Swarnima Manohar (Caltech, graduate)

Prof Nicholas Z Scoville (Caltech)
Kartik Sheth (NRAO Charlottesville)

Presentation Requested: oral
Category: Other
Question: Other

Molecular Gas in Starburts: Understanding Mergers using High Density Gas Tracers

NGC 6240 and Arp 220 can be considered the founding members of a very active class of objects called Ultraluminous Infrared Galaxies or ULIRGs. They are in different stages of mergers and hence are excellent case studies to enhance our knowledge about the merging process. We have imaged the dense star-forming regions of these galaxies at sub-arcsec resolution with ALMA and CARMA. Multi-band imaging allows multilevel excitation analysis of HCN, HCO+ and CS transitions which will constrain the properties of the gas as a function of position and velocity (across line profiles). We are doing an extensive multilevel excitation analysis of the merger as a function of radius which enables in depth understanding of the gas dynamics and gas properties such as temperature and density. This in turn probes the homogeneity of the gas in the merging system and hence the regions that facilitate high star formation rates. This tandem use of CARMA with ALMA to map these systems at different merger stages will assemble a more integrated picture of the merger process. We are probing the distribution and dynamics of star forming gas and star formation activity in the dense disk structures to enable new theoretical understanding of the physics, dynamics, star formation activity and associated feedback in the most active and rapidly evolving galactic nuclei. Here we present observations of Arp 220 and NGC 6240 from ALMA and CARMA.