

# James Webb Telescope's first images

July 19, 2022

**In news**—NASA has recently released the first full-colour images and spectroscopic data of the universe taken by the James Webb Space Telescope.

## **Images by James Webb Space Telescope-**

- Images give us a chance to see faint distant galaxies as they were more than 13 billion years ago.
- **The first five images released are:**
  1. **The deep field image of the SMACS 0723 cluster of galaxies** which date back to times when the first stars were born.
  2. The **Carina Nebula** vividly shows the birth of new stars.
  3. The **Southern Ring Nebula** which details a dying star.
  4. The **Stephan's quintet** where we can see the cataclysmic cosmic collision of galaxies and
  5. The **WASP-96 b**, an exoplanet (a planet orbiting a distant star).
- The **spectroscopic observation of JWST reveals that there is a considerable amount of water vapour in the WASP-96 b's atmosphere**. However due to the blistering heat, WASP-96 is unlikely to host life.
- These **images also raise interesting points about how the expansion of the Universe factors** into the way we calculate distances at a cosmological scale.
- These first images from the world's largest and most powerful space telescope demonstrate Webb at its full power, ready to begin its mission to unfold the infrared universe.

## **More details of the images-**

### ***Cluster of galaxies-***

- The SMACS 0723 is a noted **cluster of galaxies** around **5.12 billion light-years** away.
- **Situated in the direction of the southern constellation of Volans**, the **image is as it appeared 4.6 billion years ago**, about the same time when the Sun and the Earth evolved.
- The cluster has been **previously studied by Hubble, Planck and Chandra space telescopes.**

### ***Carina Nebula-***

- A stellar nursery booming with new stars is a **giant interstellar gas cloud in our galaxy** called NGC 3324, **located in the direction of the Carina Nebula.**
- The stunning image of an edge of the NGC 3324, dubbed Cosmic Cliff, **located approximately 7,600 light-years from Earth**, is **home to many more massive and young stars than our Sun.**

### ***A star on its deathbed-***

- **The Eight-Burst Nebula, also known as the Southern Ring Nebula or NGC 3132, is a well-known planetary nebula in the constellation Vela**, located approximately 2,500 light-years from Earth.
- Despite their name, planetary nebulae have nothing to do with planets. **They are gas shells formed from the cast-off outer layers of a dying star.**

### ***Cosmic waltz-***

- **Situated in the direction of the constellation Pegasus**, around 290 million light-years away from Earth, is the clutch of five galaxies, each bound with the other called the Stephan's Quintet.
- Two of them are currently in the process of merging into

one another.

### **WASP-96 b-**

- Located around 1,150 light-years from Earth, WASP-96b **is an exoplanet** (a planet that orbits another star) orbiting a star named WASP-96.
- **The planet has a mass half that of Jupiter** and goes around the central star every 3.4 days.
- The spectroscopic observation of JWST reveals, for example, that there is a considerable amount of water vapour in the WASP-96 b's atmosphere.
- With blistering heat, WASP-96 is unlikely to host life.

### **About James Webb Space Telescope-**

- The \$10 billion telescope is a space telescope is a **joint venture of NASA, European Space Agency (ESA), and the Canadian Space Agency.**
- It was launched on 25 December 2021 on an [Ariane 5](#) rocket from [Kourou, French Guiana](#), and arrived at the Sun–Earth [L2 Lagrange point](#) in January 2022.
- It succeeded the Hubble Space Telescope as NASA's flagship astrophysics mission.
- **It will observe in near-infrared light rather than light in the visible part of the spectrum (unlike Hubble) and** thus it will have a much greater capacity to see obscure stars and galaxies.
- **Webb has two primary scientific missions,** which together will account for more than 50 percent of its observation time.
  - First, **explore the early phases of cosmic history, looking back in time to only a few hundred million years after the Big Bang.**
  - Its second major goal is the **discovery of exoplanets, meaning planets outside the solar system. It will also investigate the potential for life on those worlds** by studying their

atmospheres.

- **It was formerly known as the “Next Generation Space Telescope” (NGST) and it was renamed in 2002 after a former NASA administrator, James Webb.**
- Unlike Hubble, the current premier space telescope that revolves around the planet, Webb will orbit the Sun.
- **It will remain directly behind Earth, from the point of view of the Sun,** allowing it to remain on our planet’s night side.
- The broad range of infrared wavelengths detectable by JWST allow it to see galaxies Hubble never could.
- Using the JWST, scientists will be able to capture extremely distant galaxies as they were only 100 million years after the Big Bang – which happened around 13.8 billion years ago.