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Variational approach to the excitonic phase transition in graphene[1] FERNANDO SOLS, Universidad Complutense de Madrid, JAVIER SABIO, FRANCISCO GUINEA, ICMM-CSIC (Madrid) — We analyze the Coulomb interacting problem in undoped graphene layers by using an excitonic variational ansatz. By minimizing the energy, we derive a gap equation which reproduces and extends known results. We show that a full treatment of the exchange term, which includes the renormalization of the Fermi velocity, tends to suppress the phase transition by increasing the critical coupling at which the excitonic instability takes place.

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