

GECKO-KATs: MeerKAT Observations of Edge-On Galaxies from a MUSE Large Program

Abstract

We propose for HI and 20 cm radio continuum follow up observations of 5 galaxies from the GECKOS sample, a MUSE large program targeting nearby edge-on galaxies. Edge-on galaxies give a direct view to the gas that extends above the plane of a disk. The amount of gas that exists above the midplane of a galaxy regulates star formation, and thus sets the mass growth of galaxies across cosmic time. HI is likely the main mass component of extraplanar gas. Measuring the amount of cold gas, and determining the physical mechanisms that govern its kinetic energy are needed to advance galaxy evolution models. MeerKAT now provides high spatial resolution observations with surface brightness sensitivity sufficient to map HI with kiloparsec resolution. This opens new science that has been limited by spatial resolution. GECKOS provides a comprehensive analysis of edge-on galaxies with extremely deep observations with the VLT/MUSE integral field spectrograph. GECKOS provides more than just the ionised gas mass, the data allows one to identify shocks and ionization structure. Moreover, the larger GECKOS project will generate stellar populations and kinematics, which can be compared. The targets of this proposal all also have resolved CO(1-0) observations. We will compare mass of ionised, molecular and atomic gas on sub-kpc above the plane of disks. We will determine if shocks are needed to make high masses of cold gas. The aims of this proposal will test outflow theory, but the longer term goal is a high-profile combination of MeerKAT with VLT.