

Abstract Submitted  
for the MAR10 Meeting of  
The American Physical Society

**High controllability of ferromagnetism in graphene**<sup>1</sup> TIANXING MA, FEIMING HU, Department of Physics and ITP, The Chinese University of Hong Kong, Hong Kong, ZHONGBING HUANG, Faculty of Physics and Electronic Technology, Hubei University, Wuhan430062, China, HAI-QING LIN, Department of Physics and ITP, The Chinese University of Hong Kong, Hong Kong — We address the issue of high controllability of ferromagnetism in graphene-based samples. To study magnetic correlations in graphene, we systematically carry out quantum Monte Carlo simulations of the Hubbard model on a honeycomb lattice. In the filling region below the Van Hove singularity, the system shows a short-range ferromagnetic correlation, which is slightly strengthened by the on-site Coulomb interaction and markedly by the next-nearest-neighbor hopping integral. The ferromagnetic properties depend on the electron filling strongly, which may be manipulated at ease by the electric gate. Due to its resultant high controllability of ferromagnetism, graphene-based samples may facilitate the new development of many applications.

<sup>1</sup>This work is supported by HKSAR RGC Project No. CUHK 401806.

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Date submitted: 01 Dec 2009

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