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Presentation Requested: oral

Category: Evolution of the Interstellar Medium and Star formation over Cosmic Time

Question: What have we or will we learn about the chemical evolution of galaxies over cosmic time with ALMA, JWST and other telescopes? Is there a metallicity density w/ redshift relationship? What molecular and atomic species have we detected with ALMA and how have they helped us better understand the composition and evolution of galaxies?

A Herschel View on the Star Formation Properties of local Luminous Infrared Galaxies

Luminous Infrared Galaxies, LIRGs, with thermal infrared (IR) dust emission in excess of 10^{11} Lsun, represent a key stage in galaxy formation and evolution. Recent studies have shown that the compactness of the SF is related to the mode through which these galaxies form new stars, both locally and at high-z: a rapid mode for starbursts, and a more quiescent mode for disks, with the starburst mode likely associated with major mergers and compact star formation. I will present results from a complete sample of local LIRGs, the Great Observatories All-sky LIRG Survey (GOALS), which covers the entire interacting sequence of galaxies, from isolated and distant pairs to late stage mergers. I will focus the discussion on the results obtained from our Herschel/PACS survey of the most important far-IR emission lines in the GOALS sample and how they can help us to constrain the properties (density and ionization field intensity) of the Inter-stellar Medium (ISM). I will also talk about our recent findings regarding the [CII]158 μ m emission line – the line that will be systematically used in the following years to study the ISM of IR-luminous galaxies detected at high redshifts in cosmological surveys to be carried out by ALMA.