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Interacting resonant level side-coupled to a Luttinger liquid: Duality to resonant tunneling MOSHE GOLDSTEIN, RICHARD BERKOVITS, The Minerva Center, Department of Physics, Bar-Ilan University, Ramat-Gan 52900, Israel — We study a model of a single level quantum dot side-coupled to a Luttinger liquid wire by both hopping and interactions. By canonical transformations and a Coulomb gas mapping, we prove a duality between this problem and that of resonant tunneling through a level connecting the edges of two wires with the inverse Luttinger liquid parameter g. The two systems thus have complementary transport properties: when one is conducting the other is insulating, and vice-versa. Using this result, as well as an exact solution at $g = 2$ and Monte-Carlo simulations on the Coulomb gas, we fully characterize the system's conductance. It exhibits an anti-resonance as a function of the level energy, whose width vanishes (enhancing transport) as a power law at low temperatures and bias voltages for $g > 1$, while diverging (suppressing transport) for $g < 1$. Level population is shown to be either a linear, a power law, or a discontinuous function of a small level energy, depending on the parameters.

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