

MeerRings: MeerKAT study of a sample of Collisional Ring Galaxies

Abstract

Collisional Ring Galaxies (CRGs) are an intriguing class of galaxies that are the results of the passage of an intruder galaxy through the disc of a target galaxy. Star formation in CRGs has been explored previously but the neutral gas has been studied only in a small subset of these rare sources. The proposed campaign aims to exploit the capabilities of MeerKAT to perform the first resolved, deep, and systematic census of the neutral gas in a considerable sample of CRGs. MeerKAT's high sensitivity will enable the detection of HI expelled to the environment and the extended HI discs of the galaxies. This would provide information on the gas kinematics in the complex velocity fields characterised by circular and non-circular motions of different structures, the extended environment, ring evolution, and cold gas properties in regions of both triggered and suppressed star formation. We also anticipate detecting splash features and other anomalous gas resulting from the collision. Thus this program also represents the first systematic investigation of such features resulting from a well-known class of interactions. The versatility of HI in tracing various gravitational and hydrodynamical processes operating at different scales, along with MeerKAT's capabilities and the unique set of processes affecting CRGs, allows us to investigate several important physical phenomena in galaxy evolution.