

Technical Page

Proposal Type: Regular
 General Category: Astronomy
 Sub-Category: Spectroscopy
 Observation Category: Galactic
 Total Time Requested: 100 Hours

Proposal Title: Stalking the Cosmic 3-Helium Abundance

ABSTRACT:

We propose to use Arecibo to derive ^3He abundances in Galactic planetary nebulae (PNe). The cosmic abundance of the ^3He isotope has important implications. ^3He can be used to test the theory of stellar nucleosynthesis; it gives important limits on models of Galactic chemical evolution; it can help constrain Big Bang Nucleosynthesis. We use the hyperfine transition of ^3He at 8665 MHz to derive ^3He abundances in Galactic HII regions and PNe. We find a lack of substantial ^3He enrichment in the Milky Way interstellar medium which in turn means that the bulk of solar mass stars do not return significant quantities of ^3He to the ISM. This conclusion is based on a small (6 sources) PNe sample which needs to be expanded. Arecibo's superior X-band gain together with its ~30 arcsec beam (an excellent match to many Galactic PN sizes) makes it the instrument of choice for this program.

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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

X-high

Atmospheric Observation Instruments:

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned