Signatures of Majorana states in electron transport through a quantum dot coupled to a topological wire

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We consider theoretically a system composed of a quantum dot coupled to a topological superconducting wire. The dot, being in Coulomb blockade (CB) regime, is additionally coupled to the leads, allowing standard transport measurements. The topological wire hosts Majorana states at its ends, which, as we show, characteristically modifies conductance through the dot. An unpaired Majorana state in the wire causes a unique temperature dependence of zero bias conductance vs. gate voltage. It decreases in-between CB peaks and on the sides of the peaks from the plateau at $\sim e^2/2h$ when temperature increases. At the same time conductance increases at the CB peak positions. It is accompanied by zero bias anomaly in differential conductance. For finite overlap of Majorana states in the wire the zero bias anomaly disappears. Instead, two characteristic Fano resonances of opposite symmetry appear, positioned mirror-symmetrically with respect to zero bias.

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