LID 568 Black Hole

Source: TH

Astronomers, using **NASA's James Webb Space Telescope (JWST)** and the **Chandra X-ray Observatory,** have discovered a **low-mass supermassive black hole LID 568.**

LID-568 Black Hole:

- **About:**
  - LID-568 is a **low-mass supermassive black hole** that existed **1.5 billion years after the Big Bang**.
  - It was discovered through **X-ray and infrared observations** and is located in a galaxy with minimal star formation, likely due to the black hole's powerful outflows.
- **Key Features:**
  - **Super-Eddington Accretion**: It feeds at a rate **40 times the Eddington limit**, which is the **maximum rate at which a black hole or star can accrete matter** without radiation pressure pushing matter away.
    - **Eddington Limit** represents the **balance between gravitational pull and outward radiation pressure**, preventing further accretion if exceeded.
  - **Galaxy Effects**: The black hole's **outflows** prevent the accumulation of matter needed for star formation in its galaxy.
- **Significance:**
  - **Challenges Current Models:** LID-568's rapid growth **contradicts theories requiring sustained accretion** for supermassive black hole formation.
  - **Insights into the Early Universe:** It suggests that **short bursts of intense feeding** could explain the formation of large black holes in the early universe.
  - **Future Research:** Opens avenues for **studying black hole accretion processes** and their **impact on galaxy evolution.**

BLACK HOLES

ABOUT

- A place in space with extremely high gravity pull; even light can't escape (hence, invisible)
- The strong gravity is due to matter being squeezed into a tiny space

The term 'black hole' was coined in the mid-1960s by American physicist John Archibald Wheeler

DETECTION

- By seeing how stars very close to black holes act differently than other stars
- In April 2019, scientists at the Event Horizon Telescope Project released the first-ever image of a Black Hole (shadow, more precisely)

Albert Einstein and Black Hole

- First predicted their existences in Theory of General Relativity
- It showed that when a massive star dies, it leaves behind a small, dense remnant core

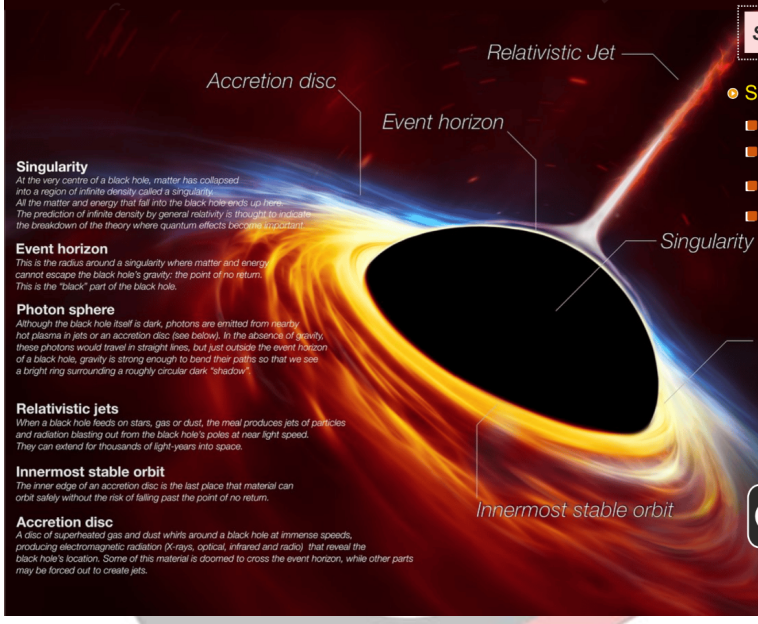
India's first dedicated satellite, AstroSat observed for the very first-time rapid variability of high energy X-ray emission from a black hole system

TYPES

- Miniature (Hypothetical):
  - The smallest; size of just 1 atom
  - Mass: varies from 1/100th of a milligram to the mass of a large mountain
  - Believed to be formed when universe began
- Stellar:
  - Mass: 20x the mass of sun
  - Believed to be formed due to Supernovae explosion

Supernova is an exploding star that has reached the end of its life

- Supermassive
  - The largest
  - Mass: >1 million suns together
  - Every large galaxy has a supermassive black hole at its centre
  - Believed to be made at the same time as their home galaxy



Sagittarius A is the supermassive black hole at the centre of Milky Way (mass: ~about 4 mn suns)

The Sun will never turn into a black hole as it is not big enough to make a black hole

Drishti IAS

Read More: Black Hole Gaia BH3