional region. This framework has been integrated into OSIRIS, which together with higher order particle shapes and dynamic load balancing is allowing the first simulations of fast ignition targets over full density and time scales. We will demonstrate how OSIRIS can be used to perform the first time full-scale one-to-one modeling of fast ignition, where the critical issues of laser absorption, electron beam divergence, and energy deposition with the compressed core will be addressed in a fully self-consistent manner. We also show how this new tool can be applied to other high-energy density problems, like ion acceleration in laser-solid interactions and shock ignition.

[1]Work supported by DOE FSC, NSF, FCT (Portugal), and HiPER.

Frederico Fiuza
GoLP/IPFN-LA, Instituto Superior Tecnico

Date submitted: 17 Jul 2010 Electronic form version 1.4