

⇒ Major Astronomical Objects/Bodies → An astronomical object @ celestial object is a naturally occurring physical entity @ structure that exists in the observable universe. ~~Handwritten~~ eg → Planetary System, Star clusters, Nebulae & Galaxies...

In astronomy, the terms objects & body are often used interchangeably.

However, an Astronomical body @ Celestial body is a single, tightly bound, contiguous (समिद्ध, समीप, लगातार) entity, while an Astronomical @ celestial object is a complex, less cohesively bound structure, which may consist of multiple Bodies @ substructures.

→ ... while Asteroids, Moons, Planets & Stars are considered as astronomical bodies. A Comet may be identified as both Body & Object. It is a body when referring to the frozen nucleus of ice & dust, ⊕ an object when describing the entire comet with its diffuse coma & tail.

Some of the Major Astronomical objects and Bodies are as follows → NEXT PAGE → (24)

→ Black Hole → Black Holes are some of the strangest & most fascinating objects in space. A

Black Hole is a region of spacetime where Gravity is so strong that nothing even light @ other EMRs, has enough energy to escape from it. * The Gravity is so strong because matter

has been squeezed into a tiny space. This can happen when a star is dying. Because no light can get out, people can't see blackholes directly. They are invisible. But we can see the effects of Blackholes have on the space around them. eg →

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Stars that are very close to the Blackholes act differently than other stars.

* Every object in space has an escape velocity (the minimum speed at which something must move to escape the object's gravitational field) on the surface of Earth, the escape velocity is about 11 km/sec, meaning that anything leaving our planet must travel faster than this to break free of Earth's gravitational pull. In case of Blackholes, its gravitational field is so strong that its escape velocity is greater than the speed of light. This means that even light cannot escape from it.

In his general theory of Relativity from 1915, Albert Einstein was the first to suggest that our universe contains such strange, dense, massive objects. Blackholes emerge from Einstein's Equations of General Relativity as a natural consequence of death & collapse of massive stars.

In 1916, German mathematician Karl Schwarzschild was the first person to formulate Blackholes mathematically. Theoretical physicist John Wheeler first coined the name BLACKHOLE many years later, in 1967. Up until the 1970s, Blackholes were mathematical curiosities only. Then in 1971, scientists discovered the FIRST Physical Black hole → ~~XXXXXXXXXX~~

"Cygnus X-1", located within the Milkyway in the constellation of cygnus (~~the swan~~ latinized greek word of swan). At the

heart of the Milkyway lies a supermassive Blackhole - "Sagittarius A*". The Colossal Structure is about 4 million times the mass of the Sun & lies approximately 26,000 light years away from Earth (Acc. to NASA). The closest Blackhole to Earth is dubbed "The Unicorn" and is situated approx. 15,00 light years away, which has incredibly low mass (about three times of Sun).

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Black holes have three layers →

Layers

- the outer layer → Accretion Disk
→ Photon Sphere
- the Event Horizon
- the Singularity

the outer layer → The outer layer mainly divided into 2 subparts →
 ① Accretion Disc → A disc of Superheated gas & dust whisks around a Black Hole at immense speeds, producing EMR (X-ray, optical, Infrared & Radio) that reveals the Black Hole's location.

② Photon Sphere → Although the BlackHoles itself is dark, photons are emitted from nearby hot plasma in accretion disc. In the absence of Gravity, these photons would travel in straight lines, ^(Relativistic jets) but just outside the Event Horizon of a Blackhole, gravity is strong enough to bend their paths so that we see a bright ring surrounding a roughly circular dark "shadow".

the Event Horizon → This is the ^{boundary} of the Black Hole around a ~~point~~ Singularity. ^{It's not a physical edge, it's just a point where matter & energy}

③ impossible to
 Cannot escape the Black Hole's gravity. So, this is the point of No Return. This is the "Real Black part" of the Black hole. ~~the~~
~~this layer~~ Gravity is constant across the event Horizon.

• the Singularity → At the very center of the Black Hole, where the object mass lies with infinite density, is known as Singularity. All the matter & energy that fall into Black Hole ends up here. So, this is the single point in spacetime where the mass of the Black hole is concentrated.

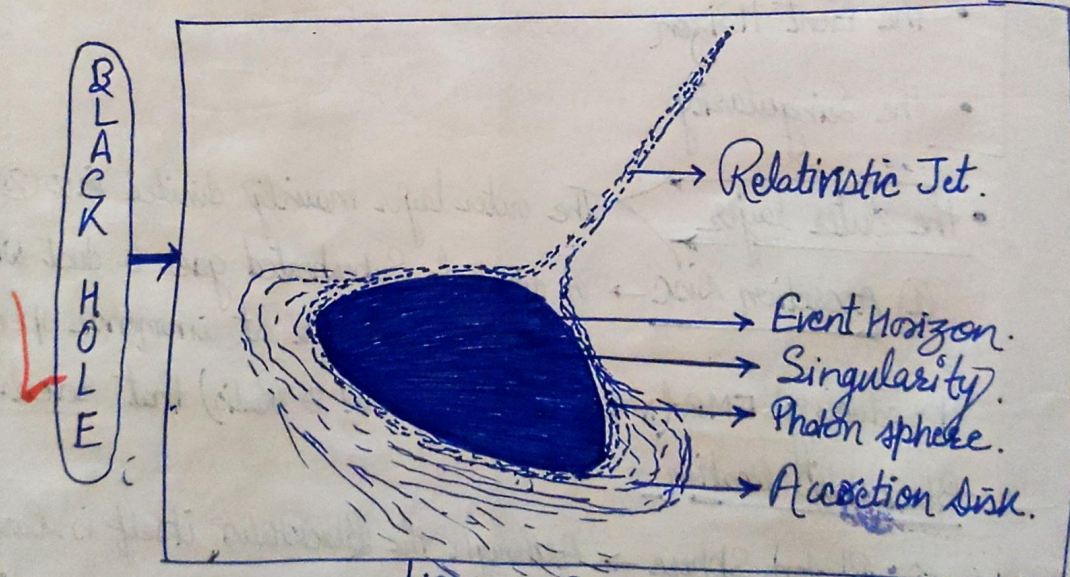


figure → Black Hole Anatomy.

Types → So far, astronomers have identified different types of Black holes →

The Micro Black holes → These Black Holes are as small as just one Atom but have the mass of a large mountain. Scientists think the Smallest Black holes formed when the Universe began but they are still only hypothetical and none has been proven to exist.