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Coulomb Blockade in 1D Fractional Topological Superconductors
YOUNGHYUN KIM, University of California, Santa Barbara, DAVID J. CLARKE, University of Maryland, College Park, ROMAN M. LUTCHYN, Microsoft Research, Station Q — We study transport through a one dimensional fractional topological superconductor with localized parafermionic zero modes. We consider a mesoscopic floating superconductor placed on a narrow trench between two fractional quantum Hall states with filling fraction $\nu = 2/3$ and calculate dependence of the conductance on charging energy, gate voltage and other physical parameters. We find that generically the system flows to strong tunneling fixed point at which effective charging energy is renormalized to zero. As a result, there is a perfect transmission through the device even in the presence of a large bare charging energy. This result is very different from a non-superconducting case where the system exhibits Coulomb blockade in the low temperature limit.

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