Radio Burst in Milky Way

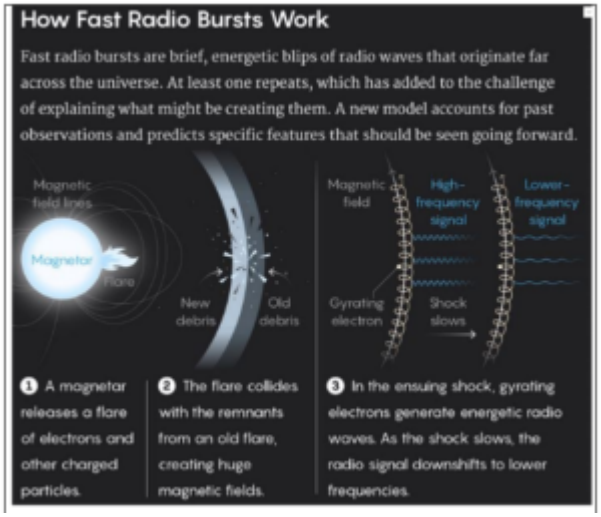
January 22, 2021

In News

- National Aeronautics and Space Administration (NASA) has spotted fast Radio Burst for the first time in the Milky Way.

What is an FRB?

- The first FRB was discovered in 2007, since when scientists have been working towards finding the source of their origin.
- Essentially, FRBs are bright bursts of radio waves (radio waves can be produced by astronomical objects with changing magnetic fields).
- Its durations lie in the millisecond-scale, because of which it is difficult to detect them and determine their position in the sky.



What is a Fast Radio Burst (FRB)

- The first FRB was discovered in 2007, since when scientists have been working towards finding the source of their origin.
- Essentially, FRBs are bright bursts of radio waves

(radio waves can be produced by astronomical objects with changing magnetic fields).
- Its durations lie in the millisecond-scale, because of which it is difficult to detect them and determine their position in the sky.

Who discovered it?

- The X-ray portion of the simultaneous bursts was detected by several satellites, including NASA's Wind mission.
- Further, a NASA-funded project called Survey for Transient Astronomical Radio Emission 2 (STARE2) also detected the radio burst.

Significant

- First noticed in 2018 by the Canadian observatory the waves have created ripples across the globe for one reason – they arrive in a pattern.
- This gave birth to theories that they could be from an alien civilization.
- Initially, it was believed that the collision of black holes or neutron stars triggers them.
- But the discovery of repeating FRBs debunked the theory of colliding objects.

Source of FRB in Milky Way

- The source of the FRB detected recently in the Milky Way is a very powerful magnetic neutron star referred to as a magnetar, called SGR 1935+2154 or SGR 1935, which is located in the constellation Vulpecula and is estimated to be between 14,000-41,000 light-years away.
- The FRB was part of one of the magnetar's most prolific flare-ups, with the X-ray bursts lasting less than a second.
- The radio burst, on the other hand, lasted for a thousandth of a second and was thousands of times

brighter than any other radio emissions from magnetars seen in the Milky Way previously.

- This flare-up, which lasted for hours, was picked up by NASA's Fermi Gamma-ray Space telescope and NASA's Neutron star Interior Composition Explorer (NICER).
- The Fermi Gamma-ray Space Telescope, formerly called the Gamma-ray Large Area Space Telescope (GLAST), is a space observatory being used to perform gamma-ray astronomy observations from low Earth orbit.
- NASA's Neutron star Interior Composition Explorer is an International Space Station (ISS) payload devoted to the study of neutron stars through soft X-ray timing.

Magnetar

- As per NASA, a magnetar is a neutron star, "the crushed, city-size remains of a star many times more massive than the Sun."
- The magnetic field of such a star is very powerful, which can be over 10 trillion times stronger than a refrigerator magnet and up to a thousand times stronger than a typical neutron star's.
- Magnetars are a subclass of these neutrons and occasionally release flares with more energy in a fraction of a second than the Sun is capable of emitting in tens of thousands of years.
- In the case of SGR 1935, for instance, the X-ray portion of the simultaneous bursts it released recently carried as much energy as the Sun produces in a month, assuming that the magnetar lies towards the nearer end of its distance range.

Neutron

- Neutron stars are formed when the core of a massive star

undergoes gravitational collapse when it reaches the end of its life.

- This results in the matter being so tightly packed that even a sugar-cube sized amount of material taken from such a star weighs more than 1 billion tons, which is about the same as the weight of Mount Everest, according to NASA.