

## Theory: Entanglement harvesting from conformal vacuums between two Unruh-DeWitt detectors moving along null paths

It is well-known that the  $(1+1)$  dimensional Schwarzschild and spatially flat FLRW spacetimes are conformally flat. This work examines entanglement harvesting from the conformal field vacuums in these spacetimes between two Unruh-DeWitt detectors, moving along outgoing null trajectories. In  $(1+1)$  dimensional Schwarzschild spacetime, we considered the Boulware and Unruh vacua for our investigations. In this analysis, one observes that while entanglement harvesting is possible in  $(1+1)$  dimensional Schwarzschild and  $(1+3)$  dimensional de Sitter spacetimes, it is not possible in the  $(1+1)$  dimensional de Sitter background for the same set of parameters when the detectors move along the same outgoing null trajectory. The qualitative results from the Boulware and the Unruh vacuums are alike. Furthermore, we observed that the concurrence depends on the distance  $d$  between the two null paths of the detectors periodically, and depending on the parameter values, there could be entanglement harvesting shadow points or regions.

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**Session Classification:** Parallel Sessions