

Abstract Submitted  
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**How Can One Maximize the Current Density & Total Electron Density of a Short-Pulse, Approximately Unidirectional, 5-10 MeV Monoenergetic Electron Beam?**<sup>1</sup> G.R. BENNETT, A.B. SEFKOW, B.W. ATHERTON, M. GEISSEL, D.I. HEADLEY, M.C. HERRMANN, M.W. KIMMEL, J.L. PORTER, P.K. RAMBO, M. SCHOLLMEIER, M. SCHWARZ — A Sandia National Laboratories (SNL) program has the goal of attaining the highest possible conversion of Z-Petawatt-Testbed (ZPW-T; up to 120-J in a 0.5-ps pulse) 1054-nm laser light, into an approximately unidirectional, 5-10 MeV, electron beam – with maximum current density & maximum total electron density. If sufficiently successful, the technique will be applied to the larger multikilojoule Z-Petawatt laser, when complete. This paper discusses the early progress/plans to date; including LSP Particle-in-Cell simulations, metrology of ultrathin carbon foils, a Double-Plasma-Mirror system to improve the ZPW-T contrast, a novel linear (LP) to circular polarization (CP) rotator, etc. Results will include: simulation, analytical (a rigorous 1D derivation of the relativistic pondermotive electric field for LP vs. CP light), & experimental progress.

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