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A study of magnetic proximity effect in two-dimensional heterostructure[1] SHANSHAN SU, GEN YIN, DARSHANA WICKRAMARATNE, MAHESH NEUPANE, ROGER LAKE, University of California, Riverside — Recent research found the spin Hall effect and the inverse spin Hall effect in heterostructures composed of a ferromagnetic insulator, $Y_3Fe_5O_{12}$, and transition metals with large atomic numbers [1]. It is also reported that graphene has an exchange-splitting with an adjacent EuO layer in both experiments and simulations [2, 3]. Our systems of interest are two-dimensional (2D) heterostructures composed of ferromagnetic insulators, ferromagnetic alloys, and graphene. Along the heterointerface, overlap of the wavefunctions of the ferromagnetic material and graphene leads to a proximity effect. To understand this magnetic proximity effect, density functional theory (DFT) is used. Exchange parameters, magnetic moments, magnetocrystalline anisotropy and exchange-splitting are calculated for the 2D heterostructures.

[1] S. Y. Huang, et. al. Phys. Rev. Lett., **109**, 107204 (2012).
[2] H. X. Yang, et. al. Phys. Rev. Lett., **110**, 046603 (2013).
[3] A. G. Swartz, et. al. J. Vac. Sci. Technol. B, **31**, 04D105 (2013)

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