Monday: Austen Lamacraft

Title: Space-time dual cat and clock models

Abstract: Many body quantum dynamics defined on a spatial lattice and in discrete time -- either as stroboscopic Floquet systems or quantum circuits -- has been an active area of research for several years. Being discrete in space and time, a natural question arises: when can such a model be viewed as evolving unitarily in space as well as in time? Models with this property, which sometimes goes by the name space-time duality, have been shown to have a number of interesting features related to entanglement growth and correlations. One natural way in which the property arises in the context of (brickwork) quantum circuits is by choosing dual unitary gates.

We introduce a class of models with d states per site, defined on the square lattice by a complex partition function, that have the property of space-time duality. These may interpreted as particular dual unitary circuits or stroboscopically evolving systems, and generalize the well studied self-dual kicked Ising model. We explore connections to the clock models of statistical mechanics, parafermions, and in the $d\to\infty$ limit the classical spatiotemporal cat model of many body chaos.