Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Spontaneous symmetry breaking in bilayer graphene[1]

MAXIM KHARITONOV, Center for Materials Theory, Rutgers University — Recent experiments [1-4] provided compelling evidence for the correlated electron behavior in undoped bilayer graphene at both zero and finite magnetic field. The key question concerns the nature of the broken-symmetry phases realized experimentally. I will present the phase diagram for the zero-density state in the quantum Hall regime ($\nu = 0$ state) obtained within the framerwork of quantum Hall ferromagnetism. Comparing these results with the experimental data of Refs. [1,4], I will argue that the $\nu = 0$ insulating state realized in bilayer graphene is the canted antiferromagnetic phase. I will also show that the (canted) antiferromagnetic phase can persist at all magnetic fields down to zero and argue that this is the most likely scenario for the insulating state observed in Ref. [4].

[1] R. T. Weitz *et al.*, Science 330, 812 (2010).
[2] F. Freitag *et al.*, arXiv:1104.3816 (2011).
[3] A. S. Mayorov, *et al.*, Science 333, 860 (2011).
[4] J. Velasco Jr. *et al.*, arXiv:1108.1609 (2011).
[5] M. Kharitonov, arXiv:1103.6285, arXiv:1105.5386, arxiv:1109.1553 (2011).

[1]This worked was supported by the U.S. DOE under contracts DE-FG02-99ER45790 and DE-AC02-06CH11357

Maxim Kharitonov
Center for Materials Theory, Rutgers University

Date submitted: 13 Dec 2011 Electronic form version 1.4