Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Angular distribution of fast electrons and protons in short pulse laser target interaction[1] HUI CHEN, Y. PING, S. WILKS, A. KEMP, R. SHEPHERD, LLNL, D. OFFERMANN, A. LINK, L. VAN WOERKOM, OSU, L. ELBERSON, U. Maryland, J. KING, UCSD, C. CHEN, MIT — Ultra intense short pulse laser pulses incident on solid targets can generate relativistic electrons either from direct laser electric field acceleration or the ponderomotive force associated with the gradient of the field. These electrons can then generate energetic protons due to the target normal sheath acceleration mechanism. These fast electrons and protons can effectively heat the solid target beyond the region of direct laser interaction and are important aspects of the fast ignition concept. One of the outstanding questions is the directionality of these fast particles, as the physics governing this will ultimately affect the energy transfer efficiency from laser to the compressed core. To this end, we have carried out experiments to systematically measure the angular distributions of fast electrons and protons for laser intensity from 10^{18} to 10^{20} Wcm^2 on the Callisto laser at LLNL for a variety of target materials and thickness, using multiple diagnostics. We found highly anisotropic distributions of particles for a variety of experimental conditions.

[1]This work was performed under the auspices of the U.S. DOE by UC LLNL under contract No. W-7405-Eng-48.

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Date submitted: 20 Jul 2007 Electronic form version 1.4