Contribution ID: **39** Type: **not specified**

Towards the phase structure of the complete Lorentzian Barrett-Crane model

Tuesday, 26 July 2022 17:55 (20 minutes)

The Barrett-Crane spin foam and GFT model is a state-sum model which provides a quantization of first order Lorentzian Palatini gravity. Its complete formulation has only recently been accomplished. It is conjectured that the collective dynamics of the quanta of this model, which correspond to discrete building blocks of spacetime with spacelike, timelike and lightlike components, gives rise to continuum spacetime at criticality via phase transition. In this talk, we discuss how phase transitions for this and related models can be studied using Landau-Ginzburg mean-field theory. To this aim, we restrict the building blocks of the complete model such that the Feynman diagrams are dual to spacelike triangulations. We also include degrees of freedom which may be interpreted as discretized scalar fields on the lattice typically employed in quantum gravity to furnish a matter reference frame. This setting lays the groundwork to study the critical behavior when arbitrary Lorentzian building blocks are incorporated and represents a crucial advance to understand how phase transitions to continuum spacetime can be achieved in this setting. It also paves the way for the analysis of the phase structure of such models via functional renormalization group techniques in the future.

Presenter: PITHIS, Andreas