

PID:PT2022_0088

Abstract:

Planck catalog of Galactic Cold Clumps (PGCCs) characterize with lowest dust temperature (10 to 15 K) and nominal column densities (0.1 to $1.6 \times 10^{22} \text{ cm}^{-2}$). They host pristine conditions for the earliest stages of star formation. Since B-field is an essential constituent of the interstellar medium and a crucial ingredient for the star formation process, we have initiated an observing campaign to measure B-field strengths in PGCCs with relatively strong HI narrow self-absorption (HINSA) features. We conducted a HINSA Zeeman experiment towards four PGCCs at L-band using FAST as a previous observing cycle pilot study. Our preliminary analyses reveal the presence of HINSA Zeeman splitting with line-of-sight B-field strengths (B_{los}) of $\sim 5 \text{ } \mu\text{G}$, albeit with a poor signal-to-noise ratio (SNR) ~ 1 . Here we propose to conduct relatively deeper observations of three PGCCs to measure B_{los} with $\text{SNR} > 5$. Estimated B-field strength and the mass-to-flux ratio criticality will shed light on the role of the magnetic field in governing the stability of the cloud. Estimation of Alfvénic Mach number will reveal the importance of B-field in comparison to turbulence in the formation and evolution of PGCCs.