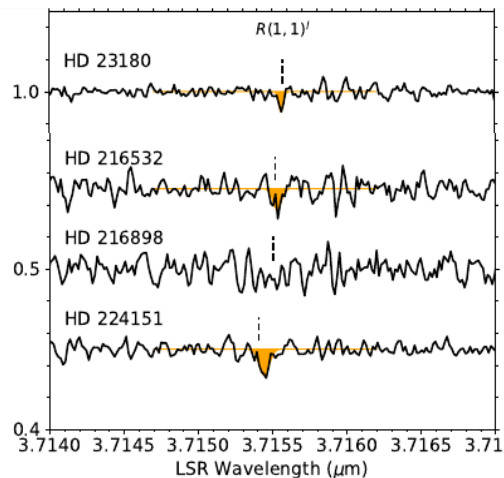
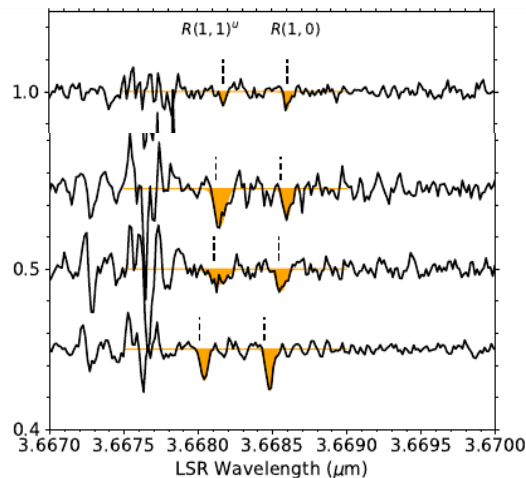
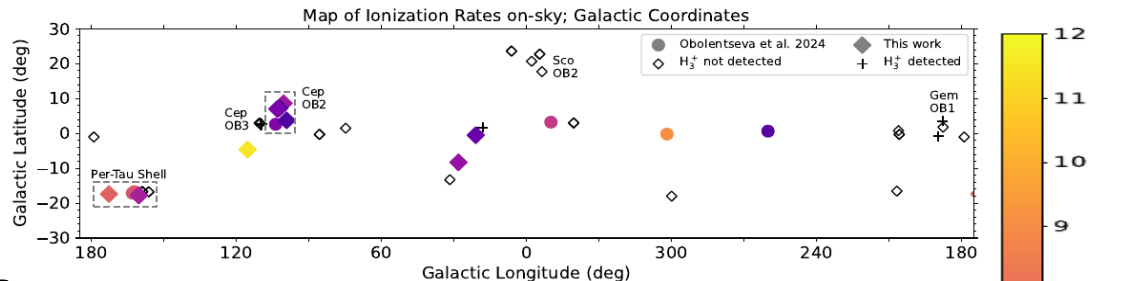


Mapping the Cosmic-Ray Ionization Rate with H_3^+

Molecules in diffuse clouds form by ion-molecule chemistry. Cosmic-ray (CR) ionization rate (of H_2) is a critical parameter.

- H_3^+ molecule traces CR ionization rate
- IRTF/iSHELL L -band spectra detect H_3^+ lines



- High resolving power ($\sim 80,000$) and continuum S/N ($\gg 100$) are critical
- H_3^+ detected in 12 out of 27 sight-lines
- Derived CR ionization rates:
 - uniform over ~ 10 pc scales
 - factor ~ 5 variations on ~ 100 pc scales
- Variations in galactic disk likely due to proximity to supernova remnants.