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Universal transport signatures of topological superconductivity in quantum spin Hall architectures[1] SHU-PING LEE, DAVID AASEN, TORSTEN KARZIG, JASON ALICEA, Department of Physics, California Institute of Technology, Pasadena, CA 91125, USA — Interfacing s-wave superconductors with quantum spin Hall systems provides a promising route to "engineered" topological superconductivity. Given exciting recent progress on the fabrication side, identifying experiments that definitively expose the topological superconducting phase (and clearly distinguish it from a trivial state) raises an increasingly important problem. With this goal in mind we use renormalization group methods to extract universal transport characteristics of superconductor/quantum spin Hall heterostructures where the native edge states serve as a lead. Interestingly, arbitrarily weak interactions induce qualitative changes in the behavior relative to the free-fermion limit, leading to a sharp dichotomy in conductance for the trivial (narrow superconductor) and topological (wide superconductor) cases. Furthermore, we find that strong interactions can in principle induce power-law-localized "parafermion" excitations at a superconductor/quantum spin Hall junction.

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