

# Accelerators Powered with Optically-Generated THz Pulses

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Compact high-gradient accelerators operating at high repetition rates are of interest for a wide variety of applications such as ultrafast electron diffraction, free electron lasers and medical accelerators. We are exploring the use of intense optically-generated THz pulses to power accelerators efficiently and with high-gradients. In a first demonstration, a single-cycle THz pulse was used to accelerate an electron bunch in a dielectrically-loaded waveguide. An energy gain of 7 keV observed with a 10 micro-Joule pulse energy. The performance of these THz accelerators will scale rapidly with increased THz pulse energy and control of the THz spectrum. The development of narrow-band THz sources and new accelerating structures will also be discussed.