

X30a Compact star formation activity in cluster galaxies at cosmic noon

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We present spatially-resolved studies of gas-rich star-forming galaxies (SFGs) in two galaxy clusters – XCS J2215 ($z = 1.46$) and La Pequeña ($z = 1.32$) – at cosmic noon using ALMA and JWST data. For SFGs in XCS J2215, we found that dust-obscured star formation traced by ALMA FIR continuum emission is approximately three times more compact than the CO $J = 2 - 1$ line emission (Ikeda et al. 2022). The dynamical masses inferred from the CO rotation curves suggest smaller CO-to-H₂ conversion factors ($\alpha_{\text{CO}} = 2.9$ on average) than the Milky-Way value ($\alpha_{\text{CO,MW}} = 4.36$), which can significantly alter the slope of the resolved Kennicutt-Schmidt relation. La Pequeña is a relatively low-mass cluster ($\log M_{200}/M_{\odot} = 13.6$) with at least ten spectroscopically confirmed members, and we use JWST/NIRCam medium band filters to map the Pa α line in six CO-detected galaxies. From the morphological fitting analysis, we found that the Pa α line is systematically more compact than the stellar distribution, consistent with the picture we found in the study of XCS J2215 cluster. Finally, we will discuss whether the compactness of star formation activity is unique to cluster galaxies by comparing them with field galaxies detected in both CO and Pa α , observed by ASPECS and JEMS, respectively.