Highlights of Spanish Astrophysics XI, Proceedings of the XV Scientific Meeting of the Spanish Astronomical Society held on September 4–9, 2022, in La Laguna, Spain. M. Manteiga, L. Bellot, P. Benavidez, A. de Lorenzo-Cáceres, M. A. Fuente, M. J. Martínez, M. Vázquez- Acosta, C. Dafonte (eds.), 2023

ΩMEGA: the Ωrigin of the Morphological Evolution of GAlaxies.

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Abstract

How do galaxies shape their morphology through time? How many details of galaxies at cosmic noon are we going to unveil? This contribution aims at presenting the expected performance of JWST imaging observations in constraining the evolution of galaxies and the origin of the Hubble sequence. In particular, I describe NIRCam mock observations of high-redshift galaxies ($3 < z < 6$) from the TNG50 cosmological simulation, discussing their parametric and non-parametric morphology.

To date, most of the available JWST simulations on the market are based on semi-analytic models and use smooth morphologies (mainly Sérsic profiles) to describe the galaxy light distribution. Providing the need for a more realistic description of the diversified structures of high-redshift galaxies, I describe the creation of synthetic images of about 25,000 galaxies from the suite of TNG50 galaxies tailored for JWST observations at multiple wavelengths. These noiseless images were processed with the mirage simulator to mimic the observational strategy (e.g., noise, dithering pattern, etc.) of the Cosmic Evolution Early Release Science survey (CEERS), one of the thirteen Early Release Science (ERS) programs approved worldwide. For each galaxy, I present the parametric and non-parametric morphology, comparing the expected performances of NIRCam in characterizing the galaxies' features at different redshift and wavelengths.

This analysis provides a fundamental bench test for the forthcoming ERS programs, granting the community realistic mock observations and a catalog of high-redshift galaxies to compare with the first data releases and investigate the best strategy for future observations.

My poster is available at https://zenodo.org/record/7034766#.Y62J2y1aZpQ