Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Electronic transport in graphene sheets in a random magnetic field CAIO LEWENKOPF, RHONALD BURGOS, JESUS WARNES, LEANDRO LIMA, Universidade Federal Fluminense, Brazil — We present a theoretical study of the effect of ripples and strain fields in the transport properties of diffusive deposited graphene flakes. Defects in the crystalline structure, adsorbed atomic impurities and charge inhomogeneities at the substrate are believed to be the dominant disorder sources for the electronic transport in graphene at low temperatures. We show that intrinsic ripples also effect the conductivity, in particular, its quantum corrections. To this end, we analyze recent experimental results on the conductivity of rippled monolayer graphene sheets subjected to a strong magnetic field parallel to the graphene-substrate interface, $B_{\|}$ [M. B. Lundeberg and J. A. Folk, Phys. Rev. Lett. 105, 146804 (2010)]. In this setting, $B_{\|}$ gives rise to a random magnetic field normal to graphene sheet, that depends on the local curvature of the smooth disordered ripples. The analysis of the weak localization corrections of the magnetoconductance allows to establish the dependence of electronic dephasing rate on the magnitude of the random magnetic field. We compare the results for $B_{\|}$ with the conductivity and weak localization corrections due to the pseudo-magnetic fields originated by intrinsic ripples and strain fields.

Caio Lewenkopf
Universidade Federal Fluminense, Brazil

Date submitted: 15 Nov 2013 Electronic form version 1.4