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Ordered states in spatially separated Coulomb-coupled double graphene AB bilayers JUNG-JUNG SU, National Chiao Tung University, ALAN H. MACDONALD, University of Texas at Austin — Electron-electron interaction effects are strong in graphene bilayer systems because of the approximately quadratic crossing between conduction and valence bands at the Brillouin-zone corners. In isolated bilayers this circumstance leads to an unusual spin-density-wave ground state and to a first-order phase transition between states with and without broken time reversal symmetry as a function of interlayer displacement field strength. In this talk I will address possible ordered states in systems containing two AB bilayers separated by a tunnel barrier but coupled by inter-layer Coulomb interactions. I focus on the case in which displacement fields induce charge transfer between layers, showing that under appropriate conditions it is possible to induce states with spontaneous coherence between bilayers. The transition to this coherent exciton condensate is first-order and accompanied by a substantial rearrangement of charge within each bilayer.

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