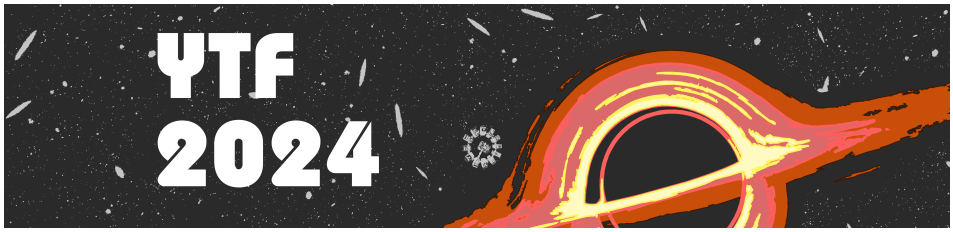

Contribution ID: **33** Type: **not specified**

Recursion relations in FLRW spacetimes

Wednesday, 18 December 2024 17:40 (30 minutes)

How do we extend the power of recursion relations to curved spacetimes? In this talk, I will present a novel framework for computing Feynman diagrams on arbitrary FLRW spacetimes, breaking them into lower-order diagrams through causality-driven recursion relations. This approach generalizes the celebrated BCFW recursion relations, traditionally confined to Minkowski spacetime, to settings where new complexities arise.

Tree diagrams are pivotal in amplitude studies, as any loop integrand can ultimately be expressed as a sum of tree-level contributions. While Minkowski spacetime simplifies the calculation of tree diagrams to residue evaluations at poles, the de-Sitter case poses unique challenges with branch cuts appearing even at tree level. I will demonstrate how our recursion relations efficiently handle such singularities, showcasing explicit examples that align with established results in the literature.

Moreover, these novel relations go beyond the requirement of Bunch-Davy's initial state. I will present an explicit solution for a phenomenologically significant diagram involving an excited initial state, highlighting the versatility of this approach.

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Session Classification: Cosmology