# Thermoelectric effects in quantum dot systems coupled to topological nanowire

Piotr Trocha[1]

[1] *Faculty of Physics, Adam Mickiewicz University, 61-614 Poznań, Poland*
ptrocha@amu.edu.pl

ABSTRACT

Recently, the idea of Majorana fermions[1] have attracted great interest in the solid state community[2]. It has turned out that Majorana fermions can reveal as quasiparticle excitations in certain condensed matter systems. One of the realized experimental setup, that is belived to host Majorana bound states, consists of semiconductor nanowire with strong spin-orbit coupling, brought into proximity with s-wave superconductor[3].

Here, we have investigated thermoelectric properties of a quantum dot systems coupled to topological nanowire which host Majorana bound states. We investigate two quantum dot systems of distinct geometries. The first one is composed of two quantum dots, each connected to its own nonmagnetic electron reservoirs and one of the dots is additionally tunnel coupled to topological nanowire. The other system consists of a single quantum dot attached to ferromagnetic leads and tunnel coupled to Majorana bound state. Thermoelectric coefficients, including conductance, thermopower, heat conductance, the figure of merit and their spin counterparts have been calculated by means of nonequilibrium Green's function technique. Some features appeared in the thermoelectric coefficients can serve a fingerprint of the existence of Majorana states in nanowire. We also show equivalence of the two considered systems under certain assumptions.

# References

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[3] Mourik V. *et al*, Science **336** 1003 (2012).