2021 MSc Project

Project Title: Feedback in SUNBIRD Galaxies

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Student can register at any South African university

Introduction:
Starburst galaxies, Luminous Infrared Galaxies (LIRGs) and Ultraluminous Infrared Galaxies (ULIRGS) have much more intense star forming rates than typical star forming galaxies. Nearby galaxies, in particular starburst galaxies and LIRGs, are great laboratories to study star formation, feedback and the baryon cycle. The intense star formation rates found in starbursts and U/LIRGs can power strong winds and outflows which can lead to quenching and morphological changes. These processes are important in order to understand how galaxies evolved from the early universe to what we see today. The processes involve changes to the multi-phase interstellar medium (ISM) in galaxies, and multi-wavelength studies are crucial to unravelling the properties and dynamics of this multi-phase ISM involved in feedback and other processes related to the baryon cycle.
New instruments such as MUSE and radio facilities such as ALMA and MeerKAT are providing powerful insights into these processes. We have conducted multi-wavelength follow-up studies of some starbursts and U/LIRGs in the SUNBIRD survey (a near-infrared survey with the VLT) using state of the art telescopes and instruments such as SALT, MUSE and ALMA. This data will provide powerful insights into feedback processes and the baryon cycle.

Project Goals:
The aim of this project is to study relationship between star formation, gas kinematics and stellar kinematics and using multi-wavelength data. I will work with the candidate to focus on a specific theme in line with their mutual interests and capabilities. A major component of the analysis will be to study the kinematics and optical line ratios in order to determine whether there are gas flows in galaxies and how these relate to star formation and ISM.

Requirements:
The project will mainly focus on analysis of multiwavelength astronomy data, so the student must have some basic programming skills, be comfortable with working in Python and be eager to learn how to use new software.