

Proposal Identification No.: P2859

Date Received: 2013-Aug-30_13:34:34

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

Section I - General Information

Submitted for Sep 1 2013.

This proposal has not been submitted before.

Proposal Type:	Regular
General Category:	Pulsars
Observation Category:	Galactic
Time Requested this semester:	40
Hours Next Semester:	18
Hours already used for this project:	0
Additional Hours required to complete project:	
Minimum Useful Time:	1.5 h
Expected Data Storage:	100-500 GB

Proposal Title: Timing Five Millisecond Pulsars Found in Fermi Unidentified Sources

ABSTRACT:

We propose timing observations over a span of one year of five binary millisecond pulsars found in Fermi gamma-ray unidentified sources. Obtaining ephemerides for these sources will allow us to check for the presence of gamma-ray pulses by folding Fermi photon data. Pulsars emitting in both radio and gamma rays offer a window into the pulsar emission mechanism simultaneously at two different energy bands. Timing observations will also allow us to assess the suitability of these pulsars for inclusion in Pulsar Timing Arrays and tests of theories of gravity.

Outreach Abstract:

We will study five stars that give off two different types of light invisible to the human eye. One of these types of light is radio waves and the other is gamma rays. The five stars belong to a type called pulsars because they spin very fast (hundreds of times per second) in a manner similar to lighthouses and emit a pulse on each rotation. Observations with the Arecibo telescope will help us understand how pulsars generate the radio waves and gamma rays they emit.

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This work is not part of a 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
1700 – 2200	14
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Time Constraints (Must Be Justified in the Proposal Text)

In order of scheduling:

2 gridding sessions: 3.5h and 2.5h (ALFA)

Starting at least a week later (L-wide or 327MHz, TBD by the gridding sessions):

3 sessions of 3h each on successive days

1 session of 3h a week later

1 session of 3h two weeks later

11 monthly sessions of 3h each thereafter

When PI indicates that superior conjunction times of the eclipsing pulsar J2052+12 can be determined (most likely within the first couple of months of the timing campaign):
 2 sessions of 2h each centered on superior conjunction (327MHz, 430MHz, or L-wide; TBD two frequencies different than the frequency used for timing)

Next Semester Time Request

Begin – End Interval–Interval	Days Needed at This Interval
1700 – 2200	6
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Time Constraints (Must Be Justified in the Proposal Text)

One 3 h session per month.

Section III - Instruments Needed

430 G L-wide 327 ALFA

Atmospheric Observation Instruments:

Special Equipment or setup: See description above of constraints on days/sessions requested.

Section IV - RFI Considerations

Frequency Ranges Planned

- 1150 - 1730
- 302 - 352
- 422 - 442

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

Source Name	Ra(hh:mm:ss.s)	Dec(dd:mm:ss.s)	RiseTime	TransitTime	SetTime
J1805+06	18:05:54.0	06:14:15.0	17:02:53	18:06:35	19:10:18
J1824+10	18:24:05.0	10:17:27.0	17:10:28	18:24:45	19:39:02
J1909+21	19:09:32.0	21:02:56.0	17:47:14	19:10:09	20:33:04
J2042+02	20:42:19.0	02:49:46.0	19:53:18	20:43:02	21:32:47
J2052+12	20:52:47.0	12:17:51.0	19:35:36	20:53:28	22:11:20