WASP-94A b - Exoplanet

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Why in News?

According to a recent study, scientists were able to use the NASA James Webb Space Telescope (JWST) to peer closely at an exoplanet nearly 700 light-years away and decipher the weather patterns on it.

- **WASP-94A b** – It is *an exoplanet,* like a gas giant with scorching atmospheric temperatures, which are called '*hot Jupiters*'.

  Exoplanet - An exoplanet/extrasolar planet is any planet that *exists outside our solar system*, which orbits other stars, orbits binary star systems, or drifts freely through the cosmos as "rogue planets."

- **Size & Mass** – It is almost *twice as large as Jupiter* but with only half the mass.
- **Orbit** – It orbits very close to its parent star — so close that it takes just four days to complete a whole revolution.
- **Tidally locked** – They have their orbits tidally locked, meaning their rotation is *synchronised with their revolution* (like Earth's Moon).
- As a result, the same side of the planet always faces the host star, much like the moon's tidally locked orbit keeps one side always facing the Earth.
- **Weather Cycle Findings** – WASP-94A b in particular has a *dynamic weather system*.
- **Mornings & Evenings** – Are covered in clouds of magnesium silicate, iron, and magnesium sulphide, while the evenings sport clear skies.
- The clouds appear to form on the cooler night side of the planet, sweep across the globe with extremely fast winds, and then disappear as they reach the hotter dayside.
- **Day vs Night Temperature Conditions** – Its dayside is a blazing desert with rock-melting temperatures, while its nightside remains pitch-dark and frozen, dipping close to absolute zero.
- **How JWST Detected This?** – Used *spectroscopy* where light is split up into its various wavelengths, followed by measuring the intensity of each one.
- If the planet has an atmosphere, it will absorb some of the light; this will create a gap in the set of wavelengths arriving at the spectrometer.
- **JWST Breakthrough** – This is the *first direct measurement* of such an extreme weather cycle on an exoplanet, offering new insights into planetary atmospheres and evolution far beyond our Solar System.

To know about the James Webb Telescope, click here

Reference

The Hindu | Webb telescope captures weather on exoplanet 700 lightyears away