Technical Page

Proposal Type:	Regular
General Category:	Astronomy
Sub-Category:	Spectroscopy
Observation Category:	
Total Time Requested:	66 Hours
Minimum Useful Time:	2h

Proposal Title: Densitometry of star-forming dusty clumps throughout the Galaxy

ABSTRACT:

We propose to obtain measurements of the dense mass fraction of young star-forming complexes in a variety of Galactic environments using beam-matched formaldehyde absorption line observations on the GBT at 2 cm and Arecibo at 6 cm. The pilot program GBT09C-049, combined with archival Arecibo data, demonstrated the possibility of efficiently measuring dense gas mass fractions in Galactic molecular clumps with the GBT and Arecibo. We propose to expand that initial sample of 22 ultracompact HII regions to 409 clumps in a wide range of evolutionary states, including inactive and star-forming infrared dark clouds, HII regions, and filamentary structures. We will use formaldehyde densitometry to measure the density and dense gas mass fraction in these 409 clumps. These measurements will be used to track the evolutionary path of molecular clumps intermediate between giant molecular clouds and protostellar cores, and the large sample size will allow us to estimate the relative lifetimes of each state. The GBT observations have already been approved, but completion of this project depends critically on the Arecibo data.

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Remote Observing Request

[X]	Observer will travel to AO
[ ]	Remote Observing
[ ]	In Absentia (instructions to operator)

Instrument Setup

C

Atmospheric Observation Instruments:

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned

4818 - 4840
4582 - 4604
5414 - 5586
5114 - 5286
4664 - 4836
4544 - 4716
4412 - 4584