ID de Contribution: **29** Type: **Non spécifié**

Generalised spectral dimensions in non-perturbative quantum gravity

jeudi 19 janvier 2023 16:20 (30 minutes)

The seemingly universal phenomenon of scale-dependent effective dimensions in non-perturbative theories of quantum gravity has been shown to be a potential source of quantum gravity phenomenology. This scale-dependent effective dimension in quantum gravity has been found by studying the propagation of scalar fields. It is however possible that the non-manifold like structures, that are expected to appear near the Planck scale, have an effective dimension that depends on the type of field under consideration. To investigate this possibility, we have studied the spectral dimension associated to the Laplace-Beltrami operator generalised to k-form fields on spatial slices of the non-perturbative model of quantum gravity known as Causal Dynamical Triangulations. We have found that the two-form, tensor and dual scalar spectral dimensions exhibit a flow between two scales at which an effective dimension appears. However, the one-form and vector spectral dimensions show only a single effective dimension. Albeit speculative for now, the fact that the one-form and vector spectral dimension do not show a flow of the effective dimension in this model can potentially be related to a dynamically generated absence of a dispersion relation for the electromagnetic field, while tensor and scalar fields are affected by dimensional flow.

Orateur: REITZ, Marcus (Jagiellonian University)