

Transmission through graphene junctions with Rashba spin-orbit coupling

M. Rataj¹ and Józef Barnaś^{1,2}

¹*Faculty of Physics, Adam Mickiewicz University, Poznań, Poland*

²*Institute of Molecular Physics, Polish Academy of Sciences, Poznań, Poland*

In this work we investigate electronic transport in a class of junctions based on graphene. The junctions consist of two parts: the first part is made of pristine graphene on a usual substrate (e.g. SiO₂), while in the second part a strong Rashba spin-orbit coupling is additionally induced (e.g. by placing this part on a different substrate). Our main goal is to analyze the probabilities of transmission from the part with the Rashba spin-orbit coupling to the pristine one. We are especially interested in the spin polarization of the transmitted charge carriers. We find that the transmission through the junctions is spin-dependent. Therefore, an electric current flowing through the junction should be spin-polarized. This effect is robust against moderate changes in the parameters of the system.

References:

[1] M. Rataj, J. Barnaś, Phys. Status Solidi RRL 7, No. 11, 997–1000 (2013)

[2] M. Rataj, J. Barnaś, Appl. Phys. Lett. 99, 162107 (2011)