Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electronically Tunable Grating-Gate Terahertz Detectors E.A. SHANER, M.C. WANKE, MARK LEE, A.D. GRINE, J.L. RENO, Sandia National Laboratories*, S.J. ALLEN, UC Santa Barbara — Spectroscopy in the millimeter-wave to THz frequencies has received a great deal of recent interest for security applications and chemical identification. This talk will address detectors that utilize plasmons in high-mobility GaAs/AlGaAs quantum well structures to provide a frequency tunable detector response. In particular, recent advances on the grating-gate detector, including membrane and split-gate versions, will be presented. The discussion will include our understanding of the detection mechanisms involved as well as the noise equivalent powers that have been achieved in the various geometries. Currently, the grating-gate style of detector covers a frequency range from 150GHz to 1THz at temperatures ranging from 4K to 80K, however, the ultimate frequency and temperature limits of these detectors are not currently known. The ability to tune the detector response by simply changing a gate voltage leads to an attractive 'spectrometer-on-a-chip' where no moving parts would be needed for THz spectral analysis. To date we have achieved spectral scans from 600GHz to 1THz in 12.5ms with a measured 15GHz minimum linewidth. *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.

Eric Shaner
Sandia National Labs

Date submitted: 20 Nov 2006 Electronic form version 1.4