

Day 1 (Poster A)

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Title: Quantum annealing in transverse-field Ising chains with a correlated disorder

Abstract:

We study the dynamical critical exponent of disordered Ising chains under transverse fields to examine the effect of a correlated disorder on quantum annealing performance. We analytically show that the correlated disorder, where the on-site transverse field depends on the nearest-neighbor coupling strengths connecting the site, gives a different universality class from the uncorrelated disorder. The dynamical critical exponent is infinite in the uncorrelated-disorder cases, whereas it is finite in the correlated-disorder case. The suppression of the dynamical critical exponent enhances the performance of the quantum annealing with an argument based on the Kibble–Zurek mechanism. Here, we show the analytic and numerical results. This work is done in collaboration with Shu Tanka and the result is partially given in ref. [1].

[1] Tatsuhiko Shirai, and Shu Tanaka “Exact bounds for dynamical critical exponents of transverse-field Ising chains with a correlated disorder”, *Annals of Physics* in press.