Technical Page

Proposal Type: Regular
General Category: Astronomy
Sub-Category: Spectroscopy
Observation Category: Galactic
Total Time Requested: 27 Hours

Proposal Title: H$_2$CO-6 cm Emission as a Probe for Dense and Cold Molecular Cores

ABSTRACT:

Formaldehyde has been successfully used as a probe of physical conditions in dense molecular clouds. Theoretical models have shown that the 6 cm “K-doublet” transition of this molecule turns to emission at densities larger than $\approx 10^6$ cm$^{-3}$ within cold molecular clouds. We have selected a sample of 10 dense ($> 10^6$ cm$^{-3}$) and cold ($\approx 15$ K) regions to check for the viability of this molecular transition as density tracer. The Arecibo Telescope is the ideal instrument to undertake this search due to its large sensitivity (we look for thermal emission within regions at more than 1 kpc) and small beamwidth (critical property to reduce the presence of absorption features in the spectra). This work is intended to be a pilot project for extended Arecibo surveys to look for the youngest places of pre/current star formation.

<table>
<thead>
<tr>
<th>Name</th>
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<th>Student</th>
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<tbody>
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Service Observing Request

Remote Observing Request

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

- [X] No
- [ ] Maybe
- [ ] Yes

Instrument Setup

C

Atmospheric Observation Instruments:

Special Equipment or setup: none

RFI Considerations
Frequency Ranges Planned

4820 - 4840