Présentation orale (en distanciel)

Titre : Resolving star formation processes at high z galaxies with JWST

Abstract :

High redshift galaxies present a very irregular morphology dominated by compact sub-structures called "clumps". The physical properties of these high-z star-forming systems remain relatively unexplored and their role in galaxy formation and evolution is not clear. The first detections of UV-bright clumps from z=8 to z=1 indicates that these star-forming clumps could be a major mode of star formation and galaxy assembly.
However, resolving structures at sub-kpc scales in high redshift galaxies (z>1) is hardly achievable with current telescopes even with space-based observations. Combining the unprecedented sensitivity and spatial resolution of JWST with the natural gravitational lens telescopes is the unique way to reach hundred/sub-hundred pc resolutions in hundreds of galaxies, necessary to resolve individual star-forming clumps and star clusters.
I will present the first results on resolved high redshift star formation processes obtained from JWST/NIRCam observations of strongly lensed galaxies observed in galaxy cluster fields (SMACS0723, WHL0137, Abell2744). The optical restframe, probed with the JWST, enables us to measure physical properties of these clumps (age, mass, extinction). We derive effective radii from <10 to 100s pc and masses ranging from 10^5 to 10^8 Msun, overlapping with massive star clusters in the local universe. Comparing these results with the most recent hydrodynamical simulations of galaxies, we can understand the physical processes involved in the formation and evolution of these clumps (such as gas turbulence, stellar feedback, galaxy mergers...). Our study show the potential of JWST observations for understanding the conditions under which galaxies evolve across the cosmic time and star clusters form in rapidly evolving galaxies.