Moving Black Hole

Why in News

Scientists have discovered the **first moving supermassive black hole** whose mass is **about three million times that of our Sun.**

- The black hole was **travelling within its own galaxy (J0437+2456)** which is around **228 million light years away from Earth.**

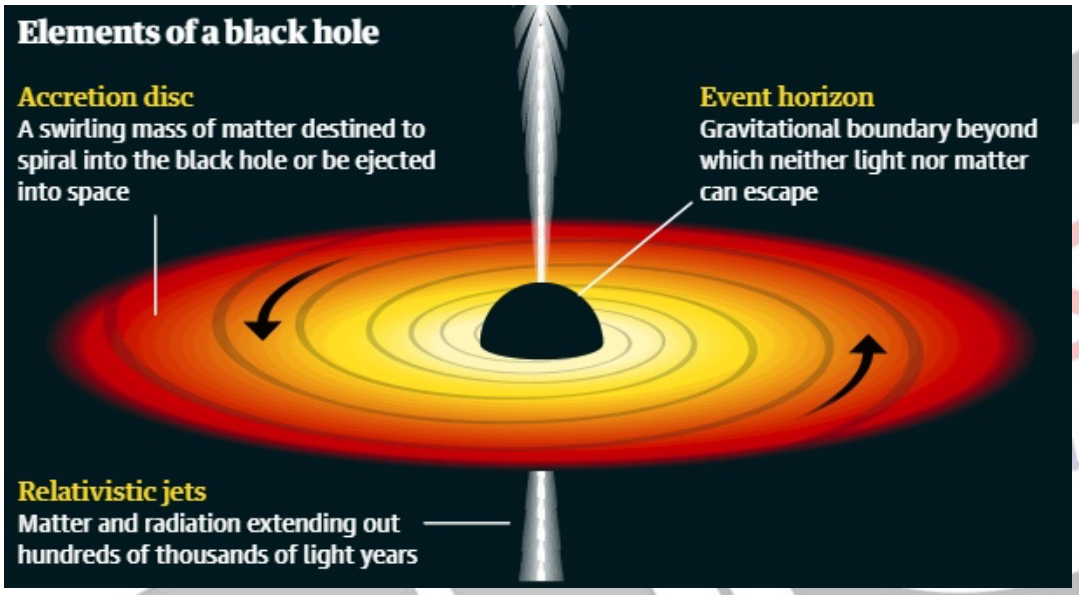
Key Points

- **Study Conducted by the Scientists:**
    - Scientists **studied 10 faraway galaxies with supermassive black holes** in the centre, **expecting them to have the same velocity as that of the galaxies they reside in.**
    - **Focus of their study was the water in the accretion disk** (the spiralling mass around a supermassive black hole made of matter that is eventually ingested by the black hole).
        - As the water **circles around the black hole** before falling into it **like liquid in a sink, it produces a laser-like beam of radio light known as a maser.** These masers can **tell the velocity of black holes very accurately.**
- **About the Moving Supermassive Black Hole:**
    - Of the 10 black holes they studied, **only the one at the center of J0437+2456 was unusual.** It was **not moving at the same velocity as its home galaxy.**
        - Besides the empirical evidence, the **enormous size of these black holes had led people to imagine them to be stationary objects** planted in the middle of galaxies as opposed to objects floating around in space.
    - It is **moving** with a speed of about **1,10,000 miles per hour** inside its **galaxy.**
    - **Possible Causes for the Motion:**
        - **Two Supermassive Black Holes Merging:** Scientists might have spotted the resulting black hole moving in a rearward motion after the merger before settling down in a position.
        - **One in a Binary System of Black Holes,** where not one but two supermassive black holes might exist within the host galaxy held together by a shared centre of gravity, which they might be orbiting.
            - The twin of the newly-discovered wandering black hole might not be emitting masers, keeping it from being detected by the radio antenna network.

Black Hole

- It refers to a point in space where the **matter is so compressed as to create a gravity field from which even light cannot escape.**

- The concept was **theorized by Albert Einstein in 1915** and the term **'black hole' was coined in the mid-1960s by American physicist John Archibald Wheeler.**
- Usually, the black holes **belong to two categories:**
    - One category **ranges between a few solar masses and tens of solar masses.** These are thought to form when massive stars die.
    - The other category is of **supermassive black holes.** These range from **hundreds of thousands to billions of times that of the sun** from the Solar system to which Earth belongs.
- In April 2019, the scientists at the **Event Horizon Telescope** Project released the **first-ever image of a Black Hole** (more precisely, of its shadow).
    - The **Event Horizon Telescope** is a **group of 8 radio telescopes (used to detect radio waves from space)** located in different parts of the world.
- Gravitational waves **are created** when two black holes orbit each other and merge.



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