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Electron generation from a high repetition rate LWFA in the relativistic lambda-cubed regime ZHAOHAN HE, BIXUE HOU, JAMES EASTER, KARL KRUSHELNICK, JOHN NEES, ALEC THOMAS, Center for Ultrafast Optical Science, University of Michigan, Ann Arbor, Michigan 48109-2099, USA — Ultrashort laser pulses of a few millijoules can provide focal intensities exceeding relativistic threshold. Intense laser pulses propagating in plasma drive nonlinear wakefield that can be used to accelerate electrons. Experiments were performed to investigate electron generation using the λ^3 laser at the University of Michigan - a table-top high-power laser system operating at 500 Hz repetition rate. The high repetition rate enables better data statistics and higher flux of particles, which are not accessible with typical sub-0.1Hz repetition rate systems. Experimental results from employing different laser condition (e.g. focal spot size, focus position, laser polarization state) and gas target condition (e.g. gas species, density profile) are presented. In addition, computational simulations using the 3D particle-in-cell code OSIRIS are performed to model the interaction.

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