Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Mass Limited Target Effects on Proton Acceleration with Femtosecond Laser Plasma Interactions CALVIN ZULICK, A. RAYMOND, A. MCKELVEY, L. WILLINGALE, V. CHVYKOV, A. MAKSIMCHUK, A.G.R. THOMAS, V. YANOVSKY, K. KRUSHELNICK, University of Michigan — Experiments at the HERCULES laser facility have been performed to measure the effect of reduced mass targets on proton acceleration through the use of foil, grid, and wire targets in femtosecond laser plasma interactions. The target thickness was held approximately constant at 12.5 μm, while the lateral extent of the target was varied. The electron current density was measured with an imaging Cu K_α crystal. Higher current densities were observed as the target mass was reduced which corresponded to an increase in the temperature of the accelerated proton beam. Additionally, a line focusing feature was observed in the spatial distribution of protons accelerated to from the wire target, believed to be a result of azimuthal magnetic fields generated by electron currents in the wire. Particle-in-cell and Vlasov-Fokker-Plank simulations were performed in order to investigate the focusing magnetic field as well as the complex sheath formation dynamics on the mesh target.

Calvin Zulick
University of Michigan

Date submitted: 11 Jul 2014 Electronic form version 1.4