Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effective screening and the plasmaron bands in Graphene A. WALTER, FHI, Max-Planck-Gesellschaft and ALS, E. O. Lawrence Berkeley Laboratory, K.J. JEON, EETD, E. O. Lawrence Berkeley Laboratory, A. BOSTWICK, ALS, E. O. Lawrence Berkeley Laboratory, L. MORESCHINI, Y.S. KIM, ALS, E. O. Lawrence Berkeley Laboratory, Y.J. CHANG, FHI, Max-Planck-Gesellschaft and ALS, E. O. Lawrence Berkeley Laboratory, F. SPECK, M. OSTLER, T. SEYLLAR, U Erlangen-Nürnberg, K. HORN, FHI, Max-Planck-Gesellschaft, E. ROTENBERG, ALS, E. O. Lawrence Berkeley Laboratory — In the following we investigate the plasmaron bands in the presence of differing effective screening, by changing the interface layer between graphene and a SiC substrate. ARPES data is presented and the deviation of the band structure from the Dirac cone picture is attributed to electron, hole, plasmon interactions. Comparison to G_0W -RPA theory is used to determine the effective dielectric constant of the underlying layer and a range of values (ε_S $\sim$219 to $\sim$11.6) is found. This investigation indicates that, in addition to the long list of unique and interesting properties, graphene is an ideal candidate for investigating the effective screening in the context of electron-hole-plasmon interactions. It is also shown that plasmaronic and electronic properties of graphene can be manipulated semi-independently, a necessity if it is to be employed in future "plasmaronic" devices.

Andrew Walter
FHI, Max-Planck-Gesellschaft

Date submitted: 30 Nov 2010 Electronic form version 1.4