Abstract Submitted
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Acceleration of Quasi-Monoenergetic Electrons to 15 MeV at 1 kHz with ¡2.7 mJ, 5 fs Pulses[1] MANH LE, FATHOLAH SALEHI, LUCAS RAILING, LUCAS PASCALE, HOWARD MILCHBERG, University of Maryland, College Park — We demonstrate acceleration of quasi-monoenergetic electron bunches with a narrow angular divergence up to 15 MeV by focusing 2.7 mJ, 5 fs pulses at a kHz repetition rate onto a near-critical hydrogen gas jet. In previous experiments, we showed that the use of near-critical gas densities [1] enabled acceleration of electrons to MeV energies using mJ-scale pulses from a kHz system by lowering the critical power for self-focusing [2, 3]. These bunches, generated in the self-modulated (SM-LWFA) regime, had broad angular divergences and exponential energy distributions [2, 3]. Our recent experiments operating in the bubble regime with 7 fs, 2.5 mJ pulses generated in a hollow-core fiber (HCF) saw the acceleration of quasi-monoenergetic electrons to 5 MeV with an improved angular spread [4]. In this work, we employ 5 fs, 2.7 mJ pulses generated in an HCF from elliptically polarized pulses to accelerate quasi-monoenegetic electron bunches to 15 MeV with 7 mrad divergence and 4 mrad shot-to-shot jitter. [1] F. Salehi *et al.*, Rev. Sci. Instrum. **90**, 103001 (2019) [2] F. Salehi *et al.*, Opt. Lett. **42**, 215218 (2017) [3] A. J. Goers *et al.*, Phys. Rev. Lett. **115**, 194802 (2015) [4] F. Salehi *et al.*, FiO+LS, JW4A.116, OSA, 2019.

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