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Electrical and Thermal Transport in Inhomogeneous Luttinger Liquids

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Abstract:

I will discuss dc transport properties of long inhomogeneous quantum wires. The theoretical approach is based on a generalization of the Luttinger liquid theory to allow for the finite lifetime of the bosonic excitations. The theory accounts for long-range disorder and strong electron interactions, both of which are common features of experiments with quantum wires. I will derive the electrical and thermal resistances and thermoelectric properties of such quantum wires. The results are expressed in terms of the thermal conductivity and bulk viscosity of the electron liquid. At sufficiently high temperature this theory reproduces the behavior of linear conductance obtained by means of classical hydrodynamics.