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Swampland Statistics for Black Holes

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In this work, we approach certain black hole issues, including remnants, by providing a statistical description based on the weak gravity conjecture in the swampland program. Inspired by the Pauli exclusion principle in the context of the Fermi sphere, we derive an inequality which can be exploited to verify the instability manifestation of the black holes via a characteristic function. For several species, we show that this function is in accord with the weak gravity swampland conjecture. Then, we deal with the cutoff issue as an interval estimation problem by putting a lower bound on the black hole mass scale matching with certain results reported in the literature. Using the developed formalism for the proposed instability scenarios, we provide a suppression mechanism to the remnant production rate. Furthermore, we reconsider the stability study of the Reissner–Nordström black holes. Among others, we show that the proposed instabilities prohibit naked singularity behaviors.

Abstract Category

Astrophysics & Cosmology

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