

Technical Page

Proposal Type: Regular
 General Category: Pulsars
 Observation Category: Pulsar Timing
 Total Time Requested: 33 Hours
 Minimum Useful Time: 1 hour

Proposal Title: Measuring Two Neutron-Star Masses Using Shapiro Delay

ABSTRACT:

We request 33hr of Arecibo time in order to measure the Shapiro delay in two PALFA-discovered binary pulsars: the 20-ms pulsar PSR J1952+2630, and the 13-ms pulsar PSR J1949+3106. Shapiro delay measurements will permit precision determinations of the pulsar (and likely white-dwarf companion) masses. Measuring neutron-star masses in particular is important both for determining the distribution of neutron-star masses in general, as well as for constraining the dense matter equation of state (EOS). The latter was recently done by measuring a surprisingly large mass of $2\tilde{M}_{\odot}$ for a different binary pulsar, which was highly constraining of the EOS (Demorest et al. 2010, Nature, 467, 1081), emphasizing the importance of additional such measurements for doing fundamental physics inaccessible in terrestrial laboratories.

Name	Institution	E-mail	Phone	Student
Patrick Lazarus	McGill University	plazar@physics.mcgill.ca	+1-514-398-7032	G

Remote Observing Request

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

Instrument Setup

L-wide

Atmospheric Observation Instruments:

Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned

1100-1800

This proposal requires Iridium RFI protection at 1612 MHz between 10pm and 6am EST.

This proposal requires coordination with Punta Salinas radar within the band 1222-1381 MHz..

This proposal requires coordination with GPS L3 at 1381 MHz.