Causal Sets, Graphs and the Planck Scale Mirage

A causal set is a model of the discrete microstructure of continuous spacetime. It is a collection of points connected by causal arrows forming a “partial ordering,” and is here generalized to include “loopy” causal sets (ordered graphs). We explore causal set global ordering properties and classification. Using a conductance model and a correspondence between causal sets and simple graphs, we consider the effect of nonlocality on the length of timelike paths. In particular, the Planck scale of time or distance (nominally $5.4 \times 10^{-44}$ s or $1.6 \times 10^{-35}$ m) may be dynamical in nature, becoming much greater depending on the system and its environment.

Please join us for light refreshments at 4:15pm outside SEB 203.