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Behaviour of quantum correlations in a non-equilibrium system at criticality CHAITANYA JOSHI, JONATHAN KEELING, School of Physics and Astronomy, University of St Andrews, UK — Even though coupling an interacting quantum system to a reservoir leads to dissipation and decoherence, there can nevertheless be non-trivial phase diagrams and critical properties of open quantum systems. As for a closed system, the exponentially large Hilbert space can however be a problem in studying such systems. Decoherence may however be expected to reduce the required size of the Hilbert space. Matrix product states (MPS) are one representation to allow tractable numerics on a strongly correlated multipartite quantum system. Although MPS have proved to be an accurate description for a closed system, we explore how the MPS state description fares in a dissipative driven system close to criticality. We pose the question how does quantum correlation length behave at the phase transition and if it does not diverge at the critical point in a dissipative system then is a finite rank MPS representation still a good approximation of the respective state.

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