Tuesday 5/09, Sara Murciano

Title: Rise and fall of critical correlations after measurements

Abstract: Quantum critical systems constitute appealing platforms for the exploration of novel measurement-induced phenomena due to their innate sensitivity to perturbations. First, we study the impact of measurement on Ising chains using an explicit protocol, whereby correlated ancilla are entangled with the critical chain and then projectively measured. These measurements can modify the Ising order-parameter scaling dimension and catalyze order parameter condensation. In particular, the general lesson we learn is that the correlations decay faster after the ancilla is measured. Second, we consider the system in a product state while the ancilla is an Ising critical chain, and by applying a similar measurement protocol we can "teleport" the long-range correlations from the ancilla to the system. In both setups, we can derive numerous quantitative predictions for the behavior of correlations in selected measurement outcomes. Finally, we show that observables can be averaged separately over measurement outcomes residing in distinct symmetry sectors; we demonstrate that these `symmetry-resolved averages' reveal measurement effects even when considering standard linearly averaged observables.