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Quantum Phase Transition in an Interacting Fermionic Chain

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We rigorously analyze the quantum phase transition between a metallic and an
insulating phase in (non solvable) interacting spin chains or one dimensional
fermionic systems. In particular, we prove the persistence of Luttinger liquid behavior in the presence of an interaction even arbitrarily close to the critical point, where the Fermi velocity vanishes and the two Fermi points coalesce. The
analysis is based on two different multiscale analysis; the analysis of the first regime provides gain factors which compensate exactly the small divisors due to the vanishing Fermi velocity. This is a joint work with Vieri Mastropietro.

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