

Proposal Abstract:

The FAST Ultra-Deep Survey (FUDS) is a deep blind survey, which aims at HI contents and hydroxyl megamasers (OHM) in galaxies over a large redshift coverage. Six 0.72 deg^2 fields will be mapped with a sensitivity of 50 μJy by using the 19-beam receiver. It will be among the most sensitive blind survey for HI and OHM to date. FUDS will produce ~ 1000 HI galaxies and a few tens of OHM, which enable the studies on the evolution of galaxies. Our previous observations have successfully demonstrated the feasibility of FUDS, with a total of 270 HI detections, including 11 high redshift galaxies ($z > 0.38$, at which only one lensed HI galaxy detected so far). Based on the sample, we find an evolutionary trend of HIMF over the last 4.2 Gyr. More samples are needed to further confirm our findings. To reach a high sensitivity of 50 μJy , ~ 114 hours FAST observation time is required for each field. Due to the time limitation for each proposal, we propose 78 hours FAST time to continue our observations on FUDS1 field. The FUDS1 field will increase our sample by another ~ 130 HI detections for studying the evolution of cool gas in galaxies.