

# Violation of the Wiedemann-Franz Law for ultracold atomic gases

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We study energy and particle transport for one-dimensional strongly interacting bosons through a single channel connecting two atomic reservoirs. We show the emergence of particle- and energy-current separation, leading to the violation of the Wiedemann-Franz law. As a consequence, we predict different time scales for the equilibration of temperature and particle imbalances between the reservoirs. Going beyond the linear spectrum approximation, we show the emergence of thermoelectric effects, which could be controlled by either tuning interactions or the temperature. Moreover, we predict in general a non linear behavior of the thermopower as a function of temperature, an exquisite signature of strong interactions in the system. Our results describe in a unified picture fermions in condensed matter devices and bosons in ultracold atom setups.