Transport in a Dissipative Luttinger Liquid

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We study theoretically the transport through a single impurity in a one-channel Luttinger liquid coupled to a dissipative Ohmic bath. For nonzero dissipation, the single impurity is always a relevant perturbation which suppresses transport strongly. At zero temperature, the current voltage relation of the link is
\[ I \sim \exp\left(-\frac{E_0}{eV}\right), \]
where \( E_0 \sim \frac{\eta}{\kappa} \) and \( \kappa \) denotes the compressibility and \( \eta \) the dissipation strength. At nonzero temperature \( T \), the linear conductance is proportional to \( \exp\left(-\sqrt{C E_0/k_B T}\right) \). The decay of Friedel oscillation saturates for at distances larger than \( L_\eta \sim \frac{1}{\eta} \) from the impurity.