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Abstract:

Magnetic fields play an important role in the evolution of interstellar medium and star formation. Zeeman effect is the only feasible method to directly measure field strength of the interstellar medium, but credible Zeeman measurements remain extremely sparse owing to the lack of suitable Zeeman probes. Up to date, there are only 137 high signal-to-noise ratio Zeeman detections, and there is no direct mapping of the Zeeman effect to provide a distribution of magnetic field strength in the interstellar medium. With the unprecedented sensitivity of FAST and our new Zeeman probe of HI Narrow Self-Absorption (HINSA) (Ching et al. 2022, Nature cover article), here we propose a HINSA and HI Zeeman mapping of the Taurus cloud. The proposed observations will be helpful to reveal a comprehensive picture of how magnetic field flux is diffused during cloud formation and to examine the hypothesis of helical magnetic fields wrapping around filamentary clouds.