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A recursion formula for the local density of states in finite Luttinger liquids[1] SEBASTIAN EGGERT, IMKE SCHNEIDER, Univ. of Kaiserslautern, Germany — The local density of states (LDOS) in quantum wires is one of the most central quantities for the experimental verification of the preditions from Luttinger Liquid theory. By now it has been well understood how boundaries lead to a crossover of powerlaws in the LDOS as a function of position and energy. It is also possible to calculate the LDOS for individual levels in finite wires analytically and numerically. However, the connection from finite wavefunctions to a semi-infinite powerlaw description remains unclear. We now present a simple recursion formula that ties together both limits and even allows to express the crossover of powerlaws in a closed analytic form in terms of hypergeometric functions. With the help of the formula it is now also possible to calculate the LDOS of long range interacting systems explicitly.

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