Proposal Abstract:

Both VLA and GBT observations have revealed that the majority of compact groups are HI-deficient, with HI mass being approximately 0.2-0.4 dex lower than expected. Furthermore, these observations have demonstrated a clear link between the merger stage of these groups and their HI deficiency, highlighting the importance of HI observations in understanding the evolution of compact groups. Our previous observation of Stephan's quintet using FAST (1sigma~10^17 cm^2) divulged a significant amount of diffuse HI emission, suggesting that the HI-deficient issue may be due to relatively low sensitivity and that there may be a substantial amount of undetected diffuse HI emission within the group. To better understand the origin of HI-deficient, particularly the properties of the diffuse HI component in groups, we propose a 34-hour FAST observation to trace possible extended features in three compact groups in different merger stages. The FAST data will allow us to investigate the kinematics of merging galaxies in these compact groups and search for the cold gas accretion hint. The HI measurements of the UDGs, together with the diffuse HI properties in the fields, will be compared with the HI dynamics from the simulation to study the formation history of these compact galaxy groups.