

R40a **Superlinear slope of the resolved Kennicutt-Schmidt law**

Rieko Momose (University of Tokyo), Sachiko K. Okumura (NAOJ), 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 a study of the resolved Kennicutt-Schmidt law (K-S law) for 10 nearby spiral galaxies using our new CO(1-0) data that resolve galactic structures at a 500 pc resolution. The CO(1-0) line emission is an established tracer of the molecular gas column density, and results in a super-linear correlation, as opposed to the recent result from CO(2-1). We discuss the cause of the discrepancy and the mechanism of star formation indicated from our new results.

The K-S law (Schmidt 1959; Kennicutt 1998) is a power law correlation between area averaged star formation rate ( $\Sigma_{SFR}$ ) and gas surface density ( $\Sigma_{gas}$ ). Despite its importance, the physics that underlie this correlation have remained unclear. The power law index,  $N$ , is a prime discriminator of the mechanisms that regulate star formation and form the K-S law (e.g. Leroy et al. 2008; Tan 2010). We argue that the CO(2-1) line does not linearly trace the total gas density of molecular comparing to our results based on CO(1-0). The linear correlation from the CO(2-1) study may not indicate the intrinsic relation between star formation and molecular gas.