

Technical Page

Proposal Type: Regular
 General Category: Astronomy
 Sub-Category: Spectroscopy
 Observation Category: Galactic
 Total Time Requested: 41 Hours

Proposal Title: Understanding Molecular Cloud Structure Through Observations of Atomic Hydrogen

ABSTRACT:

We propose to follow up on previous Arecibo Results by Li and Goldsmith 2002, which revealed that most nearby dark clouds show HI narrow line absorption (HINLA) against the general Galactic background. The results to date indicate that the fractional abundance of cold HI is about an order of magnitude larger than predicted by steady state grain formation-cosmic ray destruction of H₂. This would have significant impact on overall chemical and possibly kinematic models of dark clouds, if, e.g. turbulent diffusion (already proposed as possible explanation) is significant. We request time to make large scale (30' x 30') maps of 9 clouds (with one, TMC1 requiring a map having twice as many points). We will use the new L-wide receiver and observe HI and OH simultaneously in "ON" integrations only. The result should be reliable estimates of the HI number density which can directly be compared to theoretical predictions, to assess the viability of various explanations of "excess" HI in dark cloud cores.

Name	Institution	E-mail	Phone	Student
Paul F Goldsmith	Cornell University	pfg@astro.cornell.edu	607 255-0606	no

Service Observing Request

- None
- All of the observing run.
- Part of the observing run.
- Queue Observing

Remote Observing Request

- No
- Maybe
- Yes

Instrument Setup

L-wide

Atmospheric Observation Instruments:

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned