Abstract Submitted
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Experimental Demonstration of 1 GeV Energy Gain and Stable Self Trapping in a Laser Wakefield Accelerator[1] D. PANASENKO, A.J. GONSALVES, K. NAKAMURA, C. TOTH, C.G.R. GEDDES, E. CORMIER-MICHEL, C.B. SCHROEDER, E. ESAREY, W.P. LEEMANS, LBNL, S.M. HOOKER, Oxford, J. CARY, D. BRUHWILER, Tech-X — GeV-class electron accelerators have broad applications, including synchrotron facilities, free electron lasers, and high-energy physics (HEP). Laser-wakefield accelerators (LWFAs) may reduce cost and size of such accelerators (and push the HEP energy frontier), since LWFAs sustain electric fields of hundreds of GV/m, thousands of times those achievable in RF accelerators. Results will be presented on production of GeV-class beams using LWFAs*. Laser pulses with peak power ranging from 10-40TW were guided in gas-filled capillary discharge waveguides of length 15mm and 33mm, allowing the production of high-quality electron beams with energy up to 1 GeV. Stable self trapping and acceleration of beams to 500 MeV with few percent energy spread was also demonstrated. Electron beam characteristics and laser guiding, and their dependence on laser and plasma parameters will be discussed and compared to simulations. *Leemans et al., Nature Physics, 2006

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