

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin and Valley Polarization on deep Coulomb States in Graphene VALERI KOTOV, University of Vermont, VITOR PEREIRA, Boston University, BRUNO UCHOA, University of Illinois at Urbana-Champaign, ANTONIO CASTRO NETO, Boston University — In gapped graphene, electrons occupying the lowest energy level exhibit valley and spin degeneracies. The electrons are localized on the scale of the effective Compton wavelength, which is inversely proportional to the gap. We show that taking into account electron-electron interactions can lift both the spin and valley degeneracies, thus inducing spin and valley moments. Consequently the electrons can be polarized on nanometer (gap dependent) scale. We also explore the possible signatures of this effect, such as the modification of the density of states around the Coulomb center.

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Date submitted: 20 Nov 2009

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