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Generation of narrow energy spread ion beams via collisionless shock waves using ultra-intense 1 um wavelength laser systems[1] FELICIE ALBERT, A. PAK, Lawrence Livermore National Laboratory, S. KERR, University of Alberta, N. LEMOS, A. LINK, P. PATEL, B. B. POLLOCK, Lawrence Livermore National Laboratory, D. HABERBERGER, D. FROULA, Laboratory of Laser Energetics, M. GAUTHIER, S. H. GLENZER, SLAC National Accelerator Laboratory, A. LONGMAN, L. MANZOOR, R. FEDOSEJEVS, University of Alberta, S. TOCHITSKY, C. JOSHI, University of California Los Angeles, F. FIUZA, SLAC National Accelerator Laboratory — In this work, we report on electrostatic collisionless shock wave acceleration experiments that produced proton beams with peak energies between 10-17.5 MeV, with narrow energy spreads between Δ E / E of 10-20 %, and with a total number of protons in these peaks of 1e7-1e8. These beams of ions were created by driving an electrostatic collisionless shock wave in a tailored near critical density plasma target using the ultra-intense ps duration Titan laser that operates at a wavelength of 1 um. The near critical density target was produced through the ablation of an initially 0.5 um thick Mylar foil with a separate low intensity laser. A narrow energy spread distribution of carbon / oxygen ions with a similar velocity to the accelerated proton distribution, consistent with the reflection and acceleration of ions from an electrostatic field, was also observed.

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