Discoveries with the JWST, and what comes next

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The JWST, with its 6.5 m hexagonal mirror and its 4 infrared instruments, has yielded remarkable surprises. The first galaxies are brighter and hotter than expected, and they aren't round, but are elongated into bananas and cigars. Galaxies and even individual stars are frequently found at high redshift, through gravitational lensing. The first black holes we can find are extremely bright and sometimes surrounded by immense clusters of galaxies. Pairs of Jupiter-mass objects (JMBOs) have been discovered in the Orion nebula, upending theories of planet formation. Some new stars are observed in their dusty cocoons, and some with their orbiting disks of dust are observed edge-on, so we can test our stories of formation. Hot, large exoplanet have atmospheres that we measured in transit spectroscopy, but no small planets around M stars have detectable atmospheres, alas for the search for signs of life elsewhere. I will tie the JWST results to cosmological predictions, with galaxies arising from density fluctuations measured with the cosmic microwave background radiation, discuss the effects of cosmic dark matter and dark energy, and consider the future of astronomy. Miraculous discoveries await.

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