

JITCP Seminar

THE UNIVERSITY OF HONG KONG
HKU-UCAS JOINT INSTITUTE OF THEORETICAL AND COMPUTATIONAL PHYSICS
[Wednesday afternoon, 4 pm, In Person]

Measurement-Prepared Quantum Phases and Phase Transitions: from Ising model to gauge theory, and beyond **Prof. Zhen BI** *Penn State University*

In condensed matter physics, we usually think about quantum phases and phase transitions in the context of equilibrium many-body system. In this talk, we consider a slightly different setup to prepare quantum phases and phase transitions with shallow quantum circuit and measurements. First, I will talk about ways one can prepare interesting quantum states, including topological order, symmetry breaking state, etc., by measuring a so-called resource state. Then I will show that with post-selection one can tune a phase transition between certain quantum states by changing a continuous parameter in the measurements. This measurement-prepared quantum critical state corresponds to the so-called conformal quantum critical points where the equal-time correlators exhibit spatial conformal invariance. This establishes an exact correspondence between the measurement-prepared critical states and conformal field theories of a range of critical spin models, including familiar Ising models and gauge theories. Without post-selection, we can show the correspondence between the ensemble of quantum states prepared by measurements and the ensemble of the ferromagnetic RBIM along the special path called Nishimori line. Our findings suggest a novel mechanism in which a quantum critical wavefunction emerges, providing new practical ways to study quantum phases and conformal quantum critical points.

In Person Seminar

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KKLG102, LG1/F, K.K. Leung Building, The University of Hong Kong
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Phone: 28592360, Fax: 25599152. Anyone interested is welcome to attend.