Séminaire commun

Black hole complementarity from microstate models

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Résumé

The black hole complementarity principle states that reasonable postulates such as semi-classicality and unitarity of the evaporation process imply that information is both inside and outside the black hole, but no observer can access both copies. More recently. It has been pointed out that the apparently reasonable postulates supporting this principle contradicts strong subadditivity of tripartite entanglement between the early and late radiation, and the modes in the interior. Although there has been a lot of discussion in the literature about how the complementarity principle can be saved from clutches of paradoxes, we know very little of how it can emerge explicitly from microscopic dynamics without contradicting basic properties of von Neumann algebras. In this talk, we will present a simplified version of a black hole microstate model, where we can explicitly demonstrate replication of information via interaction between infalling quantum matter and the black hole interior, in consistency with von Neumann algebras. We will also discuss setups where more details of encoding of initial information into black hole interior and its subsequent transfer to Hawking radiation can be studied explicitly, and as a first example, discuss explicit information mirroring which satisfies additional requirements imposed by the complementarity principle.