Abstract Submitted
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Accordion effect in a laser wakefield accelerator: Generating comb-like electron beams for a tunable pulsed source of polychromatic gamma-rays.[1] SERGE KALMYKOV, University of Nebraska - Lincoln, XAVIER DAVOINE, CEA, DAM, DIF, Arpajon, France, ISAAC GHEBREGZIABHER, The Pennsylvania State University, BRADLEY SHADWICK, University of Nebraska - Lincoln — Trains of synchronized, fs-length GeV-scale electron bunches with a sub-micron normalized transverse emittance, brightness up to 10^{17} A/m^2, and controlled energy spacing may be purposely produced in both plasma channels and uniform plasmas. A cavity of electron density, driven by an optimally designed multi-color stack of 10-TW-scale laser pulses, experiences expansions and contractions, periodically injecting electrons from the ambient dense plasma, accelerating them without compromising the beam quality [1]. This periodic injection is naturally achieved in a plasma channel [2]. The channel, however, is not a prerequisite to this effect. The number of comb components, as well as their charge and energy spacing, can be controlled in a uniform plasma by independently varying focal spots of the laser stack components. Inverse Thomson scattering from these comb-like beams produces synchronized sequences of quasi-monochromatic, fs-length gamma-ray flashes, which may become an asset to pump-probe experiments in dense plasmas. [1] S. Y. Kalmykov et al., Phys. Plasmas 22, 056701 (2015). [2] S. Y. Kalmykov et al., Plasma Phys. Control. Fusion 58, 034006 (2016).

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