Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

How wrinkling singularities impact graphene's electronic transport VITOR PEREIRA, ANTONIO CASTRO NETO, Boston University — Wrinkles seem ubiquitous in graphene. They appear most noticeably in exfoliated samples (on account of the shear and strains involved in the cleavage process and subsequent transfer to the silica substrates) and also on suspended samples (in which case they can be controlled by tuning the amount of shear). It is also known that wrinkling in 2D membranes (of which graphene is the ultimate microscopic model) is intimately associated with the presence of certain conical singularities in the membrane profile. These arise from the necessity of the sheared/strained system to relieve as much in-plane stain as possible, while still conforming to flat boundary conditions. Such regions of singular strain and curvature will directly affect the motion of the Dirac electrons in graphene. We will show how that impacts the transport and local electronic properties of system. In particular, we will show that a quasi-linear conductivity is obtained, which might allow the utilization of wrinkling as a means to tune the electronic response of graphene, constituting another example of the concept of strain-engineered transport in graphene first introduced in [1].

[1] V. M. Pereira and A. H. Castro Neto, Phys. Rev. Lett. 103, 046801 (2009).

Vitor Pereira
Boston University

Date submitted: 09 Dec 2009 Electronic form version 1.4