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Hawking radiation as quantum mechanical reflection

Tuesday 13 December 2022 14:00 (1 hour)

In this work, we explore an alternative derivation of Hawking radiation. Instead of the field-theoretic derivation, we have suggested a simpler calculation based on quantum mechanical reflection from a one-dimensional potential. The reflection coefficient shows an exponential fall in energy which, in comparison with the Boltzmann probability distribution, yields a temperature. The temperature is the same as Hawking's temperature for spherically symmetric black holes. The derivation gives an exact local calculation of Hawking temperature that involves a region lying entirely outside the horizon. This is a crucial difference from the tunneling calculation, where it is necessary to involve a region inside the horizon.
Reference: https://arxiv.org/abs/2203.06588

Session

Formal Theory

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