



Contribution ID: 55

Type: **not specified**

Eleonora Parlanti - Evidences for turbulent disk galaxies at $z > 5$

Wednesday, 14 June 2023 16:30 (20 minutes)

Primeval galaxies are supposed to be subjected to galaxy-galaxy interactions, merging processes, gravitational instabilities, and feedback from both bursts of star formation and active galactic nuclei that may have an impact on the formation of the galactic disks and their properties. Therefore, exploring the kinematical properties of galaxies is fundamental to understanding what are the main processes that play a crucial role in the galaxy's growth over cosmic time. Thanks to the high angular resolution observations obtained with ALMA, we can finally investigate the kinematics of gas in distant galaxies. Here I present a kinematic study of 20 main-sequence star-forming galaxies at $z > 5$, which represent the bulk of the galaxy population in the first Gyrs of the Universe. Based on the analysis of [CII]158 μ m and [OIII]88 μ m observations, which map cold and warm gas respectively, I discuss the dynamical state of high- z galaxies and show that the ratio between the rotational velocity and velocity dispersion of gas is higher than expected. The high- z galaxy population observed with ALMA is consistent, within the error, with rotating but turbulent disks. The inferred velocity dispersion is systematically 4-5 times higher than what is measured in both the local galaxy population and $z=4-5$ massive dust-obscured galaxies reported in the literature. The tension between our results and those reported at similar redshift can be ascribed to the systematic difference in galaxy properties between the two samples: the disks of massive dusty galaxies are dynamically colder than that of dust-poor galaxies.

Session Classification: Cosmology, high- z Universe, galaxy clusters