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The effect of pulse length on laser-proton acceleration from microstructured targets JOSEPH STREHLOW, MATHIEU BAILLY-GRANDVAUX, DAIKI KAWAHITO, CHRISTOPHER MCGUFFEY, BRANDON EDGHILL, University of California, San Diego, MINGSHENG WEI, Laboratory for Laser Energetics, NEIL ALEXANDER, ALEX HAID, General Atomics, CHRISTIAN BRABETZ, VINCENT BAGNOUD, PAUL NEUMAYER, GSI Helmholtz Centre for Heavy Ion Research, REED HOLLINGER, ADAM MOREAU, SHOUJUN WANG, YONG WANG, JORGE ROCCA, Colorado State University, FARHAT BEG, University of California, San Diego — An intense laser pulse incident on a foil target creates plasma structures with TV/m fields, accelerating ions to MeV energies. Laser coupling to the target can be enhanced with structures engineered on the front side of the target. These targets were studied with two 10^{21} W/cm^2 lasers, PHELIX (500fs) at GSI and ALEPH (45fs) at CSU. Relative to flat foils, microtube targets double the proton cutoff energy and quadruple the yield. Micropillar targets, however, produce only a 30% enhancement in proton cutoff energy. ALEPH, with its shorter pulse length, predominantly accelerated protons, while PHELIX also generated energetic heavy ions. PHELIX performed optimally with microtube diameters on the order of the spot size, and further study will determine the optimum structure for ALEPH parameters. 2D PIC simulations investigate the mechanisms responsible for the enhanced proton acceleration from structured targets. Acknowledgments: UC Office of the President (LFR-17-449059; DOE NNSA (DE-NA0003842); DOE Office of Science, FES (DE-SC0019076).

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