Is there a singularity point inside a black hole?

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Abstract

There is no singularity point in a physical black hole. A singularity point was derived from solving GR equations. However, it is merely a mathematical construct that does not exist in reality,

The singularity point is a result of solving Einstein's field equations. The first who found an exact solution to GR equations was Schwarzschild in 1916, shortly after the publication of GR. The Schwarzschild solution describes the gravitational field outside a spherical mass, on the assumption that the angular momentum of the mass is zero.

Schwarzschild's black hole (SBH) has a simple structure as described in Fig. 1: There are two special radii in an SBH. The first is the event horizon that has a Schwarzschild radius (Rs). The event horizon prevents anything, including radiation, to escape the black hole. The second is at the center of the black hole i.e., at r=0. The Schwarzschild solution appears to have a singularity at the center of the spherical mass. Some of the metric components "blow up" i.e., entail division by zero at this radius. At this point the density is infinite.

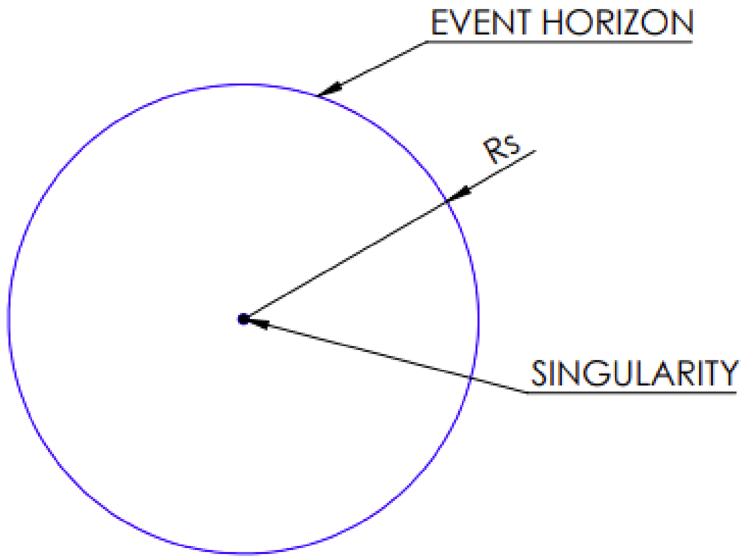

Fig. 1 - SBH

Einstein himself did not believe in a physical infinite density and objected to the physical existence of black holes. However, black holes have been observed in the universe. Galaxies contain black holes at their centers. Recently, starting in 2019 images of black holes were taken, for example, the black hole of M87 and the black hole of the Milky Way.

Two reasons for the improbability of SBH:

1. All black holes that have been observed in the universe spin on their axis. Moreover, all celestial bodies spin. (Note: the question of what is the origin of the spinning of celestial bodies is profound in cosmology – I related to it in another paper)
2. Cosmology teaches that a black hole is created from the collapse of a spinning massive star after the star consumes

its nuclear energy and then gravity wins causing the star to collapse. A spinning massive star has angular momentum. A black hole in which all its mass is squeezed into a singularity point cannot maintain the angular momentum of the progenitor massive star. No matter how big the mass of the SBH its angular momentum equals zero because the singularity point has zero dimension. The fact that the angular momentum vanished contradicts the conservation law of angular momentum.

I claim that there is a possible solution to this issue. As mentioned above Schwarzschild's solution relates to a static (non-spinning) black hole. In 1963 (eight years after Einstein passed away), Roy Kerr solved GR equations for a spinning black hole (KBH). KBH is more complicated than SBH and is depicted in Fig. 2.

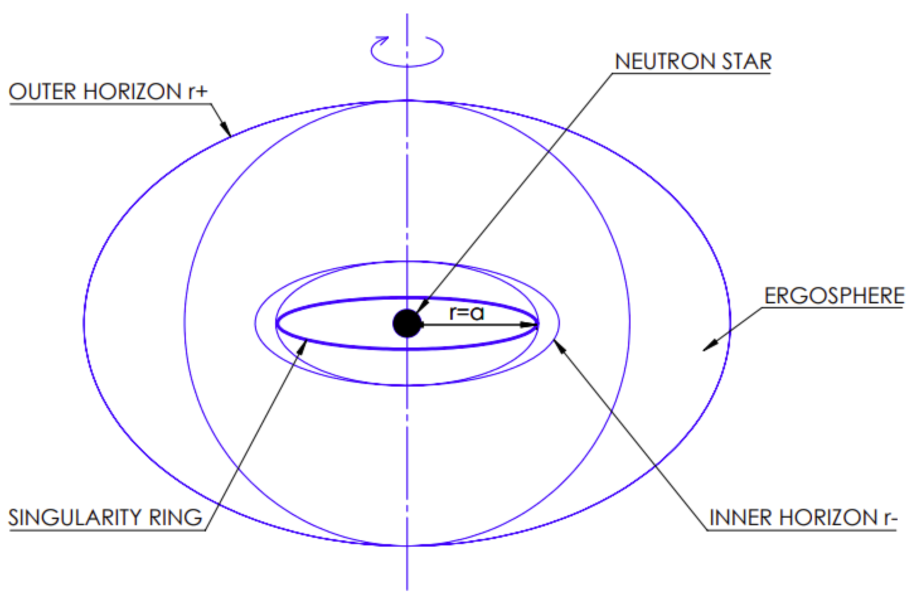

Fig. 2- KBH

KBH contains two event horizons (inner and outer) and an ergosphere. It has an ellipsoid shape rather than a sphere. But for the current discussion, I relate to the fact that KBH contains a singularity ring, that has physical dimensions. The radius of the singularity ring is: **a=J/Mc**

Where: J- angular momentum; M- mass; c-Light velocity.

Mass with a finite density can reside inside the singularity ring. I claim that this mass is a neutron star. A neutron star has dimensions and therefore it can retain the angular momentum of the progenitor star. (SEE also https://www.academia.edu/49999213/Is_a_black_hole_a_neutron_star)

So, I claim that GR is valid. The problem of singularity lies in the assumptions made by Schwarzschild to solve GR equations. According to Kerr, there are no black holes in the universe with singularity points.