Tunneling charge transport in graphene-based superconductor junctions

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9.7 cm

We study the spin polarized electron and hole tunneling transport in a graphene-based ferromagnet (G_F)-superconductor (G_S)-ferromagnet (G_F) junction. Proximity induced spin polarization and superconductivity in a graphene sheet are assumed to be created by a superconducting and ferromagnetic electrodes placed on the top of the graphene. Using a four-dimensional version of the Dirac-Bogoliubov-de Gennes equation [1] and appropriate bounadary conditions we investigate the tunneling processses through the junctions. In particular, we present calculations of the amplitudes of normal and Andreev reflections as a function of the energy of the incident electron for a wide ranges of the model parameters, such as the strength and orientation of the exchange field, the barrier strength, the the distance between the two ferromagnetic layers are presented. The tunneling transport processes in the graphene-based double junction $G_F G_S G_F$ are compared with those in non-graphene-based junctions [2].

1. C.W. Beenakker, Phys.Rev.Lett.**97**, 067007 (2006).
2. R.J. Wojciechowski and L. Kowalewski, Acta Phys. Pol. A **118**,249 (2010).

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