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A finite Luttinger liquid with longer range interactions IMKE SCHNEIDER, SEBASTIAN EGGERT, ALEXANDER STRUCK, University of Kaiserslautern — We consider the bosonization of a finite quantum wire with longer range interactions. In order to use the Luttinger liquid formalism it is necessary to introduce a changing effective interaction parameter as a function of momentum. We show that it is possible to modify the formalism so that the electron distribution in individual states can be analyzed with help of a recursive formula. Quantitative predictions for the local density of states and STM experiments can be made. In limiting cases the well known power laws are recovered. We compare the calculations with DMRG simulations of the spin $\frac{1}{2}$ Heisenberg chain.

Sebastian Eggert
University of Kaiserslautern

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