Contribution ID: **8** Type: **not specified**

Exact results from the Quench Action Method for a certain class of initial states

Wednesday, 18 May 2016 11:50 (20 minutes)

We continue the study of the Quench Action Method (QAM) for a recently considered geometrical quantum quench: two free fermionic chains initially separated by an hard wall and after put in contact and let evolve unitarily with a translation invariant Hamiltonian. Every time un unbalanced of energy, chemical potential or number of particles is present two different stationary regimes are reached at long times, depending on the ratio t/L, where t is the observation time scale and L is the total system size. To captured the two quasi-stationary states (before the quantum recurrence) with the QAM is necessary to distinguish the two case with the introduction of the time in the saddle point equation as just shown in a previous paper, and we show how this modication works also for a domain wall initial state. We compute the total time evolution for three different initial state of a XX chain, conjecturing that our master equation is valid for any initial state. We also review the derivation of the GGE state in the case of the two temperatures showing that this is an effect of finite volume, as for a domain wall initial condition.

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Session Classification: Parallel Session 18 am