

Joint Quantum Institute Seminar
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Physics 1201

Generalized Entanglement in Static and Dynamic Quantum Phase Transitions

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Developing a qualitative and quantitative understanding of quantum critical phenomena is a key challenge for both fundamental condensed matter theories and device technology applications. In recent years, entanglement theory has provided a bridging test-bed for revisiting zero-temperature quantum phase transitions from a quantum information physics perspective. What is the nature and role of entanglement across a quantum phase transition? Can appropriate entanglement measures detect quantum critical points and characterize their universality class? To what extent can non-equilibrium behavior be predicted from knowledge of the equilibrium phase diagram? These are some of the broad motivating questions I plan to address by example. In the process, I will argue how seeking satisfactory answers may challenge the traditional definition of entanglement in terms of distinguishable quantum subsystems, and suggest an alternative approach based on so-called "generalized entanglement".

Host UMD: Luis Orozco