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Islands in Schwarzschild black holes

Friday, 18 December 2020 17:00 (20 minutes)

We study the Page curve for asymptotically flat eternal Schwarzschild black holes in four (or higher) spacetime dimensions. Before the Page time, the entanglement entropy grows linearly in time. After the Page time, the entanglement entropy of a given region outside the black hole is largely modified by the emergence of an island, which extends to the outer vicinity of the event horizon. As a result, it remains a constant value which reproduces the Bekenstein-Hawking entropy, consistent with the finiteness of the von Neumann entropy for an eternal black hole.

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