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[CII] outflows in z=6 QSOs are there: investigating AGN feedback and host galaxy properties in luminous high-redshift QSOs

Thursday, 11 October 2018 15:45 (15 minutes)

I will present evidence of AGN-driven outflows in the early Universe, resulting from the stacking analysis of a sample of 48 QSOs at z~5-7 with ALMA [CII] detection. Very broad [CII] wings are on average present, and extend beyond velocities of 1000 km/s. The luminosity associated with the broad [CII] wings correlates with the AGN luminosity, while it remains unchanged in low-high SFR sources. This indicates the AGN as the main driving mechanism of the observed cold [CII] outflows in distant QSOs, with associated atomic mass outflow rates of 200-350 Msun/yr. I will discuss how these outflows relate to those observed in lower-z AGNs and give an estimate of their spatial extent.
Thanks to sub-millimetre observations with ALMA and NOEMA, we are also able to have an insight onto the host galaxy properties of high-z QSOs, otherwise outshined by the AGN radiation. I will focus on the high-resolution ALMA observation of a hyper luminous QSO at z=4.4, revealing an exceptional overdensity around the QSO with multiple companions as close as 2 kpc. These crowded surroundings, and the QSO host galaxy itself, are forming stars at a very high rate (hundreds of Msun/yr). I will discuss how the BH and stellar masses are growing in this multi-source system, which likely represents the cradle of what would be a giant galaxy at z = 0.
Finally, I will discuss how the huge AGN radiation may regulate the SF activity in the host galaxy and suggest that substantial SF at early epochs may have taken place in the companion galaxies.

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