Abstract Submitted
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Generation of Monoenergetic Electrons via LWFA in the Blowout Regime[1] F.S. TSUNG, Univeristy of California, Los Angeles — Recently, we reported the observation of low emittance, nearly monoenergetic electrons of approximately 240 MeV energy[1] in PIC simulations in which a 13TW, 50fs laser propagated through nearly 1CM of 3x10^{18} cm^{-3} preformed plasma channel. The simulations showed that self-injection occurs after the laser intensity increases due to a combination of photon deceleration, group velocity dispersion, and self-focusing. The monoenergetic beam is produced because the injection process is clamped by beam loading and the rotation in phase space that results as the beam dephases. Nearly simultaneously[2-4], three experimental groups from around the world reported the generation of near nanocoulomb of low emittance, high quality electron beams using similar laser parameters reported in our simulations. Although these simulations and experiments use a wide range of plasma parameters, laser powers and spot sizes, the mechanism by which the monoenergetic electrons are generated is universal. Using 3D PIC simulations with the code OSIRIS, we will describe how injection and acceleration occurs in these recent experiments and discuss how the energy and beam quality might be improved in the future. We will also show the difference between 2D and 3D simulations.

[1] F. S. Tsung et al, *Phys. Rev. Lett.,* **93,** 185002 (2004).
[2] Mangles et al, *Nature*, **431,** 535 (2004).
[2] Geddes et al, *Nature*, **431,** 538 (2004). [2] Faure et al, *Nature*, **431,** 541 (2004).

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