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Interaction Induced Symmetry Breaking in ABA Trilayer Graphene ROHIT HEGDE, ALLAN H. MACDONALD, University of Texas at Austin — We present a mean-field phase diagram of dual-gated ABA trilayer graphene which is obtained by numerically solving the self-consistent Hartree-Fock equations. A metal-insulator phase transition occurs in neutral ABA trilayers at interaction strength $\alpha = 0.18$ which is not associated with broken lattice symmetries. ABA trilayers do not possess the inversion symmetry present in bilayers, but do possess a mirror-plane symmetry which remains unbroken for realistic values of alpha for the case of spinless, valley-less fermions. The manner in which SU(4) spin-valley symmetry breaks depends on doping, interlayer bias, and the surrounding dielectric medium. We compare interaction effects in ABA graphene with those in the more familiar chirally-stacked multilayers.

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