14. Latest Findings JWST Challenge Cosmology Models - Early Galaxies

Astrophysicists may have an explanation for the James Webb Space Telescope's discovery of a swarm of mysterious early galaxies that threaten to break cosmology.

The ΛCDM Model predicts that, as we look farther and farther back in time — i.e., to greater and greater cosmic distances — that the galaxies we see will be inherently smaller, bluer, less evolved, less rich in heavy elements, and that at some point beyond where we've been able to look, we should cease to see stars or galaxies of any type, as we'll reach the Universe's "dark ages."

Webb finds most distant known galaxies (JADES-GS-z14-0 and z14.32 290 Million Years after Big Bang
Brighter, Larger, Redder, and Younger and Oxygen (indicates 2nd Generation) does not agree with ΛCDM Model.

https://www.livescience.com/space/cosmology/james-webb-telescopes-observations-of-impossible-galaxies-at-the-dawn-of-time-may-finally-have-an-explanation
The galaxies, which the James Webb telescope (JWST) spotted forming as early as 500 million years after the Big Bang, were so bright that they theoretically shouldn't exist: Brightnesses of their magnitude should only come from massive galaxies with as many stars as the Milky Way, yet these early galaxies took shape in a fraction of the time that ours did.

The discovery threatened to upend physicists' understanding of galaxy formation and even the standard model of cosmology. Now, a team of researchers using supercomputer simulations suggest that the galaxies may not be so massive at all — they could just be unusually bright.

Bursts of star formation explain mysterious brightness at cosmic dawn Intense ashes of light, not mass, resolve the puzzle of impossible brightness Peer-Reviewed Publication,NORTHWESTERN UNIVERSITY, 3-OCT-2023
A period that lasted from roughly 100 million years to 1 billion years after the Big Bang, cosmic dawn is marked by the formation of the universe's rst stars and galaxies. Before the JWST launched into space, astronomers knew very little about this ancient time period.

"The JWST brought us a lot of knowledge about cosmic dawn," Sun said. "Prior to JWST, most of our knowledge about the early universe was speculation based on data from very few sources. With the huge increase in observing power, we can see physical details about the galaxies and use that solid observational evidence to study the physics to understand what's happening."

Do JWST's results contradict the Big Bang?
https://bigthink.com/starts-with-a-bang/jwsts-contradict-big-bang/

Many of these early galaxies that JWST is finding have peculiar, puzzling properties about them that appear difficult to reconcile with this theoretical picture that the Universe has painted for us. They appear, for example, to be:

- very massive,
- very bright,
- very rich in heavy elements - High Metallicity. **See Section XXX**,
- very actively forming new stars,
- and very rich in gas.

Prognosis:
There are an enormous number of astrophysical possibilities that invoke no fundamentally new physics that could potentially account for why these galaxies would exist with these large masses and brightnesses.