



Contribution ID: 67

Type: **Invited/Solicited talk in mini-symposium**

## When did first galaxies form?

*Monday, December 11, 2023 4:10 PM (20 minutes)*

The advent of the James Webb Space Telescope (JWST) has brought the study of early galaxy formation to a new level. Shortly after it began its scientific operation, JWST revealed a large number of candidate galaxies at redshift ( $z$ ) greater than 11 when the universe was less than  $\sim 420$  million years old, some of which could even be at  $z \sim 20$  (age of the universe  $\sim 180$  million years). This was completely unexpected by many, as the previously accepted picture (up to July 2022) would predict hardly any galaxies such early in time. Spectroscopy has confirmed some galaxies up to  $z = 13.2$ , which stimulates the building of a new consensus that galaxy formation happened much earlier in time than previously thought. Evidence from other lines of study, such as the metal abundance in galaxies at  $z \sim 8-9$  and the confirmation of AGN at  $z \sim 10$ , all supports this new picture. This talk will give a brief overview of the up-to-date status of this frontier and will discuss the implications of this new picture to other important questions in cosmology.

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**Session Classification:** Cosmology with large-scale structure