Studies of Gas Kinematics and Star Formation in MHONGOOSE Galaxies

Level: MSc

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Project Description:
Characterizing the resolved properties of the interstellar medium and the multi-phase kinematics of galaxies is important in order to understand their evolution. MHONGOOSE is a deep HI survey of 30 nearby galaxies with MeerKAT that will allow us to study the HI in better detail and sensitivity than previous nearby galaxy surveys have done. This will enable us to learn more about various aspects of the baryon cycle and galaxy kinematics. We are obtaining optical data with SALT and other telescopes in order to complement that data and study the ionized gas, star formation and stellar kinematics and populations of these galaxies. This will complement the MeerKAT HI data and enable us to get a more complete picture of the interstellar medium, its properties and the baryon cycle from the inner to the outer regions of these galaxies.

The aim of this project is to study the optical and HI kinematics and star formation distribution of a select number of galaxies in the MHONGOOSE survey. The optical ionized gas and HI kinematics will be compared to each other and the stellar kinematics, they will be used to look for signatures of multi-phase extraplanar gas and to study the connections between the gas kinematics and star formation. The student will get to work with the latest SALT and MeerKAT data and learn how to handle and analyze this data. The analysis will involve doing profile fitting and kinematic analysis of longlist optial data and radio and optical data cubes. There is also a possibility to combine these with near and mid-infrared data from SALT and WISE.

Student Requirements: The student should be comfortable with Python coding and be open to using new software and handling different kinds of data formats.