Longitudinal Profile of an Electron Beam Generated from a Laser Wakefield Accelerator\textsuperscript{1} DMITRI KAGANOVICH, Icarus Research Inc., MICHAEL HELLE, Georgetown University, DANIEL GORDON, U.S. Naval Research Laboratory, EDWARD VAN KEUREN, Georgetown University, ANTONIO TING, U.S. Naval Research Laboratory — Electron beams produced from a laser wakefield accelerator are predicted to have bunch lengths approximately equal to one quarter of a plasma wavelength. For plasma densities on the order of $10^{19}$ cm$^{-3}$ this corresponds to lengths of $\sim 3\mu$m. Current techniques have proven unable to resolve such a short pulse at relativistic speeds. Work is underway to develop and test a noninvasive single-shot technique to measure the bunch length of high-energy ultrashort electron beams. The technique relies on the mixing of the relativistic beam’s transverse electric field with a probe laser within a nonlinear material. The theory of operation and the devices integration into the beam line will be discussed.

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