



Department of
Theoretical Physics

THE QUANTUM SPACETIME SEMINAR SERIES

Replica wormholes for an evaporating black hole (Zoom Seminar)

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Zoom link shall be shared separately



Quantum extremal islands reproduce the unitary Page curve of an evaporating black hole in JT gravity. In previous work, this result was formally derived by including replica wormholes in the gravitational path integral, but the wormholes were not found explicitly, or even fully defined, for the time-dependent geometries relevant to Hawking's paradox. A technical challenge is that replica wormholes rely on a Euclidean path integral while the quantum extremal islands of an evaporating black hole exist only in the Lorentzian signature. In this talk, I will discuss how to construct these wormholes for $n \sim 1$ replicas and confirm that they lead to the island rule for the entropy of Hawking radiation.