

## Technical Page

Proposal Type: Regular  
 General Category: Astronomy  
 Sub-Category: Spectroscopy  
 Observation Category: Extragalactic  
 Total Time Requested: 36 Hours  
 Minimum Useful Time: 1 hr

**Proposal Title:** A Cm-wavelength Search for Prebiotic (and Other) Molecules in Arp 220-like Starburst Galaxies

*ABSTRACT:*

Our on-going Arecibo line search (Project A2234) of the prototypical starburst/megamaser galaxy, Arp 220, has revealed a spectrum rich in molecular transitions. These include the “pre-biotic” molecules, methanimine (CH<sub>2</sub>NH) in emission, three v<sub>2</sub>=1 absorption lines of HCN, and possibly formic acid (HCOOH). In particular, the (rest) frequency range 4450-5300 MHz contains methanimine, formaldehyde, CH and formamide (NH<sub>2</sub>CHO) in emission, plus HCN (v<sub>2</sub>=1, J=4) and three lines of excited-OH in absorption. Our results mark the first distant extragalactic detection of methanimine, a molecule with high relevance to the origins of life. Further, the strong, but previously undetected, cm-wave HCN v<sub>2</sub>=1 direct l-type lines can aid the study of dense molecular gas and active star-forming regions in starburst galaxies. Consequently, we now propose observing the 4450-5300 MHz band towards 21 “Arp-220”-like galaxies, chosen such that emission and absorption lines of the strength found in Arp 220 would be clearly detected in them.

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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**

4450-5300