

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Role of preplasma for shortpulse laser-driven electron transport in mass-limited targets M. SCHOLLMEIER, A.B. SEFKOW, M. GEISSEL, B. ATHERTON, S.E. CORWELL, M.W. KIMMEL, P. RAMBO, J. SCHWARZ, Sandia Natl Labs, A. AREFIEV, B. BREIZMAN, UT Austin, J.M. KONING, M.M. MARINAK, LLNL — We report on experiments with the Z-Petawatt laser at Sandia National Labs using mm-sized foils and mass-limited targets of various thicknesses. Rear side accelerated proton beam measurements, in combination with simulation results, were used to infer hot electron transport in presence of preplasma. Full-scale, 3D radiation-hydrodynamics simulations of the ns to ps prepulse were performed. Preplasma properties (density profiles, temperatures, charge states) were then imported into a fully explicit and kinetic 2D particle-in-cell code to simulate, 10 ps of the main laser pulse interaction with the preplasma and target at full scale. A comparison of experimental data and numerical data shows outstanding agreement in all measured proton beam parameters, which gives confidence in the simulation results of hot electron transport. Sandia National Labs is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corp., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Marius Schollmeier
Sandia Natl Labs

Date submitted: 23 Jul 2012

Electronic form version 1.4