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De Sitter space and Entanglement

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De Sitter space, unlike its negatively curved relative, consists of two disconnected boundaries and a causally disconnected interior. In this paper, we argue that the connectedness properties of de Sitter space naturally encode the notion entanglement. We propose an holographic description of an inertial observer in terms of a thermofield double state in the tensor product of the past and future Hilbert spaces, whereby the Gibbons–Hawking formula arises as the holographic entanglement entropy between the past and future conformal boundaries. When considering the entanglement between the two interior Rindler wedges, we show–with no need of holography–that the entanglement entropy between two antipodal and causally disconnected observers is given by a quarter of the area of a pair minimal surfaces. These surfaces are the set of fixed points of an S^2/Z_q orbifold and their total area, when restricted to a single Rindler wedge, reduces to the area of the cosmological horizon (hence recovering the Gibbons–Hawking area law).

Summary

In this presentation I will give an introduction to de Sitter space and some holographic prescriptions on this background. Also how a deformation of the space, generated by the inclusion of observers allow us to obtain some quantum quantities like entanglement entropy.
This deformation generate defects that can be described with the Liouville theory, and also allow us to mimic the Kerr/CFT correspondence and made use of conformal field theory tools in order to describe the Cosmological Horizon.

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