

Spin-resolved Andreev spectroscopy as a tool for probing the Majorana quasiparticles

T. Domański¹ and M.M. Maška²

¹*Institute of Physics, M. Curie-Skłodowska University, 20-031 Lublin, Poland*

²*Institute of Physics, University of Silesia, 40-007 Katowice, Poland*

We discuss a feasible protocol for distinguishing between the exotic Majorana and the fermionic Shiba quasiparticles of the Rashba chain deposited on the superconducting substrate. Our proposal relies on the selective equal spin Andreev reflections (SESAR) operating exclusively for the topologically nontrivial superconducting state, manifested by the zero-energy Majorana modes at its edges. We argue that this spectroscopy can unambiguously probe the spatial extent of the Majorana quasiparticles [1], their leakage to the normal quantum impurities [2], unusual interplay with the correlations (responsible for the Kondorana effect) [3], and other unique properties.

References:

- [1] M.M. Maška, A. Gorkzyca-Goraj, J. Tworzydło, T. Domański, Phys. Rev. B **95**, 045429 (2017).
- [2] J. Barański, A. Kobińska, T. Domański, J. Phys.: Condens. Matter **29**, 075603 (2017).
- [3] I.J. van Beek, B. Braunecker, Phys. Rev. B **94**, 115416 (2016).

This work is supported by the National Science Centre (Poland) under the contracts DEC-2014/13/B/ST3/04451 (TD) and DEC-2013/11/B/ST3/00824 (MMM)