2. Gamma-Ray Burst

Why in News?

- Recently, astronomers recorded the brightest gamma-ray radiation (named GRB 221009A) of all time, which could overturn a long-standing theory of GRB jets.

Highlights

- The observation was conducted jointly by Center for Astrophysics, Harvard and Smithsonian's Submillimeter Array (SMA) in Hawaii, the MeerKAT Array in South Africa, the US National Science Foundation's Karl G Jansky Very Large Array (VLA) in New Mexico (USA), the Atacama Large Millimeter Array (ALMA) in Chile and NCRA's Giant Metrewave Radio Telescope, India.

- Gamma-Ray Bursts are the most powerful class of explosions in the universe, and they occur when massive stars die.

- When a massive star collapses, it creates a black hole, and the energy released during this process produces jets of high-energy particles that travel almost at the speed of light.

- These jets pierce through the collapsing star, producing X-rays and gamma rays, which can be detected by observatories on Earth and in space.

- LGRBs last for more than two seconds and are thought to be caused by the collapse of massive stars, known as supernovae. These explosions release a tremendous amount of energy and create a black hole at their center.

- LGRBs are the most common type of GRB and can be observed from distant galaxies.

- SGRBs last for less than two seconds and are thought to be caused by the collision of two compact objects, such as neutron stars or a neutron star and a black hole.

- SGRBs are much rarer than LGRBs, are more difficult to observe and typically located closer to our galaxy

- Astronomers from the National Centre for Radio Astrophysics in India concluded that the signal was a birth cry of a black hole.

- GRB 221009A provides astronomers with valuable insights into the formation of black holes and the mechanisms that produce gamma-ray bursts.

- The detection of GRB 221009A will help astronomers refine their understanding of the conditions required for the formation of black holes and the production of gamma-ray bursts.