Contribution ID: **2** Type: **not specified**

Molly Kaplan - De Sitter quantum gravity and the emergence of local algebras

Monday 13 January 2025 10:00 (45 minutes)

Quantum theories of gravity are generally expected to have some degree of nonlocality, with familiar local physics emerging only in a particular limit. Perturbative quantum gravity around backgrounds with isometries and compact Cauchy slices provides an interesting laboratory in which this emergence can be explored. In this context, the remaining isometries are gauge symmetries and, as a result, gauge-invariant observables cannot be localized. Instead, local physics can arise only through certain relational constructions. In this talk, we explore such issues for perturbative quantum gravity around de Sitter space. In particular, we describe a class of gauge-invariant observables which, under appropriate conditions, provide good approximations to certain algebras of local fields. Our results suggest that, near any minimal hypersphere in dS, this approximation can be accurate only over regions in which the corresponding global time coordinate spans an interval of order ln Gˆ(-1). In contrast, however, we find that the approximation can be accurate over arbitrarily large regions of global dS so long as those regions are located far to the future or past of such a minimal sphere. This talk is based on the paper arXiv:2410.00111 with Donald Marolf, Xuyang Yu, and Ying Zhao.

Presenter: KAPLAN, Molly