Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Cavity-assisted dynamical quantum phase transition in superconducting quantum simulators[1] LIN TIAN, School of Natural Sciences, University of California, Merced, CA 95343 — Coupling a quantum many-body system to a cavity can create bifurcation points in the phase diagram, where the many-body system switches between different phases. Here I will discuss the dynamical quantum phase transitions at the bifurcation points of a one-dimensional transverse field Ising model coupled to a cavity. The Ising model can be emulated with various types of superconducting qubits connected in a chain. With a time-dependent Bogoliubov method, we show that an infinitesimal quench of the driving field can cause gradual evolution of the transverse field on the Ising spins to pass through the quantum critical point. Our calculation shows that the cavity-induced nonlinearity plays an important role in the dynamics of this system. Quasiparticles can be excited in the Ising chain during this process, which results in the deviation of the system from its adiabatic ground state.

[1]This work is supported by the National Science Foundation under Award Number 0956064.

Lin Tian
School of Natural Sciences, University of California, Merced, CA 95343

Date submitted: 05 Nov 2015 Electronic form version 1.4