



Fast Radio Bursts

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Why in News?

Recently, an international team of astronomers studied repeating [Fast Radio Bursts \(FRB\)](#), **FRB 20190520B**, using the **Green Bank Telescope in the U.S.** and **the Parkes Observatory in Australia**. The report was published in the journal Science.

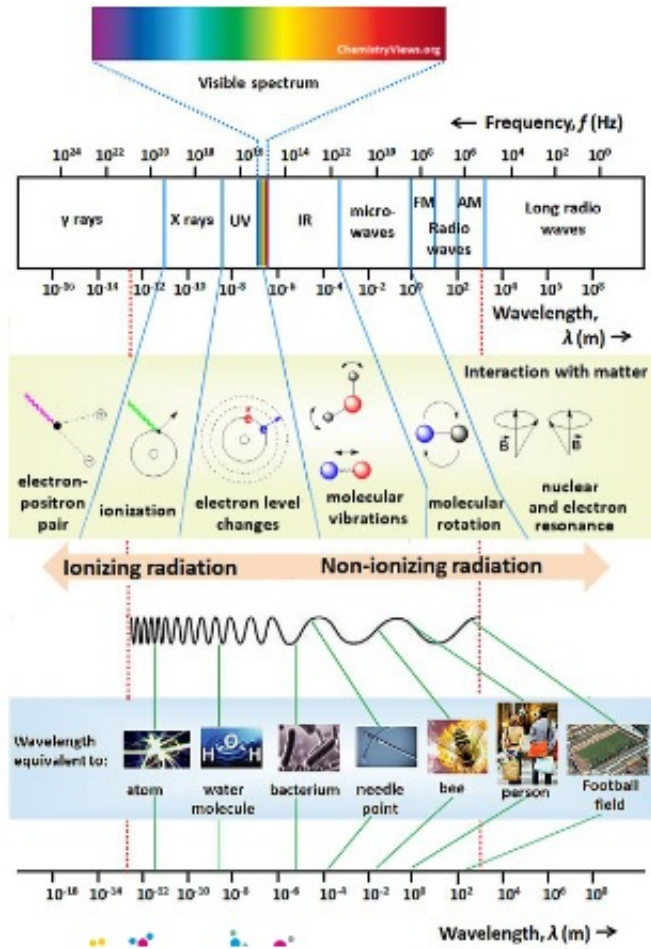
What are Fast Radio Bursts?

- They are **mysterious emissions of radio light (or Radio Waves) that come from the far reaches of the universe.**
- FRBs reach Earth from **faraway galaxies**, emitting as much energy in a **millisecond as the sun does over weeks.**
- They are the **brightest radio bursts found in nature.**
- Astrophysicists have **only been able to 'see' FRBs momentarily using large radio telescopes**, but their precise origins and causes are unknown.
- Some **FRBs are 'one-off' phenomena**, while **others are repeaters**, flashing earth intermittently.

What are the Key Highlights of the Study?

- **Highly Variable Faraday Rotation Measure:**
 - The astronomers discovered that the **Faraday rotation** measure of the repeating **FRB 20190520B** was highly **variable and reversed direction twice.**
 - This measure is an indicator of the **FRB's magnetic field strength.**
- **Binary Star System:**
 - The variation in the FRB's magnetic field strength and the direction of the reversal led the researchers to **conclude that the FRB source is likely orbiting a binary star system**, where the companion star is possibly a **massive star or a black hole.**
 - This led to the raising of the possibility that "all repeating FRBs could be in binaries." However, further monitoring and research are required to confirm this hypothesis.
- **Turbulent Magnetized Plasma Environment:**
 - The observed changes in the **magnetic field and electron density around the FRB source** suggest the presence of a **turbulent magnetized plasma environment.**
 - This environment likely influences the behavior of the FRB signals.
- **Importance of Radio Telescopes:**
 - The study underscores the significance of **advanced radio telescopes** in studying FRBs and other **intergalactic phenomena.**
 - These telescopes, such as the Very Large Array and the Deep Synoptic Array-110, enable **precise localization of FRBs and provide valuable data** for understanding their sources and characteristics.
- **Unraveling Cosmic Mysteries:**

- The study emphasizes the **role of radio astronomy in unraveling cosmic mysteries** and deepening our understanding of the universe.



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