Abstract Submitted
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Kibble-Zurek Scaling and String-Net Coarsening in Topologically Ordered Systems[1] VEDIKA KHEMANI, ANUSHYA CHANDRAN, Princeton University, F.J. BURNELL, All Souls College, Oxford, S.L. SONDHI, Princeton University — We consider the non-equilibrium dynamics of topologically ordered systems, such as spin liquids, driven across a continuous phase transition into proximate phases with no, or reduced, topological order. This dynamics exhibits scaling in the spirit of Kibble and Zurek but now without the presence of symmetry breaking and a local order parameter. The non-equilibrium dynamics near the critical point is universal in a particular scaling limit. The late stages of the process are seen to exhibit slow, quantum coarsening dynamics for the extended string-nets characterizing the topological phase, a potentially interesting signature of topological order. Certain gapped degrees of freedom that could potentially destroy coarsening are, at worst, dangerously irrelevant in the scaling limit. We also note a time dependent amplification of the energy splitting between topologically degenerate states on closed manifolds. We illustrate these phenomena in the context of particular phase transitions out of the abelian Z_2 topologically ordered phase of the toric code, and the non-abelian $SU(2)_k$ ordered phases of the relevant Levin-Wen models.

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