

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Absence of Wigner Crystallization in Graphene¹ HARI DAHAL, Boston College, Physics Department, YOGESH JOGLEKAR, Department of Physics, Indiana University-Purdue University Indianapolis, KEVIN BEDELL, Boston College, Physics Department, ALEXANDER BALATSKY, Theoretical Division, Los Alamos National Laboratory — We study the possibility of Wigner crystal phase as a ground state in graphene. The Wigner crystal phase results when the ratio of potential to kinetic energy is much higher than one, and generally, the particle density serves as a tuning parameter. Our calculation shows that potential and kinetic energy have the same density dependence resulting in a density independent ratio of energies. Moreover, kinetic energy is higher than potential energy; which rules out the possibility of Wigner crystallization. The physical reason of this observation can be traced back to the linear dispersion of carriers of Graphene, the Dirac fermions. cond-mat/0609440; Physical Review B (to be published)

¹Supported by T-11 group, LANL.

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Date submitted: 16 Nov 2006

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