Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Time-dependent real space RG on the spin-1/2 XXZ chain PETER MASON, ALEXANDRE ZAGOSKIN, JOSEPH BETOURAS, Loughborough Univ — In order to measure the spread of information in a system of interacting fermions with nearest-neighbour couplings and strong bond disorder, one could utilise a dynamical real space renormalisation group (RG) approach on the spin-1/2 XXZ chain. Under such a procedure, a many-body localised state is established as an infinite randomness fixed point and the entropy scales with time as log(log(t)). One interesting further question that results from such a study is the case when the Hamiltonian explicitly depends on time. Here we answer this question by considering a dynamical renormalisation group treatment on the strongly disordered random spin-1/2 XXZ chain where the couplings are time-dependent and chosen to reflect a (slow) evolution of the governing Hamiltonian. Under the condition that the renormalisation process occurs at fixed time, a set of coupled second order, non-linear PDE's can be written down in terms of the random distributions of the bonds and fields. Solution of these flow equations at the relevant critical fixed points leads us to establish the dynamics of the flow as we sweep through the quantum critical point of the Hamiltonian. We will present these critical flows as well as discussing the issues of duality, entropy and many-body localisation.

Peter Mason
Loughborough Univ

Date submitted: 30 Oct 2016 Electronic form version 1.4