

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

Section I - General Information

Submitted for Sep 1 2013.

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:	31
Hours Next Semester:	21
Hours already used for this project:	36
Additional Hours required to complete project:	
Minimum Useful Time:	0.5 minutes
Expected Data Storage:	less than 100 GB

Proposal Title: Timing of pulsars discovered by the PALFA survey

ABSTRACT:

We request a total of 52 hours over the course of a year for timing observations of 12 pulsars. Of these, we wish to derive precision timing solutions for four pulsars discovered in the PALFA survey in the last 6 months, in order to determine spin and binary parameters, and hence fundamental properties such as astrometry, ages, magnetic fields, and spin-down luminosities. We also wish to continue to monitor several pulsars already part of this and other (now completed) observing campaigns. Seven of the proposed sources are millisecond and/or binary pulsars, each with particular science potential, two are transient emitters (RRATs), two are long-period pulsars vital for population and Galactic studies, one of which may be a candidate intermittent pulsar. Finally, there is one young pulsar whose precision spin model will be required to search for a pulsed counterpart in Fermi telescope observations.

Outreach Abstract:

Pulsars are the neutron-star remnants of massive stars that have died in a supernova explosion. They spin very quickly – up to hundreds of times every second – and emit radio beams as a lighthouse, which we see at every rotation. These rotations can be counted very precisely; this is our aim for the 13 pulsars proposed in this project, discovered by the ALFA pulsar survey. These observations are needed to precisely determine the properties of these pulsars, including their ages and magnetic field strengths. Some of these pulsars are in orbit with unseen companion stars – with these observations, we will be able to describe these orbits as well. Several of these objects will allow us to perform tests of Einstein’s theory of relativity, and perhaps study the matter that make up these stars. In general, they will also allow the study the neutron star population as a whole.

Name	Institution	E-mail	Phone	Student
Robert D Ferdman	McGill University	rferdman@physics.mcgill.ca	+1 514 398 6520	no
Ingrid H Stairs	University of British Columbia	stairs@astro.ubc.ca	+1 604 822 6796	no

Additional Authors

B. Allen; bruce.allen@aei.mpg.de	P. Freire; pfreire@mpifr-bonn.mpg.de	A. Lyne; agl@jb.man.ac.uk
S. Bogdanov; slavko@astro.columbia.edu	J. Hessels; J.W.T.Hessels@uva.nl	M. McLaughlin; maura.mclaughlin@mail.wvu.edu
A. Brazier; abrazier@astro.cornell.edu	V. Kaspi; vkaspi@physics.mcgill.ca	S. Ransom; sransom@nrao.edu
F. Camilo; camilo@naic.edu	B. Knispel; Benjamin.Knispel@aei.mpg.de	P. Scholz; pscholz@physics.mcgill.ca (grad student)
F. Cardoso; rcardoso@mix.wvu.edu (grad student)	P. Lazarus; plazarus@mipfr-bonn.mpg.de (grad student)	L. Spitler; laura.spitler@gmail.com
S. Chatterjee; shami@astro.cornell.edu	J. van Leeuwen; leeuwen@astron.nl	K. Stovall; stovall.kevin@gmail.com
J. Cordes; cordes@astro.cornell.edu	D. Lorimer; Duncan.Lorimer@mail.wvu.edu	J. Swiggum; swiggumj@gmail.com (grad student)
F. Crawford; fcrawfor@fandm.edu	R. Lynch; rlynch@physics.mcgill.ca	W. Zhu; zhuww@phas.ubc.ca
J. Deneva; deneva@naic.edu		Full list at: http://www.naic.edu/deneva/palfa/

This work is part of a PhD 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
05:45 – 06:15	6
18:26 – 20:00	6
19:10 – 20:18	14
–	

Time Constraints (Must Be Justified in the Proposal Text)

One of our sources (PSR J0557+1551) is found toward the Galactic anticenter, and so will have to be scheduled separately.

The second set of constraints are for sources for which we only require monthly monitoring this semester. They are observed differently from the third set, which are newly discovered pulsars, and so to make observing more efficient, we divide them into separate sets.

For the first month of this semester, the third set requires special observing cadence. Please see the scientific justification for further explanation.

Note: the minimum useful single session time noted below represents the amount needed to observe only one pulsar in our source list for the typical length for this project.

Next Semester Time Request

Begin – End Interval–Interval	Days Needed at This Interval
05:45 – 06:15	6
18:26 – 20:00	6
19:10 – 20:18	6
–	

Time Constraints (Must Be Justified in the Proposal Text)

We require the same constraints as in first semester, except the third set only requires monthly observations in the second semester.

Section III - Instruments Needed

L-wide

Atmospheric Observation Instruments:

Special Equipment or setup: We will use the PUPPI backend.

Section IV - RFI Considerations

Frequency Ranges Planned

1180-1780

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

PSR J0557+1551

PSR J1902+0300

PSR J1905+04

PSR J1906+0055

PSR J1911+09

PSR J1913+1102

PSR J1925+1721

PSR J1957+25

RRAT J1906+03

PSR J1943+2210

PSR J1952+25

RRAT J2010+3146