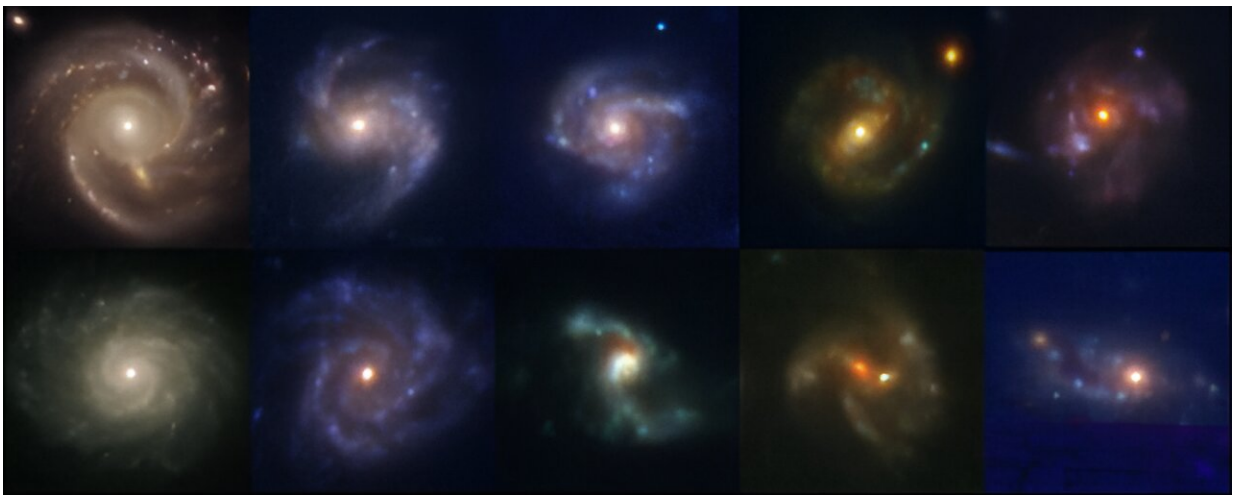


# Scientists spot more Milky Way-like galaxies in early universe, advancing our understanding of how galaxies were formed

June 11 2024, by Eric Stann

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Some of the spiral galaxies studied by the researchers in the study. Credit: Vicki Kuhn

University of Missouri scientists are peering into the past and uncovering new clues about the early universe. Since light takes a long time to travel through space, they are now able to see how galaxies looked billions of years ago.

In a new study, the Mizzou researchers have discovered that spiral galaxies were more common in the [early universe](#) than previously

thought. The work [appears](#) in *The Astrophysical Journal Letters*.

"Scientists formerly believed most spiral galaxies developed around 6 to 7 billion years after the universe formed," said Yicheng Guo, an associate professor in Mizzou's Department of Physics and Astronomy and co-author on the study. "However, our study shows spiral galaxies were already prevalent as early as 2 billion years afterward. This means galaxy formation happened more rapidly than we previously thought."

This insight could help scientists develop a better understanding of how spiral galaxies such as the Milky Way, Earth's home galaxy, formed over time.

"Knowing when spiral galaxies formed in the universe has been a popular question in astronomy because it helps us understand the evolution and history of the cosmos," said Vicki Kuhn, a graduate student in Mizzou's Department of Physics and Astronomy who led the study.

"Many theoretical ideas exist about how spiral arms are formed, but the formation mechanisms can vary among different types of spiral galaxies. This new information helps us better match the physical properties of galaxies with theories—creating a more comprehensive cosmic timeline."



Vicki Kuhn, a graduate student in Mizzou's Department of Physics and Astronomy, led the study. Kuhn's passion for studying astronomy began during high school. Credit: Sam O'Keefe / University of Missouri

Using recent images from NASA's James Webb Space Telescope (JWST), the scientists found that nearly 30% of galaxies have a spiral structure about 2 billion years after the universe formed. The discovery provides a significant update to the universe's origin story as previously told using data from NASA's Hubble Space Telescope.

Studying distant galaxies with JWST gives Guo, Kuhn and other scientists an opportunity to solve a cosmic puzzle by determining the meaning of each clue.

"Using advanced instruments such as JWST allows us to study more distant galaxies with greater detail than ever before," Guo said. "A

galaxy's [spiral arms](#) are a fundamental feature used by astronomers to categorize galaxies and understand how they form over time. Even though we still have many questions about the universe's past, analyzing this data helps us uncover additional clues and deepens our understanding of the physics that shaped the nature of our universe."

This study was presented by Kuhn at the [244th meeting of the American Astronomical Society](#) in Madison, Wisconsin.

**More information:** Vicki Kuhn et al, JWST Reveals a Surprisingly High Fraction of Galaxies Being Spiral-like at  $0.5 \leq z \leq 4$ , *The Astrophysical Journal Letters* (2024). [DOI: 10.3847/2041-8213/ad43eb](https://doi.org/10.3847/2041-8213/ad43eb)

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