

# Charge Fractionalization and Transport in low dimensions

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Quantum one-dimensional systems such as quantum wires or carbon nanotubes can carry charge in units smaller than a single electron charge. According to Luttinger theory which describes low-energy excitations of such systems, the resulting charge and spin waves are predicted to carry fractional charge and spin that propagate at different velocities. Observing fractionalization physics in an experiment is a considerable challenge in those low-dimensional systems which are adiabatically coupled to metallic (measuring) leads. We theoretically discuss the possibility of observing charge fractionalization as well as the associated (short) electron lifetime which varies as  $1/T$  (with  $T$  being the temperature) in coupled-wire geometries. We also present recent experimental data from Amir Yacoby et al. which confirm the charge fractionalization in quantum wires. A part of this work has been done in collaboration with Amir Yacoby and Bertrand I. Halperin.

References :

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