

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Quantum Quenches in Arrays of Coupled Luttinger Liquids¹

ANDREW JAMES, ANDREW HALLAM, University College London, ROBERT KONIK, Brookhaven National Laboratory, ANDREW GREEN, University College London — Cold atom realisations of one dimensional interacting bosonic models are typically formed as large arrays of decoupled tubes. A low energy description of the individual tubes (including the Lieb-Liniger case) is provided by Luttinger liquid theory. Using matrix product state methods combined with integrability, we study the time evolution of an infinite array of coupled Luttinger Liquids, after a quantum quench in which *interchain* tunnelling is switched on to form a 2D system. We extract the time dependence of the density, bosonic modes, the Loschmidt echo and the entanglement entropy and consider possible implications for phase transitions in the coupled chain system. Our results are compared to perturbation theory and contrasted with simulations for coupled arrays of massive chains.

¹EPSRC Grant No. EP/L010623/1 and DOE Contract No. DEAC02-98CH10886

Andrew James
University College London

Date submitted: 06 Nov 2015

Electronic form version 1.4