

Abstract Submitted  
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**Non-equilibrium dynamics of hard-core bosons on 1D lattices:  
short vs large time results** MARCOS RIGOL, Physics Department, University of California, Davis, ALEJANDRO MURAMATSU, Institut fuer Theoretische Physik III, Universitaet Stuttgart — Based on an exact treatment we study the non-equilibrium dynamics of hard-core bosons on one-dimensional lattices. Starting from a pure Fock state we find that quasi-long range correlations develop very fast in the system, and they lead to the emergence of quasi-condensates at finite momentum [1]. The exponent observed in the power-law decay of the one-particle density matrix, which develops dynamically, is the same that has been proven to be universal in the equilibrium case [2]. We also study the time evolution of clouds of hard-core bosons when they are released from a harmonic trap. In this case we show that the momentum distribution of the free expanding hard-core bosons approaches to the one of noninteracting fermions [3], in contrast to the known behavior in equilibrium systems. [1] M. Rigol and A. Muramatsu, cond-mat/0403387, to appear in Phys. Rev. Lett. (2004). [2] M. Rigol and A. Muramatsu, Phys. Rev. A 70, 031603(R) (2004); *ibid.* cond-mat/0409132. [3] M. Rigol and A. Muramatsu, cond-mat/0410683.

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