

## Technical Page

This proposal has not been submitted before.

Proposal Type: Regular  
 General Category: Pulsars  
 Observation Category: Galactic  
 Total Time Requested: 12 Hours  
 Minimum Useful Time: 2 hours

**Proposal Title:** The extreme lensing of the Black Widow’s radio eclipse

*ABSTRACT:*

PSR B1957+20, the original black widow pulsar, is in a close binary orbit with its ablated brown dwarf companion. The pulsar is eclipsed in the radio by absorption from material associated with the companion’s outflow. In previous Arecibo observations of B1957+20 at P-band, we discovered extreme lensing events associated with the eclipsing material immediately before and after the full eclipse. The lensing events show many exciting properties; they are highly magnified, chromatic, and clearly resolve the pulsar’s magnetosphere. We propose to study this further, observing two eclipses each at 327 MHz, 430 MHz, and 1200 MHz. The end goal is to put a physical scales on the emission locations, with multiple frequency bands probing different regions of the outflow due to the strong frequency dependence of refraction, and giving a much larger dynamical range to compare with our predictions from plasma lensing.

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### Remote Observing Request

- Observer will travel to AO
- Remote Observing
- In Absentia (instructions to operator)

### Instrument Setup

430 G                      L-wide                      327

### Atmospheric Observation Instruments:

**Special Equipment or setup:** none

## **RFI Considerations**

### **Frequency Ranges Planned**

302 - 352

420 - 430

1120 - 1220

1320 - 1420

1420 - 1620