Abstract Submitted
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Relativistic Electron Acceleration with Ultrashort Mid-IR Laser Pulses[1] LINUS FEDER, DANIEL WOODBURY, Institute for Research in Electronics and Applied Physics, University of Maryland, VALENTINA SHUMAKOVA, CLAUDIA GOLLNER, Photonics Institute, Vienna University of Technology, BO MIAO, ROBERT SCHWARTZ, Institute for Research in Electronics and Applied Physics, University of Maryland, AUDRIUS PUGLYS, ANDRIUS BALTUKA, Photonics Institute, Vienna University of Technology, HOWARD MILCHBERG, Institute for Research in Electronics and Applied Physics, University of Maryland — We report the first results of laser plasma wakefield acceleration driven by ultrashort mid-infrared laser pulses (λ = 3.9 μm, pulsewidth 100 fs, energy <20 mJ, peak power <1 TW)), which enables near- and above-critical density interactions with moderate-density gas jets. We present thresholds for electron acceleration based on critical parameters for relativistic self-focusing and target width, as well as trends in the accelerated beam profiles, charge and energy spectra which are supported by 3D particle-in-cell simulations. These results extend earlier work with sub-TW self-modulated laser wakefield acceleration using near IR drivers [1] to the Mid-IR, and enable us to capture time-resolved images of relativistic self-focusing of the laser pulse. [1] 1. A.J. Goers *et al.*, Phys. Rev. Lett. **115**, 194802 (2015)

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Linus Feder
University of Maryland

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