X64a Diversity in Molecular Gas Distribution: ALMA CO(2–1) observations of five ULIRGs at $0.1 < z < 0.5$

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Ultra-luminous infrared galaxies (ULIRGs) represent a phase during which both galaxies and their central supermassive black holes are rapidly growing. However, ULIRGs are rare in the local universe due to the limited comoving volume. The AKARI 90 μm all-sky survey provides a unique sample, consisting of the nearest and brightest ULIRGs at $0.1 < z < 1$. We present our ALMA observations of the CO(2–1) line for five AKARI-selected ULIRGs, with spatial resolution on kpc scales. These galaxies exhibit complex structures not only in their stellar components but also in their molecular gas morphologies, such as double nuclei, gas supply, tidal tails and outflows, indicating that they are in different merger stages. Based on these results, we discuss their evolutionary phases in the context of the local relation between stellar mass and black hole mass.