

4. Planet Nine

Prelims: Science & Technology- Space Technology; Geography- Solar System

Mains: GS-III- Awareness in the field of Space.

Why in News?

- ▶▶ Hidden in the outer Solar System lurks a presence, believed to be a gigantic planet orbiting the same Sun and casting a visible influence on the behaviour of a number of other objects.
- ▶▶ Although it has not yet been spotted, this behaviour would be difficult to explain if such a presence did not exist.

Planet Nine:

- ▶▶ It is popularly referred to as Planet Nine, the presumed ninth planet of the Solar System, and occasionally as Planet X.
- ▶▶ Scientists have proposed that this could be a tiny black hole instead.
- ▶▶ They have shown that the behaviour of certain Trans-Neptunian Objects like a primordial black hole.

Primordial black hole:

- ▶▶ A primordial black hole is one that is believed to have formed immediately after the creation of the universe. Like Planet Nine, primordial black holes too have been predicted to exist – including by the late Stephen Hawking – but none has been spotted as yet.

Planet Nine so far:

- ▶▶ Over the years, scientists have sought to explain several puzzling aspects of the Solar System by attributing these to the influence of Planet Nine.
- ▶▶ In a 2016 paper made out a case for Planet Nine's existence by arguing that it could be responsible for the peculiar alignment of icy objects on the outskirts of the Solar System.

New suggestion about a Black Hole:

- ▶▶ Researchers based their theory proposed two gravitational anomalies.
- ▶▶ One is the unusual orbits of asteroids beyond the orbit of Neptune, which have fed the prediction of Planet Nine, estimated to be somewhere between 5 and 20 times the mass of the Earth.
- ▶▶ The other anomaly was observed thousands of light years away, by a project called the Optical Gravitational Lensing Experiment (OGLE).
- ▶▶ In six observations, an object bent the light of a star like black holes do. This is called microlensing.

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- ▶▶ These six events correspond to objects whose masses are in the range 0.5 to 20 times the mass of Earth.
 - ▶▶ The catch is that it is much harder to look for a black hole than to look for a planet, especially when the black hole is predicted to be of small dimensions.
 - ▶▶ However, it is reasonable to expect a dark matter halo surrounds this black hole.
 - ▶▶ If dark matter can annihilate into particles we know, the halo surrounding the black hole would radiate high energy photons and the halo would be visible in X-rays and gamma rays.
 - ▶▶ Researchers propose to look through a gamma ray telescope dataset and try to find evidence of these annihilations.

