Abstract Submitted
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Large Magnetoresistance and low temperature Transport anomalies in Ion implanted HOPG[1] NICHOLAS CORNELL, ANVAR ZAKHIDOV, MYRON SALAMON, YURI GARTSTEIN, University of Texas at Dallas, XUEMEI WANG, HERBERT FREYHARDT, WEI KAN CHU, University of Houston, UTD NANOTECH INST. TEAM, U. HOUSTON TEAM — Strong positive magnetoresistance (MR) was found in highly oriented pyrolytic graphite (HOPG) upon ion implantation by boron and phosphorous. Similar effects, but with smaller amplitude, are induced by carbon ion implantation, but due to structural disorder and defect formation without carrier concentration increase. The magnetic field dependence of the MR is linear at high fields with no sign of saturation, but different contact geometries result in a wide range of parameters. Two possible explanations of strong MR are suggested and analyzed. While the MR remains large at all temperatures, plots of R(T) in constant field show a drop at lower T. Future experiments will clarify the origin of the R(T) drop, in particular, whether this might be interpreted as the onset of inhomogeneous superconductivity, as proposed in some previous work, or could be explained in the context of strong linear MR effects seen in high-mobility, disordered materials.

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