R11b The enhancement of dense gas star formation efficiency in merger remnants

植田準子（国立天文台）and Merger remnant study team

Dynamical interactions and mergers between gas-rich disk galaxies can trigger dust-obscured starbursts, resulting in galaxies bright in infrared (IR) luminosity. It has been predicted from numerical simulations that the star formation activity peaks at the final coalescence and then declines. In order to investigate the properties of molecular gas and its relation to star formation at post-merger stages, we obtained the 3 mm wavelength spectra of 28 local merger remnants with the Large Millimeter Telescope. The IR luminosities of our sample range from 10^9 $L_\odot$ to 10^{12} $L_\odot$. Fifteen molecular lines from 13 different molecular species and isotopologues were identified within the frequency range between 73 GHz and 111 GHz.

In this presentation, we focus on the HCN (1–0) line as the dense gas tracer. Seventeen out of 28 sources were detected in the HCN (1–0) line. We estimate the HCN (1–0)/^{12}CO (1–0) luminosity ratios. The HCN/CO ratios of our sample except three sources are below 0.10. This corresponds to the dense gas mass fraction of $<$23% by adapting the standard mass-to-luminosity conversion factors and is comparable to those of nearby galaxies. We also calculate the IR-to-HCN (1–0) luminosity ratios, which is referred to as the dense gas star formation efficiency. Although the ratios vary, the average ratio of the merger remnants is comparable to the late-stage merger and a few times higher compared to disk galaxies and non-merging LIRGs in the local universe. This suggests that the star formation efficiency has been increased by the merging process and does not decrease even after the final coalescence in some cases.