

# Spectral study of the radio relic in the Abell 2443 cluster

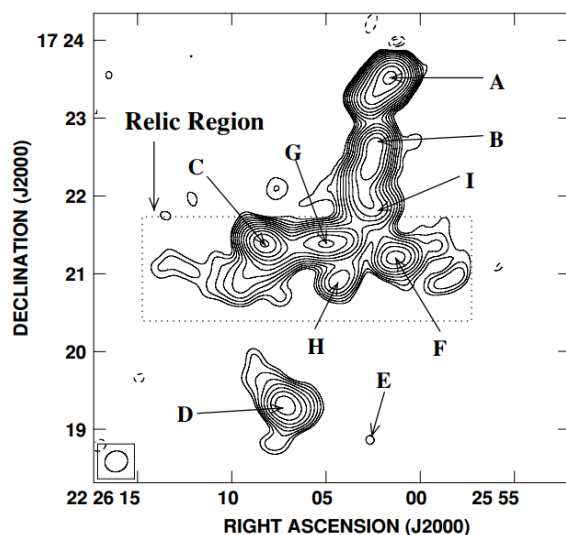
Supervisor: Dr Ramij Raja (Rhodes University)

Email: ramij.raja@ru.ac.za

**Abstract:** The aim of this project is to study the spectral nature of the radio relic in the galaxy cluster Abell 2443 using the latest MeerKAT observations archival data. The student will learn radio astronomy data analysis, imaging and other data products creation. This work may contribute to a potential journal article.

**Scientific Rationale:** Galaxy clusters are the largest gravitationally bound objects in the Universe. They reside at the nodes of the intersection of the cosmic filaments and host a plethora of hydrodynamical and astrophysical phenomena. Merging galaxy clusters in particular are very interesting objects to study cluster scale diffuse radio sources. Radio relics are ~1-2 Mpc scale diffuse radio objects located in the cluster periphery. These radio objects trace the merger events and associated shocks in the intracluster medium. Although radio relics are studied extensively, some complex objects are difficult to categorise in one class or the other and require more detailed analysis.

**Project Objective:** The Abell 2443 cluster hosts a diffuse radio source with complex morphology. It is a steep-spectrum source with the presence of small-scale sub-structures that makes this object very interesting to study. With the MeerKAT UHF and L-band data, the project student will make a resolved spectral index map of the radio relic and classify the object between classical radio relic and radio phoenix. The student will learn about radio data analysis, image and spectral index map making. This will give the student an introduction into the radio astronomy research.



A2443 radio relic at 325 MHz (Cohen & Clarke 2011)

**Required skills:** Basic Python programming. Familiarity with CASA and SAOFS9 software packages will be advantageous.