

Current transport properties and phase diagram of a Kitaev chain with long-range pairing

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We describe a method to probe the quantum phase transition between the short-range and the long-range topological phase in the superconducting Kitaev chain with long-range pairing. We show that, when the leads are biased at a voltage V , the Fano factor is either zero or $2e$. As a result, we find that the Fano factor works as a directly measurable quantity to probe the quantum phase transition between the two phases, also showing a remarkable “critical fractionalization effect”. Finally, we note that a dual implementation of our proposed device makes it suitable as a generator of large-distance entangled two-particle states.

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