Title

Mapping the Circum-Galactic H I Ring in the S0 Galaxy NGC 1533

Abstract

The distribution and kinematics of gas in ring galaxies constrain the evolution of massive early-type galaxies. We propose to map the H I distribution of a nearby SB0 galaxy NGC 1533 at L-band with MeerKAT in narrow-band high-frequency-resolution mode. NGC 1533 has a face-on circum-galactic H I ring with a maximum physical extension of 70 kpc (11.7 arcmin), which could be attributed to either tidal disruption of galaxy companions or gas accretion. Abundant gas accretion in the S0 galaxy is uncommon, and the Halpha blobs in the ring may suggest in-situ star formation. The H I morphology and kinematics afforded by MeerKAT will shed critical insights into the connection between the H I ring and its nearby environment, which is vital to ascertain the ring's origin and kinematics. To map the ring and circum-galactic medium, we aim at deriving a 3sigma detection (a noise level of 0.6 mJy beam^-1) with a H I column density of 1.3×10^{19} cm^-2. The observation requires a total of 18.8 hours, which includes 15.0 hours on-source and 3.8 hours overhead. Our team includes experts in galaxy formation and evolution, multi-phase interstellar medium, ring formation mechanisms, MeerKAT data process, and kinematic modelings of H I.