

Searching for evidence of galactic winds in Centaurus A

Abstract

Centaurus A is the closest radio galaxy, giving us the opportunity to study processes related to Active Galactic Nuclei (AGN) feedback in fine detail across a broad range of wavelengths. Its proximity also presents a significant challenge in high-dynamic range imaging for radio interferometers. Recent radio observations have begun to hint at faint new filamentary structures related to clumps of hot and cold gas to the north of the bright inner lobes, in a region commonly known as the Northern Middle Lobe (NML). This proposal seeks to make both continuum and spectral line (HI) images of the NML region in greater detail and with more sensitivity than ever before. We will be able to resolve the filaments and determine whether they are evidence of a broad supersonic wind emanating from the galactic core. We will also be able to reach unprecedented sensitivity to the HI column density and identify new clouds and more details in the known clouds of HI gas orbiting the galaxy at a radius of $\sim 10\text{-}20$ kpc and thought to be responsible for some of the features seen in the NML. The relationship between the wind, the radio continuum emission and the ring of gas may provide new insights into how AGN feedback is affecting the evolution of Centaurus A, with possibly wider applications to feedback models which are a crucial part of current cosmological simulations.