

Abstract Submitted
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SO(3) theory of the integer quantum Hall effect in graphene IGOR HERBUT, Simon Fraser University — I will discuss the Hubbard model of graphene in an external magnetic field. In the continuum limit and in the Hartree-Fock approximation, the ground state energy at half filling becomes nearly symmetric under rotations of the three-component vector (N_1, N_2, m) , with the first two components representing the Neel order parameter orthogonal to and the third component the magnetization parallel with the external magnetic field. When the symmetry breaking effects arising from the lattice, Zeeman coupling, and higher Landau levels are included the system develops a quantum critical point at which the antiferromagnetic order disappears and the magnetization has a kink. The observed incompressible states at filling factor one are argued to arise due to a finite third component of the Neel order parameter at these electron densities. Recent experiments appear consistent with $N_1=N_2=0$, and N_3 finite, at the filling factors zero and one, respectively. I. F. Herbut, Phys Rev. B vol. 76, 085432 (2007); *ibid.* vol. 75, 165411 (2007).

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