Abstract Submitted
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Laser induced ultrafast electron emission from a field emission tip[1] BRETT BARWICK, CHRIS CORDER, ADAM CAPREZ, SHAWN HILBERT, CORNELIUS UITERWAAL, HERMAN BATELAAN, University of Nebraska - Lincoln — We show that by focusing the output of a femtosecond oscillator on a tungsten nanometer field emission tip we can create electron pulses that are less than 100 fs in duration. There are different possible mechanisms for the observed electron emission: thermal excitation, multi-photon absorption and field emission. The process dominating the electron emission will ultimately determine the electron pulse duration. For different DC offset voltages we find the intensity dependence of the emission process is proportional to the light intensity to the 2nd, 3rd or 4th power. This indicates that multi-photon absorption is the dominant process. Our findings are in stark contrast to those presented by Hommelhoff *et al.* [1,2]. They claim that the electron emission process is dominated by optical field emission, which seems to be inconsistent with the Keldysh parameter ($\gamma > 1$), and our observed electron emission intensity dependence. Regardless of the ultimate pulse duration of the emitted electron packets this source may be important for UEM and other fundamental electron physics studies. [1] Peter Hommelhoff, et al. Phys. Rev. Lett. **96**, 077401 (2006). [2] Peter Hommelhoff, et al. Phys. Rev. Lett. **97**, 247402 (2006).

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