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Star formation activities among galactic structures

Rieko Momose (University of Tokyo, Institute for Cosmic Ray Research), Sachiko K. Okumura (Japan Women's University), Jin Koda (Stony Brook University), Robert C. Kennicutt, Jr (University of Cambridge), Jennifer Donovan Meyer (Stony Brook University), Daniela Calzetti (University of Massachusetts), Guilin Liu (Johns Hopkins University), Fumi Egusa (JAXA)

We present the variety of star formation activities (SFAs: star formation rate, efficiency and the Kennicutt-Schmidt law) among galactic structures (i.e. the nucleus, bar, spiral arms, and inter-arms). We quantified the variety of SFAs among galactic structures in NGC 4303 that active star formation is occurred in the spiral arms, but not in the bar (Momose et al., 2010). These difference is often attributed to the gas dynamics depending on each structure (e.g. shear motion along the bar and galactic shock in the spiral arms). In order to verify the variety of SFAs among structures, we compare them between galactic structures and among galaxies at first time. The difference among structure is large even within a galaxy. This difference, however, becomes less obvious if we analyze the data of all galaxies at the same time. They remains a possible difference between the nuclei and the rest of the structures for both star formation rate surface density and efficiency. We also discuss new indicator of SFAs, the star formation efficiency described in unit of a physical timescale (i.e., $SFE_{tphy} = SFR/[gas\ density]^N$, where N is the index of the Kennicutt-Schmidt law). Comparable SFE_{tphy} among structure suggests star formation mechanism and activities would be little different among structures.