

BLACK HOLES

Black holes have many a mystery surrounding them. Lots of non-scientists do not even know what they are or what they do. Children believe (due to many science fiction stories) that Black Holes transport you to a different dimension. Hypothetically this idea could very well happen according to the strange nature of Einstein's equations but seems very unlikely.

What is a Black Hole?

Black holes were once thought to be the monsters of the Universe but are now thought to be fundamental to the creation of a galaxy. A black hole is a region of time in space from which nothing including light can escape making them impossible to see. However we know they are there because we can see the stuff near them getting sucked in because they are like a giant vacuum.

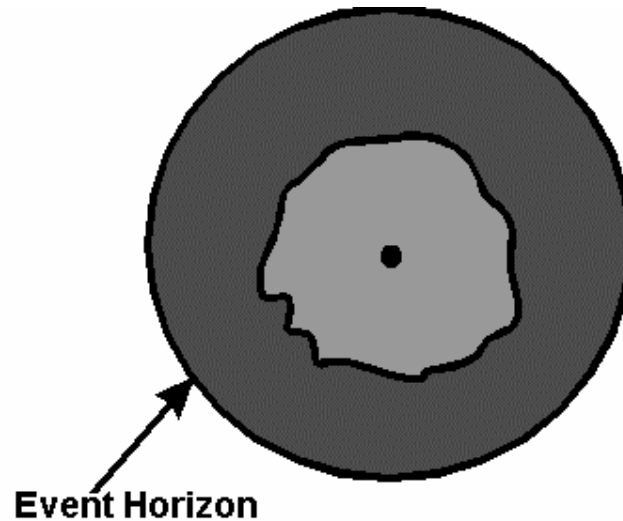


Figure. 1

Figure. 1 shows the event horizon of a black hole. This is formed by rays of light that can't quite get away from the black hole but are always floating around the edge of them. At this part of a black hole the gravity is so intense that it tugs at time and space, causing space to slow down and stretch out. Here not even light can escape this intense gravity. Any body that comes near a black hole would firstly be ripped apart by the immense gravitational force and then upon reaching the event horizon the body would never be seen again and is thought to go irreversibly towards singularity, thus become infinitely more dense.

How are Black Holes formed?

It is not clearly known how a black hole is formed and because of this there are a few types of theories. Probably the most popular theory is behind the collapsing star theory. This theory says that it would take a star 20 or 30 times greater than the sun in

mass to create a black hole. This huge star would have to undergo some kind of supernova for its contents to be blasted throughout space. However, if some of these particles were left behind with gravity still present and without a single mass supporting it, these particles would collapse on themselves. This collapse would then cause a black hole. This theory may not be true as there are many theories at this present time and it all depends on which theory you believe the most in.

Different types of Black holes

There are many different kinds of black holes. These are Non-rotating black holes, Rotating black holes, electrically charged black holes, “Mini” black holes and Galactic black holes.

Non-rotating black holes were shown in 1967 by a Canadian scientist called Werner Israel to be simple black holes. They are perfectly spherical which only depend on their mass to determine what size they are, and only black holes with the same mass are identical.

A New Zealander called Roy Kerr (photo on right) was the man to discover how to describe a rotating black hole. These black holes rotate at a normal speed only their mass and velocity of rotation determine their size and shape. There are different descriptions of rotations. If the rotation is zero, the black hole is perfectly round and identical to a non-rotating black hole. If the rotation is one, the black hole bulges and the faster it rotates the more it bulges. Finally, if the rotation is two the black hole looks the same if it makes half of a full rotation. Scientists have figured out that black holes eventually settle down and stop rotating.



An electrically charged black hole has two event horizons thus has two places where time appears to stop. The inner event horizon starts to get larger as more and more electric charge is thrown into the black hole. When the electric charge comes to a maximum the two horizons come together and merge.

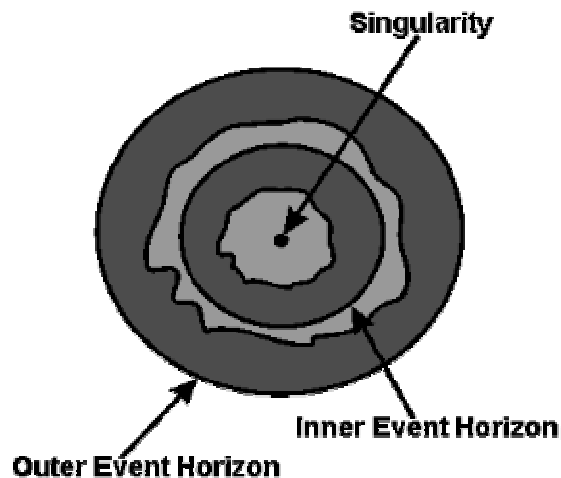


Figure.2

“Mini” black holes were first suggested by the now world famous scientist Stephen Hawking in 1971. He suggested that the Big Bang explosion caused dense, very violent turbulence, which could have squeezed concentrations of matter to form these “mini” black holes. These black holes are thought to be so small that they could not even be seen in a normal microscope.

The term “galactic” black holes come from the belief by many scientists that gigantic black holes inhabit the cores of most galaxies. Evidence discovered in the last twenty years or so suggests that holes like this power most quasars and radio galaxies, and inhabit the majority of large, normal galaxies such as our own galaxy, the Milky Way and our neighbour Andromeda. Although, we are never going to be sucked in by one of these because we are situated far away on one of the outer arms of our galaxy. Nowadays, scientists recognise that there are two different types of black hole: a stellar black hole formed from the collapse of stars, and galactic black holes that lurk in the galaxies core.

How do you find a Black hole?

A black hole can be found because; although we can't see the actual black hole we can see the effects on the matter surrounding the black hole. A Binary star system is said to be the best for finding black holes. This is a system, which consists of two stars orbiting around each other. When a black hole was part of this system, it would pull gaseous material off the surface of a neighbouring star and the gaseous material would spiral into the black hole. This is called an accretion disk.

White holes

A white hole is an additional singularity of a Schwarchild black hole. A white hole is thought to show opposite features to a black hole. It supposedly repels matter whereas a black hole sucks in matter with a huge attractive force of gravity. There is a theory about white holes although never observed. They are said to be a missing link between our universe and another, releasing matter that for us is lost into the black hole.

Conclusion

Although there are still many mysteries surrounding black holes, we assume them to exist from our findings of what happens to the matter. Also, as many people also think that there is only one kind of black holes we have also shown through our findings that there are many different kinds of them and they will continue to make a mark on our universe.