Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Delocalization by Disorder in Layered Systems VLADIMIR YUDSON, Institute for Spectroscopy, RAS, Russia, DMITRII MASLOV, University of Florida, ANDRES SOMOZA, MIGUEL ORTUNO, University of Murcia, Spain — Motivated by anomalously large conductivity anisotropy in graphite and other layered materials, we propose a simple model of randomly spaced potential barriers (mimicking stacking faults) with isotropic impurities in between the barriers. We solve this model both numerically and analytically, by utilizing an exact solution for the conductivity of a one-dimensional (1D) disordered system. In the absence of bulk disorder, electron motion in the out-of-plane direction is localized. Bulk disorder destroys 1D localization. As a result, the out-of-plane conductivity is finite and scales linearly with the scattering rate by bulk impurities until planar and bulk disorder become comparable. The *ac* out-of-plane conductivity is of a manifestly non-Drude form: the real part starts from finite value at zero frequency and has a maximum at the frequency corresponding to the scattering rate by potential barriers.

Dmitrii Maslov
University of Florida

Date submitted: 14 Dec 2009 Electronic form version 1.4