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Theory of proximity induced exchange coupling in graphene on hBN/(Co, Ni)[1] KLAUS ZOLLNER, MARTIN GMITRA, TOBIAS FRANK, JAROSLAV FABIAN, University of Regensburg — A route towards an applicable spintronics device are van der Waals heterostructures[2] with two-dimensional materials, such as graphene and hexagonal boron nitride (hBN). We perform systematic first-principles calculations of the proximity exchange coupling, induced by cobalt and nickel in graphene, via a few layers of hBN. We find that the induced spin splitting of the graphene bands is significant, even for two layers of hBN. By employing a pseudospin-dependent exchange model Hamiltonian, we can describe the first-principles data. This model can be used to study transport in graphene with proximity exchange[3]. We will also present more recent data on the proximity exchange in other two-dimensional materials and topological insulators.

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