

Seminar

Full distribution of local observables in an exactly solvable current carrying steady state of a driven XXZ chain

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Current carrying steady states of interacting spins chains exhibit rich structures generated through an interplay of current induced correlations and energetic constraints from the Hamiltonian. The XXZ spin chain when coupled to maximally polarizing Lindblad terms admits an exact solution in a matrix product state (MPS) form. We use this exact solution to study the correlations and distributions of simple local spin observables in the non-equilibrium steady state (NESS). We present exact expressions for spin correlators, entropy per site, cumulant generating functions for distributions of local observables in the XX limit (Ising anisotropy $\Delta=0$). Further, we use the exact MPS solution in systems with $\Delta>0$, to exactly calculate the numerical values of entropy, correlations, as well as distributions of spin observables in blocks as large as $n\sim 200$ sites allowing an estimation of the rate functions. The z magnetisation distribution is consistent with short range spin correlations in the z direction while the x -magnetisation shows a double peak structure at larger Δ suggesting short range ferromagnetic ordering. We find that the distribution of z -magnetisation sharpens for parameters where the current is maximised.

Tuesday, Oct 22nd 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Seminar Hall, TIFR-H