Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Scaling of Non-Saturating Magnetoresistance in HOPG NICHOLAS CORNELL, MYRON SALAMON, ANVAR ZAKHIDOV, The University of Texas at Dallas — There have been many various resistive and field dependent behaviors observed in Highly Oriented Pyrolytic Graphite (HOPG). We found HOPG samples to vary significatly in their temperature dependent resistances, even between portions of the same sample. All samples exhibit non-saturating magnetoresistance (MR) and, at low temperatures, Shubnikov-de Haas (SdH) oscillations. These oscillations give rise to a mobility $\mu = 1.2\ \mathrm{T}^{-1}$ at 5 K. The MR follows a scaling behavior that is predicted by a model based on the Hall effect in granular materials and that predicts a crossover to linear behavior with a characteristic field H_0 on the order of μ^{-1}, or 0.8 T, in agreement with experiment. Data at higher temperatures can be collapsed to a single curve if $H_0(T)$ increases linearly with temperature. Analysis of the SdH data gives a 2D carrier density in agreement with previous results, and a large mean-free path relative to crystallite size.

Nicholas Cornell
The University of Texas at Dallas

Date submitted: 19 Nov 2012 Electronic form version 1.4