

Defects induced magnetism in turbostratic Graphene

Rajesh Mandal, Satishchandra B Ogale*

Department of Physics, Indian Institute of Science Education and Research, Pune, India-411008
rajesh.mandal@students.iiserpune.ac.in

Abstract :

We have studied purely defects induced magnetism in turbostratic Graphene samples prepared with different physical conditions for inducing defects. Normal carbon is fully diamagnetic in nature and the unusual magnetic properties the samples has shown are not due to any kind of chemical impurities. The mechanism that can explain this intrinsic magnetism is defects. The main responsible defects are point defects, edge defects and line defects. The underlying physics is not simple. People have used density functional theory, nearest neighbor classical 1D Heisenberg Model, Mean- field Hubbard Model to predict this unusual magnetism. Experimentally people also detected the paramagnetic and ferromagnetic signals in different defects induced semi graphitic carbon samples. Here we have detected antiferromagnetic type transitions above liquid nitrogen temperature. The diamagnetic sample in room temperature gradually becomes paramagnetic with two magnetic transitions while decreasing temperature up to liquid helium temperature.

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Figures:

