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THEOREM ON DISPROOF OF HAWKING RADIATION WITH THE HELP OF QUANTUM TUNNELING

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ABSTRACT
In this present paper/theorem, I am trying to explain disproof of hawking radiation with the help of quantum tunneling. Quantum tunneling transmission probability of zero for any particle through an event horizon particle tunnelling from the interior of a black hole impossible.
KEYWORDS : *Hawking Radiation, Quantum Tunneling.*

INTRODUCTION

Hawking radiation is black-body radiation that is predicted to be released by black holes, due to quantum effects near the black hole event horizon. It is named after the physicist Stephen Hawking, who provided a theoretical argument for its existence in 1974. According to theory, any black hole will create and emit particles such as neutrinos or photons at the rate that of a body with a temperature.

DISPROOF OF HAWKING RADIATION

Inside the event horizon, $r < r_s$, the Schwarzschild equation describing a stationary black hole is:

$ds^2 = (1 - r_s/r).\ c^2.dt^2 - (1 - r_s/r)^{-1}dr^2 + r^2(d\theta^2+\sin^2\theta.d\varphi^2)$ - ----- (1)

For particles within the event horizon attempting to cross the Schwarzschild radius, r_s :

$r \rightarrow r_s$, and - $(1-r_s/r) \rightarrow 0$ and - $(1-r_s/r)^{-1} \rightarrow \infty$ and so $ds^2 \rightarrow \infty$

The line element ds^2 (c^2dt^2) tends to infinity as $r \rightarrow r_s$, $ds^2 \rightarrow \infty$, and so the are length, $ds \rightarrow \infty$ ----(2)

The transmission coefficient or probability, T, for quantum tunnelling through a potential energy barrier, U of width L:

$T = (16 / (4 + (k_2/k_1)^2)).\ e^{-2k2\ L} \approx e^{-2k2\ L}$ --------(3)

Where $k_2 = \sqrt{(2m\ (U - E))} / \hbar$, $k_1 = \sqrt{(2mE)} / \hbar$,

L is the width of the barrier, m is the mass of the particle,
(U - E) is the difference between the particle's kinetic energy
and the potential barrier.
E, kinetic energy

The width, L, of an event horizon:
As $r \rightarrow r_s$ the are length, $ds \rightarrow \infty$ from (2) and ds = L and so $L \rightarrow \infty$.

As $L \rightarrow \infty$ then $T \rightarrow 0$ from (3).

A photon and a particle of finite mass both subject to an infinite width would be precluded from quantum tunnelling and escaping an event horizon.

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The probability of transmission, T, of any particle through
an event horizon with infinite width, L, is zero.

CONCLUSION

It can be concluded thatforbids quantum tunnelling of particles also applies to the Kerr solution for rotating black holes. Hence,Hawking radiation via quantum tunnelling from an eventhorizon is rendered impossible.

REFERENCES

1. *S. Hawking,. "Black hole explosions?", Nature, 248 (5443), 1974, pp 30–31.*
2. *S. Hawking, "Particle Creation by Black Holes", Commun. Math. Phys. 43, 1975, pp 199 - 220*