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Non-equilibrium scaling, response and coarsening in the quantum large N vector model[1] ANUSHYA CHANDRAN, VEDIKA KHEMANI, ARUN NANDURI, S. S. GUBSER, S. L. SONDHI, Princeton University — The out-of-equilibrium dynamics of a quantum system that is suddenly or slowly driven in the vicinity of critical point is conjectured to be universal and can be described in a scaling framework. The long time tails of scaling functions for a quench from the disordered to the ordered phase are of particular experimental interest. We theoretically investigate this in the $O(N)$ vector model as $N \to \infty$ for different spatial dimensions. We demonstrate that the quartic operator that is irrelevant to the equilibrium physics above the upper critical dimension is dangerously irrelevant to the long time dynamics in the scaling limit. We also observe a quantum analogue of the classical process of coarsening in which a correlation length diverges at long times in the thermodynamic limit. Suitably defined linear response measurements offer the tantalizing possibility of directly observing the non-equilibrium scaling functions; we explore these in classical models and Chern insulators as well.

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