Non-Equilibrium Properties of Topological Matter

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We study the non-equilibrium properties of one-dimensional models with symmetry protected topological phases. For quenches where *dynamical quantum phase transitions* occur we find that their onset are associated with sudden changes in the boundary contribution. We show that these sudden changes are related to the periodical appearance of zero eigenvalues of the dynamical Loschmidt matrix in a *dynamical bulk-boundary correspondence*. We demonstrate, furthermore, that the structure of the Loschmidt spectrum is linked to the periodic creation of long-range entanglement between the edges of the system, and investigate the role of string order parameters in the dynamics. By considering *out-of-order-time correlators* we find the role that topologically protected boundary modes play in information scrambling in topological systems. Generalisations to finite temperatures, open dissipative systems, many-band models, higher dimensions, and higher order topology are also discussed.