

Abstract Submitted  
for the DAMOP11 Meeting of  
The American Physical Society

**Entanglement Dynamics in Harmonic Oscillator Chains** RAZMIK UNANYAN, MICHAEL FLEISCHHAUER, University of Kaiserslautern — We study the long-time evolution of the bipartite entanglement in translationally invariant gapped harmonic lattice systems with finite-range interactions. A lower bound for the von Neumann entropy is derived in terms of the purity of the reduced density matrix. It is shown that starting from an initially Gaussian state the entanglement entropy increases at least linearly in time. This implies that the dynamics of gapped (non-critical) harmonic lattice systems cannot be efficiently simulated by algorithms based on matrix-product decompositions of the quantum state.

Michael Fleischhauer  
University of Kaiserslautern

Date submitted: 04 Feb 2011

Electronic form version 1.4