

Proposal Abstract:

Isolated ultra-diffuse galaxies (UDG) are key to understanding the formation of low-mass galaxies and their associated dark matter halos. J0613+52, serendipitously discovered with the GBT telescope, stands out as a unique target for such studies, with its large amount of atomic gas ($\sim 1.7 \times 10^9 M_{\text{sun}}$) in a 500-kpc span, lack of companions within 110 Mpc, and non-detection of stars down to 25 mag arcsec⁻² at g-band. However, the GBT data is not enough to resolve the spatial and velocity structures of the HI 21-cm emission. We propose to conduct deep HI 21-cm line mapping of J0613+52 and its surrounding region, with FAST. This study will provide a detailed picture of atomic gas distribution and velocity structure, crucial for understanding its formation. Additionally, we aim to identify any extended filamentary structures that may connect the galaxy to the cosmic web, providing further insight into its formation history.