Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Defect Induced Resonances and Magnetic Patterns in Graphene

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— We investergate the effects of point and line defects in monolayer graphene was investigated within the framework of the Hubbard model, using a self-consistent mean field theory. These defects are found to induce characteristic patterns into the electronic density of states and cause non-uniform distributions of magnetic moments in the vicinity of the impurity sites. Specifically, defect induced resonance bound states in the local density of states are observed at energies close to the Dirac points. The magnitudes of the frequencies of these resonance states are shown to decrease with the strength of the scattering potential, whereas their amplitudes decay algebraically with increasing distance from the defect. Furthermore, non-trivial impurity induced magnetic patterns are observed in the presence of line defects: zigzag line defects are found to introduce stronger-amplitude magnetic patterns than single line defect and armchair line defects. When the scattering strength of these topological defects is increased, the induced patterns of magnetic moments become more strongly localized.

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Date submitted: 19 Nov 2010 Electronic form version 1.4