Technical Page

Proposal Type: Regular
General Category: Pulsars
Sub-Category: Continuum
Observation Category: Galactic
Total Time Requested: 15 Hours

Proposal Title: TIMING AND POLARIMETRY OF THE NEWLY DISCOVERED YOUNG PULSAR J2021+3651

ABSTRACT:

PSR J2021+3651 is a 104-ms pulsar discovered in observations made by our group in the recent Arecibo proposal P1556. This pulsar will be highlighted in a discovery paper we have submitted to the Astrophysical Journal Letters (Roberts et al. 2002). We now request 15 hours of telescope time during the next year to determine a timing solution for this pulsar and to perform polarimetry. PSR J2021+3651 is a young ($\tau_c \sim 17$ kyr) and energetic ($3.4 \times 10^{36}$ ergs/s) pulsar whose position, currently known only within the Arecibo beam width, is consistent with the position of the hard X-ray source AX J2021.1+3651 and the error box of the EGRET $\gamma$-ray source GeV 2020+3658. The dispersion measure $DM = 371$ pc cm$^{-3}$ is by far the highest of any observed pulsar in the Galactic longitude range $55^\circ < l < 80^\circ$. This DM suggests a distance $d > 10$ kpc, and a high $\gamma$-ray efficiency of $\sim 15\%$. Timing of PSR J2021+3651 will improve our values of period and period derivative, provide a precise position, and will allow us to search for glitches. Polarimetry will show if, like other young pulsars, this pulsar has a high degree of linear polarization, and may help constrain the distance.

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>E-mail</th>
<th>Phone</th>
<th>Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mallory S.E. Roberts</td>
<td>McGill University</td>
<td><a href="mailto:roberts@physics.mcgill.ca">roberts@physics.mcgill.ca</a></td>
<td>514-398-6520</td>
<td>no</td>
</tr>
</tbody>
</table>

Service Observing Request

- [x] None
- [ ] All of the observing run.
- [ ] Part of the observing run.
- [ ] Queue Observing

Remote Observing Request

- [ ] No
- [ ] Maybe
- [x] Yes

Instrument Setup

430 G L-wide S-low

Atmospheric Observation Instruments:
Special Equipment or setup: none

RFI Considerations

Frequency Ranges Planned

1350 - 1475

This proposal requires coordination with Punta Salinas radar within the band 1222-1381 MHz.
This proposal requires coordination with GPS L3 at 1381 MHz.