

X36a Analysis of the spatially resolved SFR – stellar mass relation for DustPedia galaxies

Wen E. SHI, Tsutomu T. TAKEUCHI, Suchetha COORAY, Kai T. KONO, Kiyooki Christopher OMORI (Nagoya University)

The majority of star-forming galaxies follow a relatively tight relation between stellar mass and star formation rate (SFR) in a wide range of redshifts. This is known as the star-forming galaxy main sequence (SFMS). Recent studies have shown that the SFR surface density traces the stellar mass surface density in kpc scales. This resolved SFMS indicates the connection between the global SFMS and the local processes.

We made an extensive analysis of the SFMS based on the galaxies in the DustPedia database (Davies et al. 2017), which provides access to multiwavelength imagery and photometry for hundreds of nearby galaxies. The spatially resolved SFR and mass is estimated through various approaches. (Querejeta et al. 2015, Wen et al. 2013, Bigiel et al. 2008, etc.) To make full use of the multi-band data, we also try analyzing with only the observed band data and their observation errors in each spaxel instead of the calculated parameters.

Star formation is a complicated process. We try to use statistical methods to analyze and classify the SFMS, but includes more characteristics of the galaxy. We try identifying the star forming regions with algorithms (K-means, affinity propagation and Fisher-EM etc.), and their relative position inside the galaxy in studied. We study the SFR, mass and band data variance in every spaxel with respect to their distance to the galaxy center. We try to understand the quenching process and star formation mechanism for these galaxies.