Professor James Bullock delivers talk to Aspen Institute on James Webb Space Telescope

Bullock took a crowded room on a cosmological journey from distant exoplanets to the oldest-known galaxies.

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Dean Bullock prepares to give audience members a sense of what the new James Webb Space Telescope can do.

Picture Credit:
Aspen Institute

On August 11, James Bullock, professor in the UC Irvine Department of Physics & Astronomy and dean of the UCI School of Physical Sciences, visited the Aspen Institute in Aspen, Colorado, to give a talk on the science surrounding NASA's James Webb Space Telescope (JWST), which launched in 2021. Bullock discussed what makes JWST special compared to previous generations of space telescopes like the Hubble Space Telescope. JWST, Bullock explained, sees the cosmos in the infrared part of the electromagnetic spectrum — this enables the telescope to see the oldest galaxies in the universe. One of those galaxies, called JADES GS-z13-0, is, in JWST images, only about 320 million years old, meaning it formed not long after the start of the universe during the Big Bang. At another turn, Bullock displayed a JWST image showing several galaxies, some of which are oddly-shaped, like flipped pancakes flopping around in the air. "They're normal galaxies, but the light from those galaxies is passing by this really, really massive galaxy cluster, and the galaxy cluster has so much gravity that it's bending the light into arcs and making those galaxies easier to see. This is called gravitational lensing," said Bullock, who added that the phenomenon is like a wine glass held in front of a candle and you see the glass spreading the light around its curvature. "That's exactly what this is." The talk also covered the ways JWST promises to help scientists characterize the nature of planets beyond our solar system by analyzing the chemical makeup of those planet's atmospheres. Humanity, Bullock said, is "the universe looking back at itself, trying to make sense of it all."

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