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A Novel Source of Injection Electrons for a Capillary Waveguide Accelerator CHRIS MCGUFFEY, University of Michigan Focus Center, TAKESHI MATSUOKA, UM Focus, MICHAEL LEVIN, Hebrew University, STEPAN BULANOV, VLADIMIR CHVYKOV, GALINA KALINCHENKO, STEPHEN REED, PASCAL ROUSSEAU, VICTOR YANOVSKY, UM Focus, ARIE ZIGLER, Hebrew University, KARL KRUSHELNICK, ANATOLY MAKSIMCHUK, UM Focus — Electron beams with quasimonoenergetic and/or broadband energy spectra have been produced by focusing a high-intensity (HI)laser (30TW 35fs Ti:Sapphire) through an ablated plasma plume. The plasma is ablated from a flat material by focusing a pulsed Nd:YAG laser. The characteristics of the electron beam produced are determined by the plasma density seen by the HI pulse, which can be controlled by varying the delay between ablation and the HI pulse, the ablation material, and the distance between the laser axis and ablation surface. These electron beams are candidates for injection into a capillary plasma waveguide. Capillary waveguides offer the possibility of staging or tapering to overcome the limitation of dephasing length. This injection scheme could lead to high charge, quasimonoenergetic beams with energy on the order of 1GeV. Such beams could assume some of the roles of conventional accelerators and may offer applications in medicine, biology, and solid state physics.

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