Probing the spatial distribution of star formation in distant ULIRG with ALMA

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Abstract

Evidence that distant ultra-luminous infrared galaxies (ULIRGs) exhibit a wider range of properties than local ones suggests that the physics involved in these distant highly star-forming systems is not limited to the major merger triggering of compact starbursts as it is locally. The finding of a tight scaling law linking the star-formation rate (SFR) of galaxies to their stellar mass up to z∼3 or more suggests that instead it is extragalactic gas infall that regulates star-formation even in most of these systems. A sample of z∼2 ULIRGs has been selected to be observed during ALMA Cycle 1 (band 7) to probe the projected spatial distribution of star-formation in these galaxies spanning a range of "starburstiness" (excess SFR for their mass at their redshift) and Herschel vs Spitzer color index ($IR8{=}L_{IR}/L_{8\mu m}$) - sensitive to the destructive power of concentrated massive stellar light on PAHs. The goal of this work is not only determine typical sizes, but IR surface brightness, since distant ULIRGs are particularly irregular in shape. This preliminary report will show a comparison of these high-z observations to local ULIRGs, see if they fall on the same relations than those observed for local star-forming galaxies and compare their obscured vs rest-frame UV and optical light to spatially resolve optically thick star-forming regions and better understand the far-IR vs UV relation.