Electric field control of the indirect magnetic coupling through a short graphene nanoribbon

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The ability of controlling the magnetic properties of nanostructures with external fields is an important step in development of spintronics [1-3]. In the paper we study theoretically the effect of an in-plane electric field on the coupling between magnetic planes attached to the edges of a short armchair graphene nanoribbon. The tight binding model with Hubbard and electric field potential term describes the system in question. In particular we find a low-field antiferromagnetic coupling, which can be continuously changed into a ferromagnetic one by increasing the electric field. The magnitude of the effect strongly depends on the nanostructure width and geometry.

References:

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