

What is black hole. How black hole form and discovered.

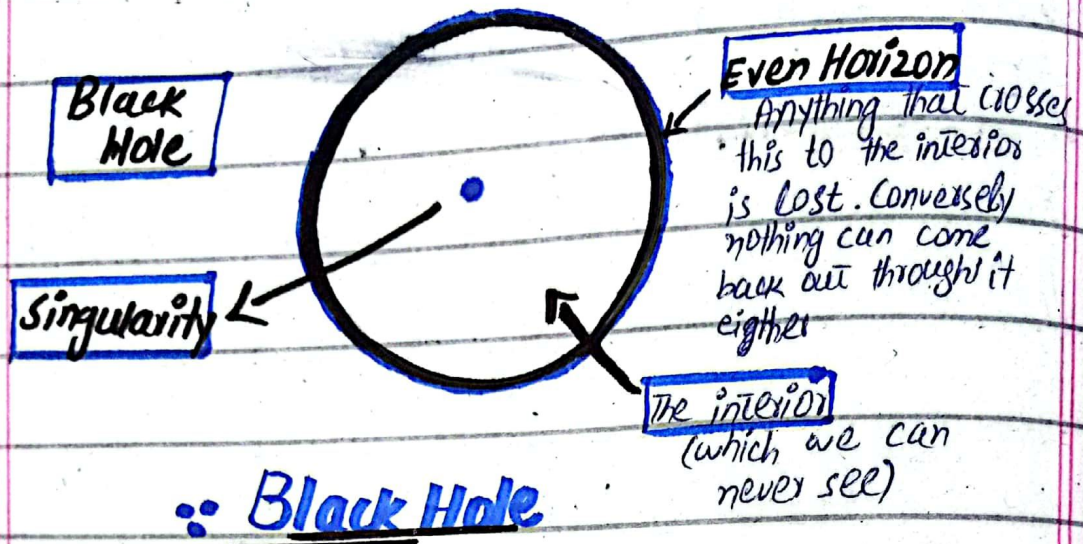
## Black Hole:-

Black holes are some of the strongest and most fascinating objects in space. They are extremely dense, with such strong gravitational attraction that not even light can escape their grasp.

The Milky way could contain over 100 million black holes, though detecting these gluttonous beasts is very difficult. At the heart of the Milky way lies a supermassive black hole Sagittarius A\*. The colossal structure is about 4 million times the mass of the sun and lies approximately 26,000 light years away from earth.

(Statement from NASA)





## Types of Black Holes:-

### •- Stellar Black hole:-

A stellar black hole is a black hole formed by the gravitational collapse of a star. They have masses ranging from about 5 to several tens of solar masses. e.g Cygnus X-1

### •- Intermediate Black hole:-

An intermediate mass black hole is a class of black hole with mass in the range  $10^2 - 10^5$  solar masses: significantly more than stellar black holes but less than the



$10^5$ - $10^9$  solar mass Supermassive black holes.

## Supermassive Black hole:-

Supermassive black hole, a black hole more than one hundred thousand times the mass of the sun.

Nearly every large galaxy has a supermassive black hole at its centre.

For example, the Milky Way galaxy has a supermassive black hole at its center, corresponding to the radio source Sagittarius A\*.

## Primordial Black holes:-

Scientists theorize that primordial black holes formed in the first second after the birth of the universe. In that moment, pockets of hot material may have been dense enough to form black holes, potentially with masses ranging from 100,000 times less than a paperclip to 100,000 times more than the Sun's.



## How do Black holes form?

Black holes are expected to form via two distinct channels.

→ According to the first pathway, they are stellar corpses, so they form when massive stars die. Stars whose birth masses are above roughly 8-10 times mass of our sun, when they exhaust all their fuel, their hydrogen they explode and die leaving behind a very compact dense object, a black hole. The resulting black hole that is left behind is referred to as a stellar mass black hole and its mass is of the order of a few times the mass of the sun. Not all stars leave behind black holes, stars with lower birth masses leave behind a neutron star or a white dwarf.

→ Another way that black holes form



is from the direct collapse of gas, a process that is expected to result in more massive black holes with a mass ranging from 100 times the mass of the sun up to even 100,000 times the mass of the sun.

### How black holes are discovered?

Black holes don't emit or reflect light making them effectively invisible to telescopes. Scientists primarily detect and study them based on how they affect their surroundings: Black holes can be surrounded by rings of gas and dust, called accretion disks, that emit light across many wavelengths, including X-rays.

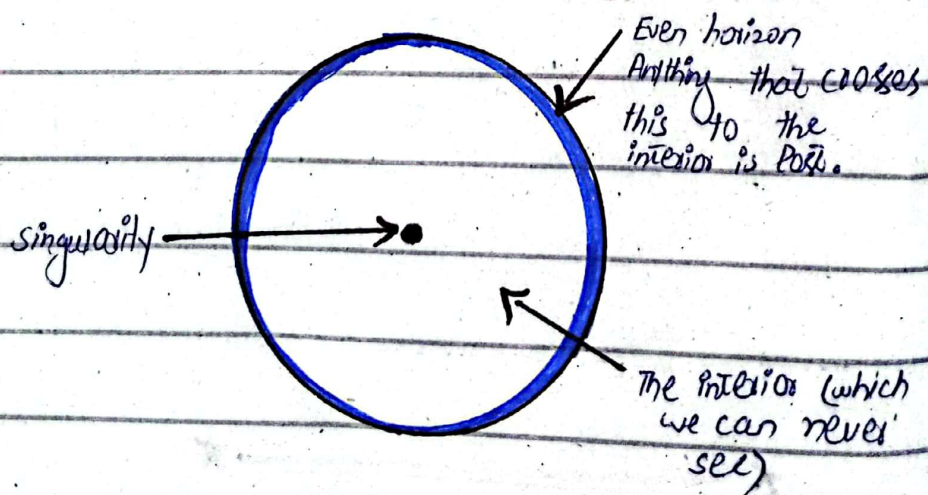




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## What is inside a black hole?

Black holes has two parts: there is the event horizon, which you can think of as the surface, though it's simply the point where the gravity gets too strong for anything to escape. And then, at the center, is the singularity. That's the word we use to describe a point that is infinitely small and infinitely dense.



∴ Black hole