

**Emergent Topology and Symmetry-breaking Order in Correlated Quench Dynamics**

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Quenching a quantum system involves three basic ingredients: the initial phase, the post-quench target phase, and the non-equilibrium dynamics which carries the information of the former two. In this talk, I will introduce how to identify both the topology and symmetry-breaking order in a correlated system, the Haldane-Hubbard model, from quantum dynamics induced by quenching an initial magnetic phase to topologically nontrivial regime. The equation of motion for the complex pseudospin dynamics is obtained through the flow equation method, with the pseudospin evolution shown to obey a microscopic Landau-Lifshitz-Gilbert equation. We find that, with the particle-particle interaction playing crucial roles, the correlated quench dynamics exhibit robust universal behaviors on the band-inversion surfaces (BISs), from which the nontrivial topology and magnetic orders can be extracted. In particular, the topology of the post-quench regime can be characterized by an emergent dynamical topological pattern of quench dynamics on BISs, which is robust against dephasing and heating induced by interactions; the pre-quench symmetry-breaking orders can be read out from a universal scaling behavior of the quench dynamics emerging on the BIS. These results may show insights into the exploration of novel correlation physics with nontrivial topology by quench dynamics.