

33rd Biweekly Colloquium

March 3, 2022

2:00 - 3:00 pm

SAC - 1041

The role of Galactic Dynamics on Star Formation

The Milky Way, our cosmic residence, is one of the most studied yet enigmatic celestial structures. To understand the formation and evolution of the Galaxy, we require detailed knowledge of the star formation process. To this end, we studied a large sample of 500 star-forming dense molecular clumps near the Galactic center, focussing on a detail understanding of the role of large scale Galactic dynamics on star formation. We obtain that the spectral and physical characteristics of these clumps are strongly coupled with the Galactic dynamics, for instance, i) three clump clusters near the Galactic center are affected by the Galactic bar shock, resulting in their emission line broadening, ii) high mass clumps are mostly located on the Galactic spiral arms, which may be attributed to an impact of spiral density waves, and iii) low mass clumps are ubiquitous on the Galactic plane. In addition, based on the outcomes obtained from spectral analysis, we developed a supervised convolutional neural network that classifies the star forming clumps with 90% accuracy. Currently, we are developing an unsupervised machine learning architecture, a self organising map, to classify molecular clumps based on their spectral distributions on the sky.

Dr. Md. Ali Nawaz



Mohammad Ali Nawaz joined NSU as an Assistant Professor in Fall 2019. He completed MSc and BSc in Physics from the Shahjalal University of Science and Technology, Sylhet, Bangladesh. He received his Ph.D. in Astrophysics from the Australian National University, Australia, in 2015. During his Ph.D., he studied energetics and composition of extragalactic jets and their interaction with the galaxy and cluster through detailed modeling of the inner structure of an iconic radio galaxy Hydra A. Dr. Nawaz was awarded the FAPESP fellowship and started postdoctoral research in Theoretical Astrophysics at the University of Sao Paulo, Brasil, in 2016. He developed an automated software for spectral analysis of a large dataset of star forming molecular clouds while mentoring a Ph.D. student at the University of New South Wales, Australia. His research interests focus on theoretical studies of radio galaxies, formation of high mass stars, structure and dynamics of the Milky Way Galaxy, etc.



Organized by
Department of Mathematics and Physics
North South University
<http://www.northsouth.edu/academic/seps/math-physics.html>