

## Technical Page

Proposal Type: Regular  
 General Category: Astronomy  
 Sub-Category: Spectroscopy  
 Observation Category: Galactic  
 Total Time Requested: 14 Hours  
 Minimum Useful Time: 1 hr

**Proposal Title:** Are Infrared Bubbles Actually Rings?

**ABSTRACT:**

It has recently been questioned whether the interstellar “IR bubbles”, of which Churchwell et al. cataloged  $\approx 600$ , are 3D shells or 2D rings seen approximately face-on. This has important implications for the structure of molecular clouds. We propose a test between these two hypotheses. The associated HII regions would evolve differently depending upon how they are confined, possessing bipolar structures with expanding lobes in the ring case, but smaller, spherical forms, with slower expansion, for a surrounding shell. We propose observing 16 “IR bubbles” at C-band, simultaneously recording 8  $H\alpha$  lines to search for the broad/double lines from the HII regions predicted by the ring hypothesis. Numerous other recombination and molecular lines will also be recorded, allowing investigation of both the ionized gas and the surrounding molecular shells. Combining the formaldehyde and  $H\alpha$  spectra can distinguish between near and far kinetic distances for the individual nebulae.

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### Remote Observing Request

- 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**

4350 - 5350