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A Complete Characterisation of Ultra Steep Spectrum Sources in the COSMOS Field

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Ultra Steep Spectrum (USS) radio sources have been successfully used to select powerful radio galaxies at high redshifts. Typically restricted to large-sky surveys and relatively bright radio flux densities, it has gradually become possible to extend the USS search to new sensitivity levels, thanks to a new generation of radio surveys produced by the so-called SKA-pathfinders. Combining recent observations from MIGHTEE (the MeerKAT International Gigahertz Tiered Extragalactic Explorations) and VLA-COSMOS we identify more than 700 USSs, the majority of which with optical/near-infrared counterparts and redshift estimates. Using the comprehensive multi-wavelength dataset available over this area, we are able to extensively characterize this population, and explore the usefulness and efficiency of the USS radio criteria to reach the highest redshifts at the faintest radio fluxes, of clear relevance to the preparation of future SKA surveys. We find that the faint USS source population doesn't show significant differences from the broader sub-mJy radio population, in particular revealing a large number of star-forming galaxies with a redshift distribution peaking at z<1. In spite of this apparent lack of efficiency of the USS criteria in selecting very high redshift galaxies, at the faintest radio flux levels, sources at very high redshift (z>6) are still found in our sample. This suggests the possibility of exploring compound observational diagnostics to optimize the search for very high redshift radio sources, in particular in the upcoming SKA-era.

keywords

radio galaxies, AGN, epoch of reonization, high redshift

In-person or online?

online

Career level

Student

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