

Measurement of the DESI Galaxy cluster bulk velocity with kSZ Signals from ACTPol Data Release 4

Measurements of galaxy cluster kinematics have the potential to provide constraints on dark matter modeling and a unique constraint on baryon density in an intracluster medium. During the MSc research, the student will use 1-point statistics to detect the kSZ signal in ACTPol DR4 maps. To obtain the kSZ signal, the student will develop and apply aperture photometry on BOSS NORTH and Deep 56 regions of ACTPol DR4 using galaxy cluster positions from DESI Legacy Survey Imager Data Release 8. With the kSZ signal, a student will estimate the bulk velocity of the galaxy cluster.

Require skill:

- Basic astronomy and cosmology
- Python Programming

Learning outcomes:

- Basic of Large Scale Structures cosmology.
- Cosmic Microwave Background and Kinematic Sunyaev-Zel'dovich Effect
- ACTPol map inspection and analysis
- DESI Galaxy cluster catalogue inspection
- Aperture photometry