

Abstract for an Invited Paper
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Octet Quantum Hall Effect in Graphene Bilayers¹

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Interaction driven integer quantum Hall effects are anticipated [1] in graphene bilayers because of the near-degeneracy of eight Landau levels which appear near the neutral system Fermi level at filling factors between $\nu=-4$ and $\nu=4$. The bilayer graphene octet exhibits a wide variety of broken symmetry states, with Ising, XY and Heisenberg character which can be controlled by an external field which creates an electric potential difference between the two layers. Because of the peculiarities of the bilayer graphene electronic structure states with $n=0$ and $n=1$ orbital character are degenerate. I will explain predictions that an intra-Landau-level cyclotron resonance signal will appear at some odd-integer filling factors, accompanied by collective modes which are nearly gapless and have approximate $k^{3/2}$ dispersion. This talk will be based on work performed in collaboration with Yafis Barlas, Rene Cote, Kentaro Nomura, and Jules Lambert.

[1] Y. Barlas *et al.*, Phys. Rev. Lett. **101**, 097601(2008).

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