SAAO Proposed MSc Project – 2022

A systematic search for remnant and restarted radio source populations in a multi-frequency survey

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Student should register at UCT

Project description: Radio galaxies are well-known to go through cycles of activity, where phases of apparent quiescence can be followed by repeated activity of the supermassive black hole (see Fig. 1). The details of the AGN intermittency are important for both understanding galaxy evolution in general, and constraining the mechanisms responsible for jet triggering. 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 and restarted radio sources have been detected.

This project uses MeerKAT/MIGHTEE Early Data Science observations along with other low and high-frequency radio continuum data to systematically search for remnant and restarted radio source populations in deep wide-field surveys such as the COSMOS and XMM-LSS. 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.

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

The student is encouraged to get in touch over e-mail to discuss the project with the supervisor.

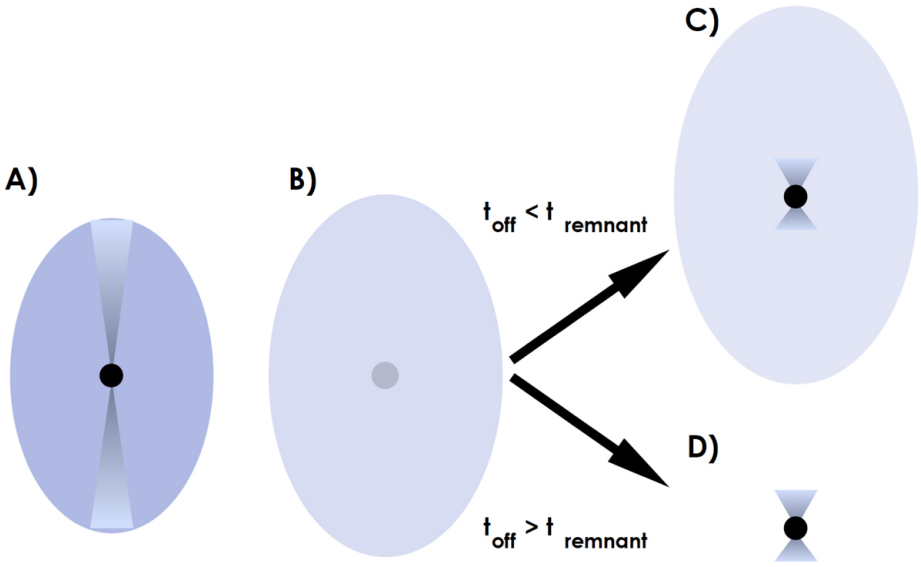

Figure 1: Sketch of the duty cycle of radio galaxies with various scenarios for the restarted phase by Jurlin et al. (2020). It illustrates an active radio galaxy (A) going through a remnant stage (B), and then through a restarted phase (C and D) .