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# SMBH accretion properties of radio-selected AGN out to z=4

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Are all radio AGN weakly accreting SMBHs? If not, does their SMBH accretion rate change with radio power and/or cosmic time? The VLA-COSMOS 3 GHz Large Project (PI: Smolcic) provides a uniquely deep and large radio survey to address these questions. I will present a comprehensive analysis of the average SMBH accretion properties of radio-selected AGN in the COSMOS field.

The sample was originally selected from radio-continuum observations at 3 GHz to be fully complete in radio luminosity (Lr), and counts ~1300 radio AGN identified via >2$\sigma$ excess in radio emission relative to the star formation (SF) of the host.

We stacked the latest Chandra COSMOS+Legacy images for all radio-excess AGN, as a function of both Lr and redshift, in order to derive the average X-ray luminosity and specific SMBH accretion rate (s-BHAR) in each Lr-z bin. While the average s-BHAR does not show any significant trend with Lr, at any redshift, we do find a significant increase of s-BHAR with redshift, at fixed Lr. This redshift trend nicely resembles the strong redshift increase in the fraction of blue (star-forming) radio AGN hosts, at fixed Lr.

A possible interpretation for these results implies a link between the average AGN radiative power, and the availability of cold gas supply within the host. Our study suggests that radio AGN become radiatively-efficient (Eddington ratio > 1%) at z~2, and it corroborates the idea that the high-redshift Universe facilitates radiative AGN activity, regardless of the AGN radio power.

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