

Arecibo Observatory
William E. Gordon Telescope
Observing Time Request
COVER SHEET

Section I - General Information

Submitted for Mar 1 2015.

This proposal has been submitted before.

The previous proposal number is P2789.

Proposal Type:	Regular
General Category:	Pulsars
Observation Category:	Galactic
Time Requested this semester:	55
Hours Next Semester:	31.5
Hours already used for this project:	123
Additional Hours required to complete project:	
Minimum Useful Time:	1 hour
Expected Data Storage:	less than 100 GB

Proposal Title: Timing of pulsars discovered by the PALFA survey

ABSTRACT:

We request a total of 87 hours over the course of a year. We wish to derive precision timing solutions for 14 pulsars and Rotating Radio Transients (RRATs) found in the PALFA survey, in order to determine astrometry, spin, and binary parameters, and hence fundamental properties such as ages, magnetic fields, and spin-down luminosities. Three of these are binary pulsars, 9 are RRATs, and 2 are long-period pulsars. We wish to continue regular monthly timing observations of the MSPs, to obtain significant measurements of their spin and astrometric properties, and reduce covariances between parameters. We additionally require a dense observing campaign for the long-period pulsars and the 4 RRATs with repeated pulsations to obtain phase-coherent ephemerides, and of one MSP to attempt Shapiro delay detection. Finally, we request monthly observations of highly-intermittent RRATs, to better characterize these sources and derive implications for the Galactic neutron-star population.

Outreach Abstract:

Pulsars are the neutron-star remnants of massive stars that have died in a supernova explosion. They rotate very rapidly – the fastest known spins approximately 700 times per second! Pulsars emit radio beams that we see at every rotation, as with a lighthouse. These rotations can be counted very precisely, and this is what we aim to accomplish with the data from the 18 pulsars proposed in this project, which were discovered by the ALFA pulsar survey. We wish to precisely determine properties of these pulsars, such as their ages and magnetic field strengths, and allow us to study the neutron star population as a whole. Some of these are in orbit with unseen companions – these observations may enable us to describe these orbits. These observations may lead to tests of Einstein’s theory of relativity, and the study of extreme matter that makes up the interiors of these stars.

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This work is part of both a PhD and a MS thesis.

Remote Observing Request

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

Section II - Time Request

The following times are in LST.

For these observations night-time is not needed.

Begin – End Interval–Interval	Days Needed at This Interval
18:02 – 20:17	6
17:58 – 20:58	14
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Time Constraints (Must Be Justified in the Proposal Text)

The first set of observation sessions require monthly scheduling.

For the second set of observations, we require special observing cadence, and request a dense campaign to be scheduled at a specific time for scientific reasons. Please see the scientific justification for a detailed explanation.

Next Semester Time Request

Begin – End Interval–Interval	Days Needed at This Interval
18:02 – 20:17	6
17:58 – 20:58	6
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Time Constraints (Must Be Justified in the Proposal Text)

We require the same LST constraints as in first semester, but only require monthly observations for both sets of observations in the second semester.

Section III - Instruments Needed

L-wide S-low

Atmospheric Observation Instruments:

Description of Observer Equipment: We will use the PUPPI backend.

Special Equipment or setup: none

Section IV - RFI Considerations

Frequency Ranges Planned

1180-1780

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.

Section V - Observing List

Target List

RRAT J1849+01 18:49:00.0 01:00:00.0 18:11:43 19:27:49
RRAT J1905+0849 19:05:00.0 08:49:00.0 17:54:40 20:16:47
RRAT J1906+03 19:06:00.0 03:00:00.0 18:16:17 19:57:13
PSR J1910+07 19:10:00.0 07:00:00.0 18:04:34 20:16:54
PSR J1911+10 19:11:00.0 10:00:00.0 17:58:00 20:25:25
RRAT J1912+0829 19:12:00.0 08:29:00.0 18:02:29 20:22:58
PSR J1913+0617 19:13:00.0 06:17:00.0 18:09:49 20:17:39
RRAT J1914+0625 19:14:00.0 06:25:00.0 18:10:23 20:19:05
RRAT J1915+0639 19:15:00.0 06:39:00.0 18:10:38 20:20:50
RRAT J1917+11 19:17:00.0 11:00:00.0 18:02:03 20:33:22
RRAT J1928+15 19:28:00.0 15:00:00.0 18:07:35 20:49:47
RRAT J1928+1725 19:28:00.0 17:25:00.0 18:05:57 20:51:24
PSR J1932+17 19:32:00.0 17:00:00.0 18:10:09 20:55:12
PSR J1937+16 19:37:00.0 16:00:00.0 18:15:46 20:59:36