

# TESS finds Pulsating White Dwarf

October 25, 2021

**In news-** A team of astronomers, using NASA's Transiting Exoplanet Survey Satellite (TESS) have reported a unique phenomenon in a white dwarf about 1,400 light years from Earth. They saw the white dwarf lose its brightness in 30 minutes.

## **What is a pulsating white dwarf?**

A pulsating white dwarf is a white dwarf star whose luminosity varies due to non-radial gravity wave pulsations within itself. Known types of pulsating white dwarfs include DAV, or ZZ Ceti, stars, with hydrogen-dominated atmospheres.

## **White dwarf and TW Pictoris-**

- It is **part of a binary system called TW Pictoris, located in the Pictoris constellation**, and the binary system is about 1400 light years from us.
- **TW Pictoris** consists of a white dwarf that feeds from a surrounding accretion disk fuelled by hydrogen and helium from its smaller companion star.
- The two objects are so close to each other that the star transfers material to the white dwarf.
- As this material approaches the white dwarf it forms an **accretion disk or a disk of gas, plasma, and other particles around it.**

## **It's switch on and off mode-**

- As per scientists, in this system the **donor star in orbit around the white dwarf keeps feeding the accretion disk.**
- As the accretion disk material slowly sinks closer

towards the white dwarf it generally becomes brighter (**on mode**).

- During the 'on' mode, when the brightness is high, the white dwarf feeds off the accretion disk as it normally would.
- Suddenly and abruptly the system turns 'off' and its brightness plummets.
- When this happens the magnetic field is spinning so rapidly that a centrifugal barrier stops the fuel from the accretion disk constantly falling on to the white dwarf.

The new discovery will help the astronomers understand the physics behind accretion – how black holes and neutron stars feed material from their nearby stars.

### **Transiting Exoplanet Survey Satellite (TESS)-**

- TESS is a space telescope for NASA's Explorers program, designed to search for exoplanets (in orbit around the brightest dwarf stars in the sky) using the transit method in an area 400 times larger than that covered by the Kepler mission.
- It was launched in 2018 by Falcon rocket system.
- Using the Hubble Space telescope and TESS, astronomers have identified several white dwarfs over the years.