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Disorder and ferromagnetism in a graphene sheet NUNO M.R. PERES, Universidade do Minho. Portugal, FRANCISCO GUINEA, Instituto de Ciencia de Materiales de Madrid. CSIC, ANTONIO H.C. NETO, Boston University — We study the presence of ferromagnetism in the phase diagram of the two-dimensional honeycomb lattice close to half-filling (graphene) as a function of the strength of the Coulomb interaction and doping. We show that exchange interactions between Dirac fermions can stabilize a ferromagnetic phase at low doping when the coupling is sufficiently large. In clean systems the zero temperature phase diagram shows both first order and second order transition lines and two distinct ferromagnetic phases: one phase with only one type of carriers (either electrons or holes) and another with two types of carriers (electrons and holes). Using the coherent potential approximation we argue that disorder further stabilizes the ferromagnetic phase.

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