NASA’s IXPE Mission

Why in News

Recently, **National Aeronautics and Space Administration (NASA)** launched a new mission named **Imaging X-ray Polarimetry Explorer (IXPE).**

Key Points

- **About:**
    - **IXPE observatory** is **a joint effort of NASA and the Italian Space Agency.**
    - It will study **“the most extreme and mysterious objects in the universe –** supernova remnants**, supermassive** black holes**, and dozens of other high-energy objects.”**
    - Its primary length is **two years and the observatory will be at 600 kilometers altitude,** orbiting around Earth’s equator.
    - It is expected to **study about 40 celestial objects** in its first year in space.
    - It will complement other X-ray telescopes such as the Chandra X-ray Observatory and the European Space Agency’s X-ray observatory, XMM-Newton.
- **Significance:**
    - It will help observe **polarized X-rays from neutron stars and supermassive black holes**. By measuring the polarization of these X-rays, we can study where the light came from and understand the geometry and inner workings of the light source.
    - It will help scientists understand how black holes spin and their location in the past.
    - It will help unravel how **pulsars** shine so brightly in X-rays.
    - It will help learn what powers the jets of energetic particles that are ejected from the region around the supermassive black holes at the centers of galaxies.
- **NASA’s Other Recent Missions:**
    - **Double Asteroid Redirection Test (DART).**
    - **Mission Lucy** (Jupiter Trojan Asteroids).
    - **Near-Earth Asteroid Scout**

Supernova

- A supernova is an extremely powerful explosion that accompanies the death of a massive star.

Black Hole

- A black hole is a **place in space where gravity pulls so much that even light can not get out.** The gravity is so strong because matter has been squeezed into a tiny space.
- **Gravitational waves are created** when two black holes orbit each other and merge.

Neutron Stars

- Neutron stars **comprise one of the possible evolutionary end-points of** high mass stars.
- Once the core of the star has completely burned to iron, energy production stops and the core

rapidly collapses, squeezing electrons and protons together to form neutrons and neutrinos.
- A **star supported by neutron degeneracy pressure is known as a 'neutron star',** which may be seen as a pulsar if its magnetic field is favourably aligned with its spin axis.

Source: IE