

Title

Exploring the life-cycle and feedback in restarted radio AGN

Abstract

Cycles of activity (active galactic nuclei, AGN) and quiescence in a galaxy are crucial for regulating star formation and the growth of the central black hole. Understanding this cycle, and linking it to the cold gas properties, which is the fuel for star formation, can help test the role of cumulative AGN feedback in galaxy evolution. However, this has been a challenging task, hampered by the relatively limited sensitivity and resolution of existing GHz surveys.

We propose to use the MeerKAT and LOFAR synergy to study the spatially resolved spectral indices and associated HI absorption in ten restarted radio AGN, spanning a wide redshift range $0.05 < z < 1.4$. These have been selected using 150 MHz LOFAR data to have a young source at the centre, and large (>100 kpc) scale remnant emission around it. Combining the MeerKAT continuum images with LOFAR data, we will use the spatially resolved spectra to understand the conditions of the remnant emission and its connection to the young source at the centre. We also aim to study, in a systematic manner, the HI detection rate in restarted AGN, which has been suggested to be high, connected with the re-triggering mechanism. We will then test whether the feedback on cold gas kinematics is stronger in young centres of restarted AGN, which has been found for ionised gas and proposed by simulations. We will systematically test this for the first time in restarted radio AGN up to redshifts close to the cosmic noon.