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Diluted Graphene Antiferromagnet[1] HERBERT FERTIG, Indiana University, LUIS BREY, Instituto de Ciencia de Materiales de Madrid, SANKAR DAS SARMA, University of Maryland — We study RKKY interactions between local magnetic moments for both doped and undoped graphene. We find in both cases that the interactions are primarily ferromagnetic for moments on the same sublattice, and antiferromagnetic for moments on opposite sublattices. This suggests that at sufficiently low temperatures dilute magnetic moments embedded in graphene can order into a state analogous to that of a dilute antiferromagnet. We find that in the undoped case one expects no net magnetic moment, and demonstrate numerically that this effect generalizes to ribbons where the magnetic response is strongest at the edge, suggesting the possibility of an unusual spin-transfer device. For doped graphene we find that moments at definite lattice sites interact over longer distances than those placed in interstitial sites of the lattice ($1/R^2$ vs. $1/R^3$) because the former support a Kohn anomaly that is suppressed in the latter due to the absence of backscattering.

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