

### Technical Page

Proposal Type: Regular  
 General Category: Astronomy  
 Sub-Category: Spectroscopy  
 Observation Category: Galactic  
 Total Time Requested: 40 Hours

**Proposal Title:** DI in the Most Deuterated Known Molecular Cloud: A Key to Understanding Deuterium Astrochemistry

**ABSTRACT:**

We propose to observe DI at 327 MHz most deuterated known molecular cloud (NGC 1333) in which ND<sub>3</sub>, D<sub>2</sub>S, ND<sub>2</sub>H, D<sub>2</sub>CO, CHD<sub>2</sub>OH, and CD<sub>3</sub>OH have been detected. Gas-phase and grain-models predict that DI/HI = 0.1 - 0.4 in this unusual cloud. The column density of DI is predicted to be 10 - 100 times the column densities in any Galactic HI region. Thus we should be able to confirm our detection at the 5 sigma level. We will compare models that predict that deuterated molecules come from the gas-phase reactions or from the evaporation of grain mantles. Knowledge of the column densities of both D, H, and deuterated molecules in this cloud will allow us to determine their physical properties (T and density) and to constrain astrochemistry models. We will also estimate the underlying D/H ratio NGC 1333. If we do not detect DI, then the doubly and triply deuterated molecules cannot come from the gas-phase reactions and must result from the evaporation of grain mantles

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**Service Observing Request**

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

**Remote Observing Request**

- No
- Maybe
- Yes

**Instrument Setup**

327

**Atmospheric Observation Instruments:**

**Special Equipment or setup:** none

**RFI Considerations**

## Frequency Ranges Planned