

FAST Proposal Coverpage

Last updated: 01/10/2019

Project Name:

(A 1-line title for your project)

Unveiling the HI gas for galaxies in transition from low to high star formation efficiency

Project Summary:

(A 1 paragraph summary of your project, including its scientific goals and how you will address them. This information will be potentially public.)

We are proposing 10 FAST hours to obtain the HI spectra for 10 Herschel and ALMA detected galaxies from our ongoing Valparaiso ALMA/APEX Line Emission Survey (VALES) project. VALES project is supported by state-of-the-art data including low J CO observations (ALMA and APEX), multiwavelength photometry from the UV to the FIR and SDSS, GAMA, Magellan, Palomar, VLT/MUSE spectroscopy (fiber, long slit or AO-IFU), which aims to understand the fundamental relations that control star formation the low redshift galaxies ($0.03 < z < 0.35$). Our previous results have shown that the star formation mode ($SFE' = SFR/M_{H_2}$) of the VALES sample are smoothly transiting from the main sequence galaxies to the ULIRGs, and the bimodality distribution of the star formation mode may be just caused by the selection bias. To (1) understand the star formation process especially the star formation efficiency ($SFE = SFR/(M_{H_2} + M_{HI})$) of the star formation mode transiting galaxies in VALES sample; (2) the dynamical correlation between the atom (HI), the molecule gas (CO) and ionized gas ($H\alpha$) by comparing the emission profile of the HI, CO and $H\alpha$ emission, and (3) H_2 formation efficiency from HI with different dust properties, we still need the HI flux measurement of the VALES galaxies. 80% (70 out of 86 galaxies) of our VALES sample have no nearby SDSS bright galaxy at the same redshifts within the 2.9' FAST L band beam. Therefore, FAST with the small beam size and highly sensitive 19 beam receiver is the ideal telescope for our project.