

Proposed MSc Project

A systematic search for remnant radio galaxies

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Student will be expected to register at UCT.

Background: Remnant radio galaxies represent the final stage in the evolution of a radio galaxy, during which the accreting supermassive black hole has switched off and/or weakens to such a low level that the plasma outflow can no longer be sustained. They are important objects for understanding of the radio galaxy life cycle, i.e. from the triggering of relativistic jets to the nuclear engine switch off, and possibly followed by a restarting activity of the AGN. One of the main challenges in the field of galaxy evolution, however, is understanding what causes the dormancy of the AGN jets. It is thus crucial to address in a statistically meaningful way the nature of the link between active and dormant phases of jet activity. Actually, only a handful of the elusive dying sources have been detected mainly because of the rapid timescale of particle energy decay.

Project description: This project uses MeerKAT and LOFAR data along with other low and high-frequency radio continuum data to systematically search for remnant radio source populations in deep wide-field surveys such as MIGHTEE fields. By exploiting new observations with high sensitivity and resolution, one can draw the source radio spectrum to help reconstruct the history of the AGN activity. SALT/RSS observations will be conducted for optical host counterparts with non-publicly available spectroscopic redshift.

Special requirements: With python programming skills and a desire to learn how to use new astronomy software such as CASA, CARTA and pyBDSF.

References: Brienza M., et al. 2016, A&A, 585, A29 • Morganti R. 2017, Nature Astronomy, 1, 596 • Murgia M., et al. 2011, A&A, 526, A148 • Randriamanakoto et al. 2020, MNRAS, 496, 3381

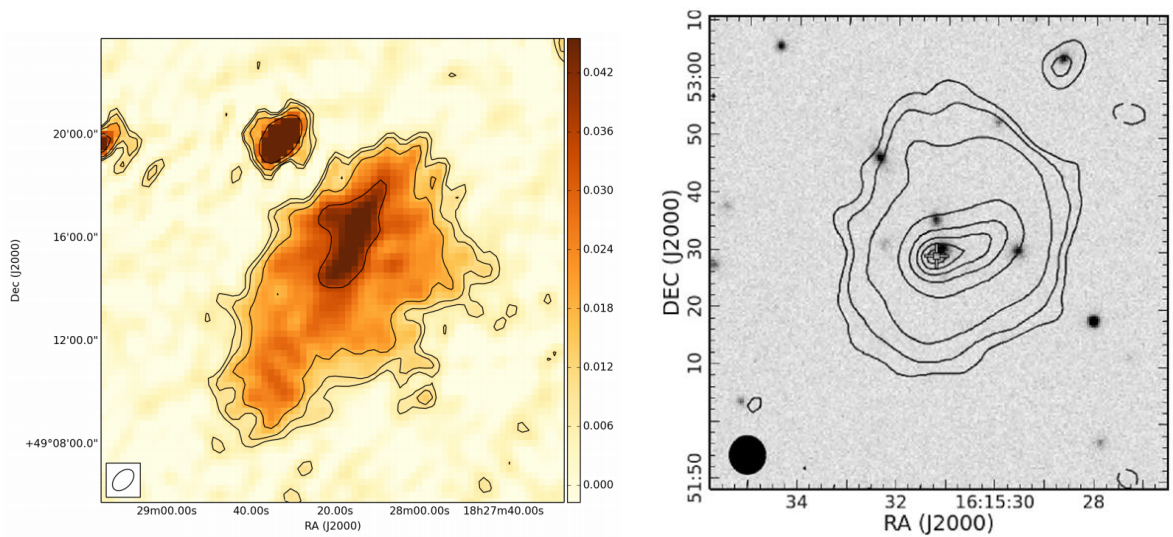


Figure 1: Typical examples of dying radio galaxies.