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Skyrmions in a graphene bilayer at filling factors $\nu = -3, -1$ WENCHEN LUO, RENÉ CÔTÉ, U. Sherbrooke, YAFIS BARLAS, U. Florida and NHMFL, ALLAN H. MACDONALD, U. Texas at Austin — In a quantizing magnetic field, the Landau level $N = 0$ of a graphene bilayer in the Bernal stacking consists of an octet of degenerate states if Zeeman coupling is neglected. The quantum numbers of an electron are its spin, its layer (or valley) index and its *orbital* index $n = 0, 1$. It was shown recently that, in the Hartree-Fock approximation, the ground states of the bilayer at integer filling factors $\nu \in [-3, 4]$ and with an applied electrical bias can be described as different kinds of quantum Hall ferromagnets (QHF's) [1]. In this talk, we discuss the single-particle excitations of the QHF states at filling factors $\nu = -3, -1$ when the bias is such that the ground states are orbital ferromagnets. In particular, we look for the possibility of exciting quasiparticles with orbital-pseudospin textures (orbital skyrmions) at these filling factors. In these orbital skyrmions, a topological charge $Q = 2$ would be associated with a $q = 1$ electronic charge.

[1] Yafis Barlas, R. Côté, K. Nomura, and A. H. MacDonald, Phys. Rev. Lett. **101**,097601 (2008).

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