

A very powerful radio loud AGN at $z=5$. Blazar or not?

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Looking for Active Galactic Nuclei (AGNs) in the first Gyr of the Universe is crucial to understand when and how the first super massive black holes (SMBHs) formed, how they are related to galaxy formation and what is their role in the re-ionisation process. Explaining how such massive systems could be built up in the short ($< 1\text{Gyr}$) available cosmic time is still an open issue. Selecting high- z AGN candidates requires a multi-wavelength approach. In particular, we are carrying out a project which combines optical, IR, and radio datasets to identify radio loud AGNs at redshift $z>4.5$.

I will present the newly discovered extremely radio loud quasar DES0141-54 at $z=5.0$, selected by combining the very recently data release (DR1) of the Dark Energy Survey (DES) with the Sydney University Molonglo Sky Survey (SUMSS) radio catalog. Rest-frame UV-optical spectra were obtained for this object using EFOSC2 at the NTT and X-Shooter at the VLT. This object is extremely bright in the radio band and its radio-loudness (ratio of the radio to optical flux) is one of the largest ever measured ($R>10000$) at this redshift. However, puzzlingly, the X-ray emission measured by the XMM-Newton and Swift satellites is weaker compared to what expected from a such large radio emission.

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