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## AGN feeding and feedback revealed in detail by MeerKAT and the SKA

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Active Galactic Nuclei (AGN) are key drivers of galaxy evolution, triggered by cold gas accreting onto a super-massive black hole. However, the processes regulating this gas accretion (feeding) and how AGN alter the interstellar medium to affect star formation (feedback) remain poorly understood. A major observational challenge is the vast range of spatial scales involved: AGN fuelling and jet-ejection occur over the sub-pc scales, while AGN feedback shocks and heats the ISM preventing star formation over the galactic and circum-galactic scales. Moreover, it is unclear how short stochastic AGN episodes are connected with the long timescales of gas accretion and star formation.

In this talk, I will highlight how MeerKAT observations allow us to overcome these observational limitations with two examples. In NGC 3100, a 300 kpc-long, low-density ( $\sim 10^{19} \text{ cm}^{-2}$ ) HI filament fuels a cold gas circum-nuclear disk, where HI clouds fall onto the SMBH. Meanwhile, broad-band continuum observations of Fornax A reveal the rapid flickering of its AGN. Additionally, multi-wavelength observations MeerKAT, ALMA, MUSE show a jet-driven multi-phase gas outflow alongside clouds fuelling the AGN, explaining its rapid recurrent activity.

Finally, I will show how the SKA will open a new parameter space in AGN studies. I will present simulated SKA AA\*/AA4 broad-band continuum and HI observations of a nearby AGN, comparing them with the Fornax A MeerKAT observations. Together, the SKA-LOW and MID telescopes will enable detailed observations of AGN feeding and feedback in hundreds of nearby AGN down to low radio powers ( $10^{23} \text{ W Hz}^{-1}$ ).

### Topics

Galaxy Evolution & AGN

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