

An Investigation of CO Luminosity-Linewidth Correlation Among Low and High z Galaxies

Yi-han Wu¹; Tomo Goto¹

¹*National Tsing Hua University, Hsin Chu, Taiwan*

The evolution of dark energy has been an important topic in cosmology. The distance measurement of luminous objects at high z can provide a clue on the evolution.

Galaxies with CO detection can be a reliable tool since the observation can reach to high z ($z > 1$) and the empirical relation between CO luminosity (L_{CO}) and the linewidth (FWHM) has been found. The goal of this study is to investigate (i) the existence of L_{CO} -FWHM correlation and (ii) if L_{CO} -FWHM correlation evolves with respect to z .

We compiled published CO data only in 1-0 transition from the literature, both at low ($0 < z < 0.07$) and high ($z > 1$), redshifts to avoid the uncertainty caused from different CO transitions. Besides, Lambda CDM model was adopted in our analysis. After the considerations of the line width correction and the mu (magnificent factor) correction, we separately established L_{CO} -FWHM correlations with the low and high z samples for comparison. We found that both corrections are quite consistent with power-law relations. Furthermore, the two correlations seems to be compatible, implying no significant evolution of the relation.