Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Low power laser-driven electron source based on plasmon enhanced metalized optical fiber tips SAM KERAMATI, Univ of Nebraska - Lincoln, ALI PASSIAN, VINEET KHULLAR, PAVEL LOUGOVSKI, Oak Ridge National Laboratory, HERMAN BATELAAN, Univ of Nebraska - Lincoln — Pulsed laser-driven electron sources have been extensively studied and developed over the past decade to achieve coherent pulsed electron matter waves. The electrons are generated by focusing femtosecond laser pulses on metallic nanotips. Applications range from electron microscopy to the study of fundamental quantum mechanical processes [1]. It is therefore advantageous to replace femtosecond lasers with the much simpler diode lasers. We demonstrate that metalized optical fiber tips can emit electrons by diode laser illumination. We present our experimental data after the theoretical analysis of the problem [2] along with the simulation results of the proposed plasmon assisted electron emission. The laser beam is coupled into the uncoated end of the optical fiber allowing the light to propagate to the metalized fiber tip. No further optical alignment is required within the vacuum system. The electrons from the tip can thus be conveniently delivered anywhere in a vacuum chamber. This heralds a prospective low-cost plug-and-play electron source. The detailed wavelength dependence of the emission will be used to investigate the proposed plasmon-based mechanism. [1] B. Barwick, et al, New J Phys 9, 142 (2007) [2] A. Passian, et al, Phys Rev B 71, 115425 (2005)

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Date submitted: 24 Jan 2018 Electronic form version 1.4