

X11b Interactions of Five Galaxies at the Core of a Galaxy Over-Density at  $z = 7.88$ 

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Investigating galaxy over-density is crucial for understanding early galaxy growth because dense environments accelerate galaxy evolution via multiple processes, such as galaxy-galaxy interactions and gas infalls. At the same time, galaxy over-densities may create large ionized bubbles, enabling ionizing photons to travel large distances, further contributing to cosmic reionization. To study galaxy evolution in over-dense environments, a panchromatic approach is essential, and this is now possible thanks to the unprecedented synergy between JWST and ALMA. Recently, a massive galaxy over-density at  $z = 7.88$  was reported behind the lensing cluster Abell 2744 (Morishita+22). Further, accelerated galaxy growth in the most dense  $\sim 3'' \times 3''$  ( $\sim 11 \text{ kpc} \times 11 \text{ kpc}$ ) region of the over-density, where five galaxies are merging, was reported (a.k.a “the Quintet”; Hashimoto+23). Our cycle-10, deep ALMA observations of [CII]  $158\mu\text{m}$  lines from “the Quintet” revealed an extreme complex interaction between galaxies by showing detections from all five merging galaxies totaling  $L_{[\text{CII}]} \gtrsim 10^9 L_{\odot}$ , showing multiple spatially-extended ( $\sim 1 \text{ kpc}$ ) [CII] components bridging galaxies together as well as confirming some of the previously tentative dust continuum detections. In this talk, we will introduce first results from the new ALMA observations and discuss multiple-emission line properties seen by ALMA and JWST.