

# Six extraordinarily massive first-generation galaxies discovered

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**In news**— According to a new study, James Webb Space Telescope (JWST) has discovered six extraordinarily massive first-generation galaxies, formed roughly 500-700 million years after the Big Bang.

## Key findings-

- The study said that **these galaxies challenge current understanding of galaxy formation** as they should not have existed so early in their life.
- The study has revealed that **Tens to hundreds of billions of sun-sized stars' worth of mass is formed in only five per cent of the time.**
- The **shapes of these galaxies weird.** Despite **having the same mass as the Milky Way**, one of the galaxies is 30 times smaller.
- **The team of scientists spotted these monster galaxies using the Cosmic Evolution Early 44 Release Science programme of JWST.**
- The programme studies the formation of the earliest galaxies when the universe was less than five per cent of its current age.
- Researchers turned the telescope to a patch of the sky close to the Big Dipper, which appears to harbour a group of stars that form a pattern in the night sky.
- **Hubble space telescope first observed this region in the 1990s.**
- **The galaxies are in the same area in the sky but are not close to each other in three-dimensional space.** Some are

much further away than others

- **The stars appeared as bright and red “fuzzy dots”.** Red light typically means it is old.
- The universe is expanding. As most other galaxies move away from us, their light has shifted to longer, which means redder wavelengths.
- **The team analysed these images further and found stellar masses greater than 10 billion solar masses,** including one with a stellar mass of roughly 100 billion solar masses. One solar mass is the mass of our Sun.
- The Milky Way forms about one-two new stars every year. Some of these galaxies would have to be forming hundreds of new stars a year for the entire history of the universe.
- The findings are based on preliminary observations. The researchers said they need more data to confirm if the new galaxies are as old and massive as they seem.
- **Alternatively, the light could be coming from faint quasars,** which are short for quasi-stellar radio sources.
- **A quasar is an intense beacon of light coming from the centre of some galaxies and is powered by supermassive black.**
- If these galaxies are as massive as they appear, a different formation channel could have created these monster galaxies very quickly and efficiently.
- The researchers plan to split the light of each of these galaxies into its rainbow-like fingerprint using spectroscopy.
- This will tell us the distance with 0.1 per cent accuracy. It will also tell us what is producing the light, whether it is stars or something more exotic.

**Further**

**reading:**

**<https://journalsofindia.com/james-webb-space-telescope/>**