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Proton energy increase and X-ray yields from micro-cone targets SANDRINE A. GAILLARD, T. BURRIS-MOG, M. BUSSMANN, T.E. COWAN, T. KLUGE, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany, K.A. FLIPPO, R.P. JOHNSON, D.T. OFFERMANN, J. REN, T. SHIMADA, Los Alamos National Laboratory, Los Alamos, NM, USA, M. SCHOLLMEIER, Sandia National Laboratories, Albuquerque, NM, USA — The 200 TW LANL Trident short-pulse laser system has been continuously improving its contrast (ASE and ps ramp) since 2008. When improving the ASE contrast through 2009, a significant number $(>5\times10^6$ protons) of high energy (67.5 MeV) protons were recorded, from Cu flat-top cone targets [S. A. Gaillard et al., Phys. Plasmas 18, 056710 (2011)], using only 80 J at 1.5×10^{20} W/cm², and irradiated at a grazing incidence along the bottom cone wall. When performing a systematic study using collisional 2D PIC simulations, the Direct Laser Light Pressure Acceleration mechanism of electrons along the cone wall surface with the laser at grazing incidence was identified; this is distinct from other absorption mechanisms. Through the course of improving both the ASE and the ps ramp of the laser contrast, we observed an interplay between contrast, target size $(300 \times 300 \ \mu m^2 - 2 \times 2 \ mm^2)$ and target thickness $(1 - 100 \ \mu m)$ on $K\alpha$ yield; and discuss its implications on electron recirculation or lack thereof.

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