Valley-kink in Bilayer Graphene at ν =0: A Charge Density Signature for Quantum Hall Ferromagnetism[1] CHIA-WEI HUANG, EFRAT SHIMSHONI, Department of Physics, Bar-Ilan University, Ramat Gan, 52900, Israel, HERBERT FERTIG, Department of Physics, Indiana University, Bloomington, IN 47405, USA —

We investigate the interaction-induced valley textured domain walls in bilayer graphene at the ν =0 quantum Hall state, subject to a kink-like perpendicular electric field. Such a state can be realized in a double-gated suspended sample, where the electric field changes sign across a line in the middle of the sample. Using the Hartree-Fock approximation, we find that the Coulomb interaction opens a gap between the two lowest-lying states near the Fermi level, and yields a smooth valley texture throughout the domain walls. Moreover, our results suggest possibilities to visualize the resulting texture via measuring the charge density difference between the two graphene layers, which is predicted to exhibit a charge density wave. The width of the smooth texture and the resulting pattern can be tuned by the interplay between the magnetic field and gate electric fields.

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Date submitted: 12 Nov 2012   Electronic form version 1.4