

News & Comments

First Observation of Slow Spin of Early Galaxy

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Telescopes have become more powerful and advanced, enabling astronomers to detect galaxies more distant than ever before. Due to light's finite speed and the fact that we see objects as they were at the time the light was emitted, the farther something is away, the farther back in time we are looking. The very distant galaxies are among the oldest galaxies in our universe, and their distance from us has progressively increased as the universe has expanded.

As a matter of fact, the farther a galaxy is from us, the faster it appears to move away from us. As a result of how "redshifted" a galaxy's emission appears, we can estimate how fast it is moving, and thus when it was formed. An observer experiences redshift when an object moving away from him emits light of a different wavelength (hence the term "redshift").

Atacama Large Millimeter/submillimeter Array (ALMA) telescope in Chile is especially well-suited for observing such redshifts in galaxy emissions due to its location in the Atacama Desert. Redshifted emission from MACS1149-JD1 has recently been observed by an international research team, which has led to some fascinating conclusions. Observations of the light wavelengths indicated that parts of the galaxy were moving away from us, while others were moving towards us. These variations led them to conclude that the galaxy was disc-shaped and rotated at a speed of 50 kilometers per second. At the Sun's position, the Milky Way rotates at a speed of 220 kilometers per second. The galaxy is so far away that its light comes to us from a time when the Universe was only 550 million years old – 4% of its present age. "The rotation speed of JD1 is much slower than those found in galaxies in later epochs and our [Milky Way] Galaxy and it is likely that JD1 is at an initial stage of developing a rotational motion," says Akio K. Inoue, a co-author of the [paper](#), also at Waseda University.

According to these findings, galaxies begin small and rotate slowly. As they accumulate matter, their rotation speed increases over billions of years. A further study of galaxy rotation rates over cosmic time will be conducted with the help of the James Webb Space Telescope.

KEYWORDS

Galaxies, rotation, James Webb Space Telescope, redshifted, Atacama Large Millimeter/submillimeter Array (ALMA) telescope, galaxies, milky way, galaxy, MACS1149-JD1, ALMA, Astronomy, Astrophysics, Waseda University

