Proposal Abstract:

We propose to use FAST to observe 118 early-type spiral and S0 galaxies selected from the IFU surveys and with neutral hydrogen (HI) detected with ALFALFA survey. We aim to increase their signal-to-noise ratio in HI detection from 2-10 to >20, thus to obtain reliable HI kinematic data. In combination with our existing 103 galaxies heavily biased to late-type spirals, we will construct a large galaxy sample representative of the nearby universe with high-quality HI and stellar kinematics from IFU observations. By combining the HI and stellar kinematics data, we will be able to obtain, for the first time, reliable measurements of the stellar and dark matter mass distribution within 5Re, thus accurate dark matter fraction for a representative large sample of galaxies. It will provide an important test for the interplay between baryonic matter and dark matter in hydrodynamical cosmological simulations. Our sample will also be unique to investigate the relationship between neutral hydrogen angular momentum and galaxy evolution, the variation of initial stellar mass function of galaxies, and constrain the self-interaction cross-section of dark matter particles.