

The width of a black hole atmosphere

Master's thesis
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2025

Abstract:

Black holes are classical solutions to Einstein's equations; however, they may also be regarded as macroscopic quantum objects. It is possible that a real physical structure exists inside a black hole, rather than it being merely empty space. If a black hole is a physical object rather than a purely abstract geometric entity, its horizon could act as a reflective surface. Such reflection might give rise to the formation of a so-called "atmosphere." We estimate the thickness of this atmosphere by solving the geodesic equation derived from the Klein-Gordon equation for a particle propagating near the horizon.