Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Charge redistribution and interlayer coupling in twisted bilayer graphene under electric fields PATRICIO VARGAS, ERIC SUAREZ MORELL, Physics Department, Universidad Tecnica Federico Santa Maria, Casilla 110-V, Valparaiso, Chile, LEONOR CHICO, LUIS BREY, Departamento de Teoria y Simulacion de Materiales, Instituto de Ciencia de Materiales de Madrid, CSIC, E-28049 Cantoblanco, Spain — There is an ongoing controversy on the electronic characteristics of rotated bilayer graphene. Several experiments on rotated few-layer graphene grown on SiC show an electronic behavior similar to that of single-layer graphene, with the same carriers' velocity as that of an isolated graphene monolayer; for this reason, these systems have been considered as composed of uncoupled graphene sheets. We investigate the electronic density redistribution of rotated bilayer graphene under a perpendicular electric field, showing that the layers are actually coupled even for large angles. This layer-layer coupling is evidenced by the charge transfer on these structures as a function of the external voltage. We find an inhomogeneous excess charge distribution that is related to the moiré patterns for small angles, but that persists for larger angles where the carriers' velocity is equal to that of single layer graphene. Our results show that rotated bilayer systems are coupled for all rotation angles.

Patricio Vargas
Physics Department, Universidad Tecnica Federico Santa Maria,
Casilla 110-V, Valparaiso, Chile

Date submitted: 03 Nov 2011 Electronic form version 1.4