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65+ MeV Protons from Short-Pulse-Laser Micro-Cone-Target Interactions[1] S.A. GAILLARD, FZD/UNR, K.A. FLIPPO, D.C. GAUTIER, D.T. OFFERMANN, J.B. WORKMAN, F. ARCHULETA, R. GONZALES, T. HURRY, R.P. JOHNSON, S. LETZRING, D.S. MONTGOMERY, S.-M. REID, T. SHIMADA, LANL, T. LOCKARD, Y. SENTOKU, UNR, M.E. LOWENSTERN, J.E. MUCINO, AOSS, U of M, Ann Arbor, B.B. GALL, U of Mo, Columbia, E. D'HUMIERES, U. Bordeaux 1, M. GEISSEL, M. SCHOLLMEIER, SNL, M. BUSSMAN, T.E. COWAN, T. KLUGE, J.M. RASSUCHINE, FZD — Two sets of laser-ion acceleration experiments at the LANL 200 TW Trident laser at $\sim 10^{20}$ W/cm^2 (1 μm, 80 J, $\sim$600 fs) with high ($>10^{10}$) and low ($>10^8$) contrast are compared for regular size flat foils ($\sim$2x2 mm), reduced mass targets (RMT, 200-500 μm diameter) and new micro-cone targets in various geometries to elucidate the production of hot electrons and ions in these targets. Results from the latest experiment at high contrast show proton energies in excess of 65 MeV for flat-top cones, compared to $\sim$55 MeV for RMTs and $\sim$45 MeV for flat foils. Data from a Cu Kα 2D imaging crystal, an electron spectrometer and an RCF stack are presented and compared, showing the importance of not just generating hot electrons, but efficiently propagating these hot electrons to the accelerating "tip", where they can then be converted to ion energy, as well as the importance of the micro-cones' supporting foil size.

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