

A Complete Picture of Atomic Gas, Molecular Gas, and Star Formation in Ten of the Best-Studied MeerKAT-Visible Galaxies

Abstract

We propose to map 21-cm HI emission at high resolution from 10 nearby galaxies with extensive existing multi-wavelength data, include public wide field ALMA CO(2-1) mapping. We will use the combination of MeerKAT, ALMA, and UV-IR multiwavelength data to derive critical new insights into the physical drivers of H₂/HI balance in galaxies, to calibrate the resolved radio continuum as a star formation rate tracer, and to measure the kinematics of neutral gas across both the molecular and atomic phase from the inner galaxy to the edge of the disk. MeerKAT represents the only viable option for high-quality 21-cm maps for these southern targets, and the MeerKAT-ALMA pairing is potentially very powerful but has so far been only weakly exploited, so this represents a natural early program for MeerKAT.