

Abstract Submitted
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Collimated Multi-MeV Ion Beams in the Forward Direction from High-Intensity Laser Interactions With Underdense Plasma L. WILLINGALE, S.P.D. MANGLES, P.M. NILSON, Z. NAJMUDIN, A.G.R. THOMAS, M.C. KALUZA, M.S. WEI, C. KAMBERIDES, S.R. NAGEL, A.E. DANGOR, K. KRUSHELNICK, Blackett Laboratory, Imperial College, London SW7 2BZ United Kingdom, R.J. CLARKE, K.L. LANCASTER, Central Laser Facility, Rutherford Appleton Laboratory, Chilton, Oxon, OX11 0QX, United Kingdom, S. KARSCH, J. SCHREIBER, Max-Planck Institut fur Quantenoptik, Hans-Kopfermann-Str. 1, D-85748 Garching, Germany, W. MORI, Department of Physics and Astronomy and Electrical Engineering, UCLA, Los Angeles, California 90095, USA — Ions have been observed to be accelerated to multi-MeV energies in the forward direction from high-intensity (about $5 \times 10^{20} \text{Wcm}^{-2}$) laser interactions with underdense plasma. The effect of the plasma density and laser parameters on the maximum ion energy and collimation is discussed. The acceleration method for these ions in the forward direction is the large electric field that is created by the fast electrons moving out of the back of the target in to the vacuum. The correlation between the longitudinal electron and ion spectra is considered as well as 2D-3V PIC code simulations to verify this acceleration method.

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