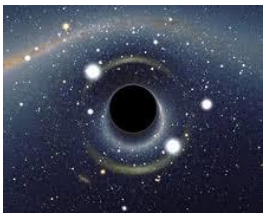
Title : BLACK HOLE
General Classification : Definition of BLACK HOLE
Identification

- Description 1 : History of Black Hole
- Description 2 : Black Hole Classification
- Description 3 : Singularity of Black Hole

BLACK HOLE



A black hole is a region of spacetime exhibiting such strong gravitational effects that nothing—not even particles and electromagnetic radiation such as light—can escape from inside it.[1]

The history of black hole was briefly proposed by astronomical pioneer John Michell in a letter published in 1783-4. Michell's simplistic calculations assumed that such a body might have the same density as the Sun, and concluded that such a body would form when a star's diameter exceeds the Sun's by a factor of 500, and the surface escape velocity exceeds the usual speed of light. Michell correctly noted that such supermassive but non-radiating bodies might be detectable through their gravitational effects on nearby visible bodies. Scholars of the time were initially excited by the proposal that giant but invisible stars might be hiding in plain view, but enthusiasm dampened when the wavelike nature of light became apparent around the early nineteenth century. If light were a wave rather than a "corpuscle", it became unclear what, if any, influence gravity would have on escaping light waves. In any case, thanks to modern relativity, we now know that Michell's picture of a light ray shooting directly out from the surface of a supermassive star, being slowed down by the star's gravity, stopping, and then free-falling back to the star's surface, is fundamentally incorrect.[2]

According to theory, there might be three types of black holes: stellar, supermassive, and miniature black holes – depending on their mass. These black holes would have formed in different ways. Stellar black holes form when a massive star collapses. Supermassive black holes, which can have a mass equivalent to billions of suns, likely exist in the centers of most galaxies, including our own galaxy, the Milky Way. We don't know exactly how supermassive black holes form, but it's likely that they're a byproduct of galaxy formation. Because of their location in the centers of galaxies, close to many tightly packed stars and gas clouds, supermassive black holes continue to grow on a steady diet of matter.
No one has ever discovered a miniature black hole, which would have a mass much smaller than that of our Sun. But it's possible that miniature black holes could have formed shortly after the "Big Bang," which is thought to have started the universe 13.7 billion years ago. Very early

in the life of the universe the rapid expansion of some matter might have compressed slower-moving matter enough to contract into black holes.[3]

The Singularity of black hole, at the center of a black hole, as described by general relativity, lies a gravitational singularity, a region where the spacetime curvature becomes infinite. For a non-rotating black hole, this region takes the shape of a single point and for a rotating black hole, it is smeared out to form a ring singularity that lies in the plane of rotation. In both cases, the singular region has zero volume. It can also be shown that the singular region contains all the mass of the black hole solution. The singular region can thus be thought of as having infinite density. Observers falling into a Schwarzschild black hole cannot avoid being carried into the singularity, once they cross the event horizon after attaining a certain ideal velocity, it is best to free fall the rest of the way. When they reach the singularity, they are crushed to infinite density and their mass is added to the total of the black hole. It is generally a theory about black hole singularities.[4]