

# Gravitational fine-grained entropy enhancements.

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Entanglement entropy can be computed directly by describing the density matrix of the associated system. For gravitational systems such as black holes, the radiation entropy has a geometrical construction given by extremal surfaces. However, due to the quantum characteristics of black holes, this surface can be generalized to quantum extremal surfaces. We outline the derivation of gravitational fine-grained entropy using the quantum version of extreme surfaces. We provide evidence about a new method to compute von Neumann entropy.

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