

Day 2

Andrew D. King, D-Wave

Title: Kibble-Zurek scaling in the fast-anneal regime

Abstract:

The Kibble-Zurek mechanism (KZM) describes statistics of defects (domain walls or kinks) when a system passes through a second order phase transition. A coherent 1D chain is expected to show scaling behavior consistent with quantum KZM, but coupling to a bath (open system) interferes with KZM dynamics, giving way to a different scaling as discussed and experimentally observed by Bando et al. (10.1103/PhysRevResearch.2.033369). We will present new fast anneal experimental results, for anneal times ranging from 20 nanoseconds to 10 microseconds, obtained using a lower-noise D-Wave processor. We observed three regimes: A power-law scaling at fast anneal times that is consistent with quantum KZM, a mid-anneal time feature that indicates the onset of interactions with the bath, and a long-anneal regime in which thermal and quantum effects compete.