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Kondo Effect in Bilayer Graphene[1] DIEGO MASTROGIUSEPPE, SERGIO ULLOA, NANCY SANDLER, Ohio University — Because of the linear dependence of the density of states (near Dirac points), the physics of localized magnetic moments on graphene exhibits unique characteristics [1]. From the experiments by Mattos et al [2], where a possible observation of the 2-channel Kondo effect was reported, to recent studies on vacancies [3], the role of local moments on graphene remains poorly understood. The technical difficulties to determine the nature of the origin of the local moment add to the complexity of the problem. To gain insight into this problem, we have undertaken a study of a bilayer graphene system with Bernal stacking and an intercalated magnetic impurity. We model the system with a multiband Anderson impurity model and obtain the effective Kondo Hamiltonian via a Schrieffer-Wolff transformation. Although several conducting channels couple to the impurity, the standard 1-channel Kondo regime is recovered at low temperatures. The effective Kondo exchange couplings depend on the interlayer hopping giving rise to tunable Kondo temperatures.

[1] P. S. Cornglia et al., PRL 102, 046801 (2009); B. Uchoa et al., PRL 106, 016801 (2011)
[2] L. Mattos et al. (unpublished)
[3] J. -H. Chen et al., Nature Phys. 7, 535(2011); M. M. Ugeda et al., PRL 104, 096804 (2010).

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