

High resolution HI gas kinematics in Lupus I

Abstract

Lupus I is an exceptionally low-density star-forming cloud that appears presently in an active star-forming phase. The cloud is likely formed by colliding flows powered by two OB clusters, which is manifested by signs of turbulence in the magnetic field, and a large scale velocity gradient in molecular and HI gas. In fact, previous studies indicate that a significant part of the mass of Lupus I may still be in atomic hydrogen, making HI an interesting spectral line to study also small scale gas kinematics around prestellar cores, especially when combined with molecular line data to obtain a complete view of the gas kinematics. The currently existing HI data of Lupus I are part of the all-sky HI4PI survey, but are too low in spatial and spectral resolution to study prestellar cores and their environments. We propose to observe the first high angular and spectral resolution HI mosaic of Lupus I with Meerkat, to study the full (atomic and molecular) gas kinematics around the prestellar cores by comparing the HI with archival and literature molecular line data (at similar resolutions). We will determine the HI column density at ~ 0.01 parsec scales, allowing a detailed correlation with H₂ column densities from Herschel to reveal the gas distribution around prestellar cores and search for potential gravitational signatures in the column density distribution.