Abstract Submitted
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Temporal characterization of the wave-breaking flash in a laser plasma accelerator[1] BO MIAO, LINUS FEDER, ANDREW GOERS, GEORGE HINE, FATHOLAH SALEHI, JARED WAHLSTRAND, DANIEL WOODBURY, HOWARD MILCHBERG, University of Maryland, College Park — Wave-breaking injection of electrons into a relativistic plasma wake generated in near-critical density plasma by sub-terawatt laser pulses generates an intense ($\sim 1\mu$J) and ultra-broadband ($\Delta\lambda \sim 300nm$) radiation flash [1]. In this work we demonstrate the spectral coherence of this radiation and measure its temporal width using single-shot supercontinuum spectral interferometry (SSSI). The measured temporal width is limited by measurement resolution to 50 fs. Spectral coherence is corroborated by PIC simulations which show that the spatial extent of the acceleration trajectory at the trapping region is small compared to the radiation center wavelength. To our knowledge, this is the first temporal and coherence characterization of wave-breaking radiation.

[1] Goers, A. J., et al. "Multi-MeV electron acceleration by subterawatt laser pulses." Physical review letters 115.19 (2015): 194802.

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