Abstract Submitted
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Towards sub-femtosecond emission[1] ROGER BACH, PETER HANSEN, HERMAN BATELAAN, University of Nebraska-Lincoln, SHAWN HILBERT, Texas Lutheran University — To manipulate femtosecond pulses of electrons new electron optical elements are needed. For example, if a source has a lower limit in the duration of the electron pulses that it generates, then aan electron optical element that can reduce the pulse duration could be useful. An example of this is the proposed "temporal lens " [1]. To detect the short electron pulses one also needs new elements. Attempts to use the ponderomotive interaction between the electron pulse and a second laser pulse will be presented [2]. Alternatively, we have started to explore a plasmonics structure provided by the Capasso group to make a fast electron switch. This has the potential to be useful both for switching, shaping and detecting the electron pulse. Finally, the experimental parameters and detection ideas for quantum degeneracy will be discussed. [1] S. Hilbert, B. Barwick, K. Uiterwaal, H. Batelaan, A. Zewail, "Temporal lenses for attosecond and femtosecond electron pulses", Proceedings of the National Academy of Sciences, p. 10558, vol. 106, (2009). [2] L. Kreminskaya, C. Corder, V. Engquist, O. Golovin, P. Hansen, H. Batelaan, A. I. Khizhnyak, G. A. Swartzlander, Jr., "Laser Beam Shaping: Donut Mode Formation by Interference." Laser Beam Shaping X (Proceedings Volume) Proceedings of SPIE Volume: 7430.

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