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Probing thermalization and dephasing using the Kibble-Zurek mechanism MICHAEL KOLODRUBETZ, Boston University, BRYAN CLARK, Microsoft Station Q, ANUSHYA CHANDRAN, SHIVAJI SONDHI, DAVID HUSE, Princeton University — The Kibble-Zurek mechanism was introduced to describe defect creation after ramping through critical points. Recent work has extended this concept to a full non-equilibrium scaling theory, described by the same low-energy critical exponents as in equilibrium. In this talk, I will discuss applying Kibble-Zurek analysis and its extensions to probe open questions in non-equilibrium dynamics, specifically working to understand thermalization or – in the case of integrable systems – dephasing to a generalized Gibbs ensemble. The major advantage of investigating these questions within the Kibble-Zurek scaling regime is that the results are universal in the renormalization group sense, i.e., insensitive to microscopic details that often confound analyses of thermalization. I will describe both analytical and numerical (TEBD) approaches to address the problem, with an emphasis on understanding the long-time behavior after a slow ramps and small quenches.

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