R40c CO(4–3) & [CI] Observations in ULIRGs with ASTE

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Galaxy merger is a fundamental process that dictates the evolution of galaxies in the Universe. When two gas-rich galaxies interact with each other, the angular momentum of gas decreases because of the tidal torque and gas fall into the central region. This nuclear gas concentration triggers intense star formation. During this processes, the cold gas will rapidly condense, form stars, and subsequently be exposed to radiation pressure from the newly born massive stars. Observationally, we expect that (1) the amount of dense gas with respect to the tenuous molecular gas (dense gas mass fraction), and (2) the physical condition of the gas, to change dramatically.

In order to test this prediction, we carried out CO(4–3) and [CI] line observations using ASTE in two of the brightest southern ULIRGs. The CO(4–3) and [CI] are used for the tracer of the dense gas mass and the bulk H2 gas mass, respectively, and therefore allows us to derive the dense gas mass fraction. The [CI], CO(4–3) and $L_{\rm FIR}$ data along with PDR models will allow us to quantify the density of the gas and the strength of the UV radiation field (G_0) and $n_{\rm H}$ in these galaxies.