Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Bilayer Graphene: An Electrically Tunable Semiconductor HONGKI MIN, BHAGAWAN SAHU, SANJAY BANERJEE, ALLAN MACDONALD, The University of Texas at Austin — Using *ab initio* density functional theory calculations, we verify [1,2] that the energy band structure of bilayer graphene can be tuned by applying an external electric field. As the strength of the external electric field increases, the electronic spectrum of bilayer graphene changes from a that of a zero-gap semiconductor to that of a gapped semiconductor. From the *ab initio* calculations the external field dependence of the screened interlayer potential difference and tunneling amplitudes are extracted by fitting to a tight-binding model. We discuss the role of interlayer correlations in determining the size of the gap and the accuracy of local density approximation. [1] Edward McCann and Vladimir I. Fal'ko, Phys. Rev. Lett. **96**, 086805 (2006). [2] Taisuke Ohta, Aaron Bostwick,, Thomas Seyller, Karsten Horn, and Eli Rotenberg, Science **313**, 951 (2006).

Hongki Min
The University of Texas at Austin

Date submitted: 03 Dec 2006 Electronic form version 1.4