

Exploring dynamical quantum criticality via moment expansions.

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Abstract:

Global quenches of quantum many-body systems can give rise to a sequence of dynamical quantum phase transitions (DQPT), which can be seen as non-analytic points of the return rate function (or Loschmidt echo), analogous classical phase transitions as non-analyticities of the partition function. Using summation techniques for expectation values of MPO's we evaluate the moments of the rate function, which vastly improves the task of identifying DQPT and highlights the close connection between DQPT and Fisher zeros of classical partition functions.