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Theory of THz rectification at a gate controlled Shottky barrier in a FET based plasmonic detector G.R. AIZIN, J. MIKALOPAS, CUNY, New York, G.C. DYER, UC Santa Barbara, E.A. SHANER, M.C. WANKE, Sandia National Laboratories, S.J. ALLEN, UC Santa Barbara — We present a theory of the resonant THz photoresponse in a grating gated FET with a gate controlled Shottky barrier [1]. We use theoretical modeling to show that the potential barrier induced in the 2D FET channel by an isolated gate finger, biased to pinch off, yields the Shottky-like $I-V$ characteristics of the FET. The grating gate couples an external THz radiation to the plasmon excitations in the 2D electron channel. We calculate the photoresponse signal resulting from the THz rectification at the Schottky barrier and demonstrate that it has resonant peaks at plasmon frequencies. The results obtained are consistent with recent measurements [2]. This work is supported by ARO (Grant # W911NF-05-1-0031) and The University at Buffalo NSF NIRT (Grant #ECS0609146). Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. 1. E.A. Shaner et al, Appl. Phys. Lett., 90, 181127 (2007). 2. G. Dyer et al, this meeting presentation.

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