Abstract Submitted
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Temporal Response of a Plasmonic Antenna[1] M. BECKER, C.-W. HUANG, R. BACH, H. BATELAAN, Department of Physics and Astronomy, University of Nebraska - Lincoln, E. SMYTHE, F. CAPASSO, School of Engineering and Applied Sciences, Harvard University — Using femtosecond lasers, we investigate the temporal response of a plasmonic antenna [1]. This structure is fabricated by Capasso's group. In this report, we propose an application of such a plasmonic antenna: **femtosecond electron switching**. The plasmonic antenna may be very effective in influencing the motion of free electrons because the intensity of an input electric field can be enhanced by up to a factor of a thousand in the near field [2]. Our estimates indicate that the plasmonic antenna can cause large deflection angles of about 0.1 radian upon applying a 10 nJ, 10 femtosecond duration laser pulse. Therefore, a low power, high repetition rate femtosecond laser may be used to excite the plasmonic structure and influence electrons' motion at the femtosecond time scale, leading to a femtosecond electron switch. We want to experimentally determine this dynamical response of the antenna. A preliminary test of the plasmonic antenna shows that it can respond in the femtosecond regime. Detection schemes that are sensitive to about 10 femtoseconds are now being explored. [1] Elizabeth J. Smythe, Ertugrul Cubukcu, and Federico Capasso, *Opt. Exp.* **15**, 7439 (2007) [2] Ertugrul Cubukcu, et *al.*, *IEEE J. Sel. Top. Qu. Elec.*, Vol.14, No.6, 1448 (2008)

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