Contribution ID: **87** Type: **Talk**

MALS Data Release I: Probing Evolution of Cold gas in AGNs

Wednesday, 8 May 2024 16:15 (15 minutes)

The MeerKAT Absorption Line Survey (MALS) has observed 391 telescope pointings at L-band (900-1670 MHz) at declination<20 deg. In this talk, I'll present the radio continuum images and a catalog of 495,325 (240,321) radio-sources detected at SNR> 5 over an area of 2289 deg^2 (1132 deg^2) at 1006 MHz (1381 MHz). With excellent continuum (20 microJy/beam) and spectral sensitivity (0.5 mJy/beam per 6 km/s channel), this catalog will form the base catalog for future HI 21-cm and OH 18-cm absorption line search, addressing main theme of MALS : evolution of cold gas in galaxies up-to z~2. Through comparisons with NVSS and FIRST at 1.4 GHz, we established the catalog's accuracy in the flux density scale and astrometry to be better than 6% and 0.8", respectively. We estimated spectral indices of a subset of 125,621 sources, confirmed the flattening of spectral indices with decreasing flux density and identified 140 ultra steep-spectrum (alpha<-1.3) sources as prospective high-z radio galaxies. From the catalog, we have also identified 1308 variable and 122 transient radio-sources composed primarily of AGNs that demonstrate long-term (26 years) variability in their observed flux densities. The MALS catalogs and images are publicly available at https://mals.iucaa.in. The talk will also cover the detection of HI 21-cm absorption associated with a quasar at z=1.353. By analyzing this source with literature samples of quasars and radio-galaxies with HI absorption, we conducted a joint radio and optical analysis to constrain the location and properties of cold gas in quasars versus galaxies.

keywords

Radio surveys, Catalogs, source finding, imaging, Cold gas in AGNs

In-person or online?

in-person

Career level

Student

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Session Classification: Clusters/LSS & AGN/High-z