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Terahertz radiation-induced sub-cycle field electron emission across a split-gap dipole antenna[1] JINGDI ZHANG, Department of Physics, University of California, San Diego, XIAOGUANG ZHAO, KEBIN FAN, XIAONING WANG, Department of Mechanical Engineering, Boston University, GU-FENG ZHANG, Department of Physics, University of California, San Diego, KUN GENG, Department of Physics, Boston University, XIN ZHANG, Department of Mechanical Engineering, Boston University, RICHARD D. AVERITT, Department of Physics, University of California, San Diego — We use intense terahertz pulses to excite the resonant mode (0.6THz) of a micro-fabricated dipole antenna with a vacuum gap. The dipole antenna structure enhances the peak amplitude of the in-gap THz electric field by a factor of ˜170. Above an in-gap E-field threshold amplitude of ˜10 MVcm-1, THz-induced field electron emission is observed (TIFEE) as indicated by the field-induced electric current across the dipole antenna gap. Field emission occurs within a fraction of the driving THz period. Our analysis of the current (I) and incident electric field (E) is in agreement with a Millikan-Lauritsen analysis where log (I) exhibits a linear dependence on 1/E. Numerical estimates indicate that the electrons are accelerated to a value of approximately one tenth of the speed of light. (arXiv: 1508.04737)

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