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Claudia Di Cesare - Metal enrichment in the CGM around high-z merging galaxies

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We study the emission of the [CII]158 μm from the gas sourrounding merging systems at 4 ≤ z ≤ 6 (post Reionization Epoch), when galaxies rapidly assembled their masses and reached their chemical maturity. It has now become clear that galaxies are complex ecosystems, continuously exchanging material with the surrounding environment, and understanding the physical mechanisms that drive galaxy evolution at these remote cosmic epochs, requires an appropriate combination of observational and theoretical tools. The observational part of this work makes use of major merger systems present in the ALMA Large Program to Investigate [CII] at Early times (ALPINE) survey, which is designed to measure [CII] and the FIR-continuum emission for a sample normal galaxies at z = [4.4-5.8]. In particular, we consider and analyse merging systems whose components can be spatially and/or spectrally resolved, so that we can distinguish between the [CII] emission coming from the single components of the system and that coming from the system as a whole, this distinction between emissions help us understanding the metal enrichment of the circumgalactic medium (CGM) around the selected candidates. How much of the [CII] emission is coming from the components of the merging system? And from the gas surrounding the system? We then, make use of the hydrodinamical cosmological simulation dustyGadget (Graziani+2020) to select synthetic analogues of observed galaxies, which help us interpret observational results. Indeed, simulated counterparts give us hints on the feedback processes regulating baryon cycling at the CGM scale and on the role of outflows and gas stripping in merging systems. In the end, the comparison between simulated and observed galaxies gives us information on how these early galaxies acquire their gas content and get enriched with metals and dust grains.

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