



Role of deep radio continuum surveys in understanding the evolution of active galactic nuclei

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To understand the evolution of active galactic nuclei (AGN) and host galaxies across cosmic epochs is one of the key science drivers of extragalactic surveys. Although, obscuration poses a challenge to detect the complete population of AGN across cosmic epochs. The merger induced dust-obscured galaxies (DOGs), identified as relatively bright in infrared but faint in optical, are supposedly potential hosts of AGN. However, detection of AGN in DOGs is challenging due to high absorption of optical, UV and X-ray emission arising from the AGN. Radio emission is insensitive to dust obscuration, and hence, to detect radio AGN hosted in DOGs, we exploit deep field radio surveys such as *MeerKAT International GHz Tiered Extragalactic Exploration (MIGHTEE)* at 1.3 GHz, *SuperMIGHTEE* survey from upgraded Giant Metrewave Radio Telescope (uGMRT) at 400 MHz and 650 MHz, and LOw Frequency ARray (LOFAR) surveys at 144 MHz. These surveys provide the deepest imaging data (up to a few microJy) at respective frequencies and have similar angular resolutions of nearly 5.0 – 10 arcsec. We demonstrate that the deep radio continuum surveys are most efficient in detecting AGN hosted in high-*z* DOGs. Using stacking, we find the existence of faint radio emission in otherwise radio-undetected DOGs. In this talk I shall emphasize the importance of combining data from the most advanced radio telescope arrays to uncover the diverse AGN and galaxy population at high redshifts and, also the role of deeper radio continuum surveys planned with the square-kilometer array (SKA)-mid and SKA-low.

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