

Proposal Abstract:

Magnetic fields play a crucial role in the formation and evolution of molecular clouds and the formation of stars. The orientation and strength of magnetic fields are the decisive parameters in highlighting the evolutionary stage of the gas. The Davis - Chandrasekhar - Fermi (DCF) method is widely used to indirectly estimate the magnetic field strength from the plane-of-sky field orientation and tend to overestimate the strength due to the line-of-sight integration effects. On the other hand, the Zeeman effect is the only method available to directly measure the magnetic fields but subjected to depletion effects using OH and CN lines. None of the methods has been able to bracket the limits of the magnetic field strength accurately. A new Zeeman tracer, HI Narrow Self-absorption (HINSA) can serve as the better diagnostic to measure the magnetic field strength due to not being depleted and high line strength. We propose to carry out high-sensitivity Zeeman HINSA observations towards the sources with strength estimated using DCF method. We plan to better constrain the uncertainties on the field strength using our proposed sample and address the stability of the clouds with better accuracy and test the models of the magnetic field strength.