

# Earliest galaxies morphologies

Resolved morphologies of the early galaxies (with redshift  $> 6$ ) observed with the James Webb Space Telescope (JWST) (using the Near-InfraRed Camera, NIRCam, instrument unless otherwise specified). Galaxies in the field (top row) show clumpy and dense structures (Kartaltepe et al. 2023). Thanks to gravitational lensing, the light from these compact galaxies is resolved into several stellar clumps down to small sizes on the scale of tens of parsecs ("The Cosmic Grapes"; Fujimoto et al. 2024). In some cases, these clumps show strong emission lines as showcased for M1149-JD1 observed with NIRISS and NIRCam (Bradač et al. 2024), MIRI imaging and integral field spectroscopy (Álvarez-Márquez et al. 2023), and NIRSpec (GA-NIFS collab. in prep.) suggesting that intense episodes of star formation are concentrated within them. Near the critical lines, the galaxy light is stretched into long arcs revealing bright compact bound star clusters, with intrinsic sizes smaller than 10 parsecs such as for the "Cosmic Gems arc", "Firefly Sparkle", and "Sunrise arc" (Adamo et al. 2024; Mowla et al. 2024; Vanzella et al. 2023a, respectively) and single stars such as "Earendel" (Welch et al. 2022). These stellar systems dominate the light of their galaxies, suggesting that star cluster might be a dominant star formation mode for young galaxies.

This graphic was developed during the breakthrough workshop 'The Chronology of the Very Early Universe According to JWST: The First Billion Years' at the International Space Science Institute (ISSI) in Bern, Switzerland.

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- Specific citation: *This graphic by Angela Adamo and Fabio Crameri (ISSI Bern) published in ISSI Breakthrough Workshop team (2024) is available via the open-access [s-ink.org](https://s-ink.org) repository.*
- Related reference: ISSI Breakthrough Workshop 2024 team (2024, pre-print), arXiv, <https://doi.org/10.48550/arXiv.2405.21054>

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