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## Euclidean path integral, entanglement entropy, and information loss paradox; Cutting Rule for Cosmological collider Signals: A Bulk Evolution Perspective

*Thursday, January 13, 2022 2:00 PM (1h 20m)*

In this presentation, we discuss the information loss paradox of black holes in the light of the Euclidean path integral approach. This provides an interesting idea to understand the entanglement entropy and the Page curve. In order to make the discussion better, perhaps we further need to provide some quantum boundary conditions for the singularity. Finally, we compare our results to the recent developments in the string community.

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We show that the evolution of interacting massive particles in the de Sitter bulk can be understood at leading order as a series of resonant decay and production events. From this perspective, we classify the cosmological collider signals into local and nonlocal categories with drastically different physical origins. This further allows us to derive a cutting rule for efficiently extracting these cosmological collider signals in an analytical fashion. Our cutting rule is a practical way for extracting cosmological collider signals in model building, and can be readily implemented as symbolic computational packages in the future.

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