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The Hubbard model on the bilayer honeycomb lattice with Bernal stacking THOMAS C. LANG, STEFAN ÜBELACKER, Institute for Theoretical Solid State Physics, RWTH Aachen University, ZI YANG MENG, Center for Computation and Technology, Louisiana State University, MICHAEL SCHERER, CARSTEN HONERKAMP, Institute for Theoretical Solid State Physics, RWTH Aachen University, ALEJANDRO MURAMATSU, Institute for Theoretical Physics III, University of Stuttgart, FAKHER F. ASSAAD, Institute for Theoretical Physics and Astrophysics, University of Wuerzburg, STEFAN WESSEL, Institute for Theoretical Solid State Physics, RWTH Aachen University — Using a combination of quantum Monte Carlo, the functional renormalization group and mean-field theory we study the Hubbard model on the bilayer honeycomb as a model for interacting electrons on bilayer graphene. The free bands consisting of two Fermi points with quadratic dispersions lead to a finite density of states, which triggers the antiferromagnetic instability and spontaneously breaks sublattice and spin rotational symmetry once a local Coulomb repulsion is introduced. We show that the antiferromagnetic instability is insensitive to the inclusion of extended Coulomb interactions and discuss effects on the sublattice magnetization and of finite size systems in numerical approaches.

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