Contribution ID: **94** Type: **not specified**

Galassie ad alto redshift nell'era JWST: prospettive dal modello GAlaxy Evolution and Assembly

Wednesday 4 June 2025 15:49 (12 minutes)

"Early results from JWST have provided new challenges to our understanding of early galaxy formation. In particular, the abundance and inferred physical properties of z
$gtrsim7$ galaxies suggest potentially significant tensions with predictions from the standard ΛCDM cosmological model.
In my work (Cantarella et al., in preparation), we take advantage of the latest version of the GAEA galaxy formation model (De Lucia et al., 2024) to investigate the formation and evolution of galaxies in the high-redshift Universe. GAEA successfully reproduces a large set of statistical properties of galaxies, showing results that are in reasonable agreement with observational constraints. Notable examples include: the galaxy stellar mass function up to $z \sim 11$, once accounting for observational uncertainties and cosmic variance; the total (galaxies and AGN) UV luminosity function (LF) up to $z \sim 10$, where the AGN UV emission represents an important contribution at the bright end of the UV-LF up to $z \sim 8$; the mass-metallicity relation at $z \leq 4$, whilst our model slightly overestimates the metallicity content at earlier cosmic epochs.
At $z \geq 11$, UV-LF estimates are at least one order of magnitude higher than model predictions. To address this, we investigate the effects of different physical mechanisms in the high-redshift regime, such as either an enhanced star formation efficiency coupled with a reduced stellar feedback or, alternatively, a vanishing stellar feedback at $z > 10$. While better matching the $z > 10$ observed GSMF and UV-LF, these model variants increase the gas metallicity content in $z \geq 4$ galaxies, strengthening the disagreement with the estimated MZR evolution."

sessioni congresso

Presenter: CANTARELLA, Sebastiano (Istituto Nazionale di Astrofisica (INAF))

Session Classification: La gravità, la materia oscura e le tensioni cosmologiche: il contributo di JWST, Euclid (chair: P. Rosati)