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Presentation Requested: oral

Category: Assembly of Galaxies / Mass & Structure Evolution

Question: What have we learned or can we learn about galaxies at the Epoch of Reionization with ALMA / what are the synergies with other telescopes? What is the role of ALMA, JVLA and SKA (and other telescopes) for confirming galaxies where Lyman alpha is not detected (i.e. at putative $z > 7.5$)

Testing Reionization using [CII] and Lyman α

The [CII] $158\mu\text{m}$ line will provide crucial information on reionization. First, it can confirm redshifts for candidate $z > 7.5$ galaxies that lack detected Lyman α . More interestingly, when Ly α *is* detected— which it may be for galaxies inhabiting even the earliest ionized bubbles during reionization— the [CII] line affords a second reionization test. [CII] redshifts are unaffected by the IGM, while the centroid of Ly α will be shifted to the red when the line's blue side is suppressed by a neutral IGM. Thus, the velocity offset will be larger during reionization than it is at lower redshifts. We will discuss the physical basis of this test, how it is affected by the phenomenology of both lines, and prospects for applying it in our ongoing searches for both these lines at $z \geq 7$.