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Roberto Decarli - The physics of the ISM in quasars at $z > 6$

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Quasars at cosmic dawn ($z > 6$) are some of the most active sources in the early Universe. The rapid accretion of gas onto the already assembled massive black holes ($\sim 10^9 M_{\text{sun}}$) and the intense consumption of gas through rapid star formation release enormous amount of energy onto the interstellar medium, setting up unique conditions that are not present in the local Universe. Multi-line studies of the ISM using ALMA and other mm-wavelength facilities offer a unique insight on these conditions, where we can probe the baryon cycle in these early quasars, the balance between inflows, accretion, outflows, star formation, and feedback. We examine the case of the quasar PJ183+05 observed at $z=6.4$, where all the gas phases can be studied in detailed via a comprehensive ALMA study. Finally, we discuss the perspective of a synergy between ALMA and JWST in unveiling the physical properties and the astrophysical processes at work in the build-up of the first quasars.

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