**Eurostrings 2024** 



Contribution ID: 61

Type: Talk in parallel session

## Entanglement Entropy via replica trick and theories with islands in higher dimensional curved backgrounds.

Wednesday 4 September 2024 11:30 (20 minutes)

Entanglement entropy quantifies the degree of entanglement between two quantum systems or between two subregions in a QFT and hence is an important tool to understand the quantum system. Certain tricks (Replica) and holographic duals (Ryu-Takayanagi Area) have been used to calculate this measure. However, its study in dimensions > 2 has been mostly limited to flat backgrounds and CFT vacuum states in specific subregions due to technical as well as conceptual difficulties. I will present our work trying to bridge this gap, by calculating the EE for a CFT state in a subregion in higher dimensional curved backgrounds using the replica trick. In the presence of gravity, the quantum corrections to the black hole entropy is crucial in resolving the information paradox. Recently, its study in 2 dimensions led to the island proposal as a potential correction required to preserve unitarity in black hole evaporation. We will use our result for EE in higher dimensional black hole background, to discuss if islands exist in higher dimensions (d > 2) and obtain constraints on the QFT spectrum for islands to exist.

## Link to publication (if applicable)

https://arxiv.org/pdf/2401.01653

One more paper on which the talk is based on is in preparation and will be put out in a few days

Authors: SHEKAR, Arvind (University of Southampton); Prof. TAYLOR, Marika

Presenter: SHEKAR, Arvind (University of Southampton)

Session Classification: Parallel sessions

Track Classification: Black holes and quantum information 2