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Universal resistance quantum in multichannel transport and dissipative field theory PRASENJIT DUTT, Yale University, THOMAS SCHMIDT, Yale University, Basel University, KARYN LE HUR, Yale University, Ecole Polytechnique — The Landauer formula for coherent DC transport lies at the heart of nanoelectronics and embodies a startling prediction: the quantization of the conductance in one-dimensional metallic wires for ballistic transport, in steps of $R_q^{-1} = e^2/h$ for each channel. Scattering proccesses undergone by the electrons cause a deviation from this result. The resistance then depends on the transparency of the channel and assumes a nonuniversal value. Recently, the unit of resistance R_q has been shown to be a universal feature for AC transport through a single-channel quantum RC circuit with a large cavity. This result can be understood by mapping the system to the one-channel Kondo model and the emergent low-energy Fermi-liquid theory. In a different context R_q arises in a certain nonequilibrium setting for the multichannel quantum RC circuit. In this work, we study AC transport in the many-channel quantum RC circuit. Under certain well-defined conditions the charge relaxation resistance remains universal and equals R_q. We study the emergence of this universal resistance in the multi-channel limit by using the mapping with a dissipative particle on a ring and making an analogy with the Kondo model.

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