Measurement induced criticality from dissipative (non-)Markovian dynamics

It has recently been shown that phase transitions may be driven by the interaction of a quantum system with the environment and emerge both at the level of ordered-disordered phase (such as ferromagnetic vs paramagnetic) and at the level of the scaling law of entanglement entropy. In this talk, I present a study of these two classes of transition within the same setting - a Ising spin chain subject to unitary (from long-range interactions) and dissipative (from random projective measurements) dynamics. The two transitions are both present, but are distinct and occur at different interactions ranges. All the literature studies consider the case of Markovian projective measurements, but most of the environments have a non-Markovian structure. It seems therefore natural to also study the case of dissipative processes driven by a non-Markovian environment.