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Transport signatures of Majorana quantum criticality realized by dissipative resonant tunneling HUAIXIU ZHENG, Departments of Physics and Applied Physics, Yale University, New Haven, Connecticut 06511, USA, SERGE FLORENS, Institut Neel, CNRS and UJF, 25 avenue des Martyrs, BP 166, 38042 Grenoble, France, HAROLD BARANGER, Department of Physics, Duke University, P. O. Box 90305, Durham, North Carolina 27708, USA — We consider theoretically the transport properties of a spinless resonant electronic level coupled to strongly dissipative leads, in the regime of circuit impedance near the resistance quantum [1]. Using the Luttinger liquid analogy, one obtains an effective Hamiltonian expressed in terms of interacting Majorana fermions, in which all environmental degrees of freedom (leads and electromagnetic modes) are encapsulated in a single fermionic bath. A perturbative treatment of the Majorana interaction term yields the appearance of a marginal, linear dependence of the conductance on temperature when the system is tuned to its quantum critical point, in agreement with recent experimental observations [2].

[1] H. Zheng, S. Florens, and H.U. Baranger, Phys. Rev. B 89, 235135 (2014).
[2] H. T. Mebrahtu, I. V. Borzenets, H. Zheng, Y. V. Bomze, A. I. Smirnov, S. Florens, H. U. Baranger, and G. Finkelstein, Nat. Phys. 9, 732 (2013).

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