

Title

## **A Wideband High Sensitivity Polarimetric Observation of Pictor A**

Abstract

Pictor A is a nearby galaxy at a redshift of 0.035 and the fifth brightest source in the Southern Hemisphere. Its proximity makes it an ideal laboratory for studying galactic evolution. This source shows significant amounts of polarized emission of up to 60% in some regions. From previous observations with the VLA and MeerKAT, it exhibits a consistent value of rotation measures averaging  $\sim 44 \text{ rad/m}^2$  across its extent. However, the origins of these observed rotation measures remain a mystery. Moreover, Pictor A displays a pronounced spectral steepening around its "waist," close to its radio core.

Our team proposes a wideband, high-sensitivity observation of Pictor A to unravel the origin of its rotation measures and spectral steepening. By exploring these phenomena at high Faraday depth resolution and broad bandwidth coverage, we hope to gain insights into the magnetic field strengths in its jets, lobes and the properties of the magneto-ionized gas along its line of sight. A high dynamic range image from a previous MeerKAT observation featured many double-lobed sources near Pictor A. We intend to derive and use RMs of these nearby sources to constrain the origin/location of the magnetised plasma.