

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Tunneling Under Microwave Illumination in Bilayer Two Dimensional Electron Systems J.A. BONETTI, L.C. SINCLAIR¹, J.P. EISENSTEIN, Caltech, L.N. PFEIFFER, K.W. WEST, Bell Labs, Lucent Technologies — The striking Josephson-like effect recently observed [1] in bilayer 2D electron systems at $\nu_t = 1$ raises important questions about the nature of photon-assisted tunneling in this system. For instance, it is unknown whether Shapiro steps will arise, or whether the presence of radiation will lead to photon-assisted sidebands [2]. In order to address these questions, we have examined the effect of microwave radiation on tunneling in bilayer electron systems. Several aspects of coupling radiation into the sample will be presented, including issues of heating and gating. Preliminary results demonstrate a conduction enhancement near gate voltages corresponding to top and bottom layer depletion. The frequency and power dependence of this enhancement will be presented. This work is supported by the NSF and DOE.

[1] I.B. Spielman, J.P. Eisenstein, L.N. Pfeiffer, and K.W. West, Phys. Rev. Lett. 84, 5808 (2000).

[2] Ady Stern, S. M. Girvin, A. H. MacDonald, and Ning Ma, Phys. Rev. Lett. 86, 1829 (2001)

¹Now at UC Boulder

J.A. Bonetti
Caltech

Date submitted: 08 Dec 2004

Electronic form version 1.4