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Magnetism and Correlations of Fractionally Filled Zero-energy States in Graphene Quantum Dots A. DEVRIM GUCLU, Institute for Microstructural Sciences NRC, Ottawa, PAWEL POTASZ, Wroclaw University of Technology, Poland, OLEKSANDR VOZNYY, MAREK KORKUSINSKI, PAWEL HAWRYLAK, Institute for Microstructural Sciences NRC, Ottawa — We study electronic and magnetic properties of triangular graphene dots with zig-zag edges. Such structures have recently attracted attention due to the existance of a shell of degenerate states at the Fermi level, with half-filled shell exhibiting a magnetic moment[1,2,3]. In this work, we present new results demonstrating the important role of electronic correlations as a function of the filling fraction of the shell. The effect of degeneracy, finite size and electron-electron interactions are treated nonperturbatively using a combination of density functional theory, tight-binding, Hartree-Fock and configuration interaction methods. We show that the nature and magnetization of the ground state depend strongly on the filling fraction of the degenerate shell. Half-filled charge neutral shell leads to full spin polarization but this magnetic moment can be completely destroyed by adding a single electron. [1] J. Fernandez-Rossier and J.J. Palacios, Phys.Rev.Lett. **99**, 177204 (2007) [2] M. Ezawa, Phys.Rev.B, **77**, 155411 (2008) [3] Kaxiras *et al.*, Nano Lett. **8**, 241 (2008).

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