This proposal has not been submitted before.

Proposal Type: Regular
General Category: Pulsars
Observation Category: Galactic
Total Time Requested: 15 Hours
Minimum Useful Time: 30 minutes

Proposal Title: Confirming the Fastest Pulsar Candidates Detected by the PALFA Pulsar Survey

ABSTRACT:
Sub-millisecond pulsars are objects of great interest as they offer the opportunity of eliminating many theories of the equation-of-state of ultradense matter, which predict maximum rotation rates of neutron stars. Detecting such sources is extremely challenging due to observational biases, including the effects of the interstellar medium and binary eclipsing and acceleration. The PALFA pulsar survey has the greatest chances of any pre-SKA survey of finding sub-millisecond pulsars. Based on characteristics of both the folded signal and the Fourier power spectrum of fast millisecond pulsars previously detected by the survey, we selected a set of 22 targets that are the most likely to be astrophysical. We propose to observe these 18 sub-millisecond pulsar candidates with Arecibo. Confirming one or more sources would have significant impacts on nuclear and particle physics as well as neutron-star astrophysics as it would highly constrain the unknown equation-of-state for neutron stars.

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>E-mail</th>
<th>Phone</th>
<th>Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emilie Parent</td>
<td>McGill University</td>
<td><a href="mailto:parente@physics.mcgill.ca">parente@physics.mcgill.ca</a></td>
<td>1 (819) 520-0324</td>
<td>G</td>
</tr>
</tbody>
</table>

Remote Observing Request

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

Instrument Setup

- L-wide

Atmospheric Observation Instruments:

Special Equipment or setup: none
RFI Considerations

Frequency Ranges Planned

L-wide: 1150-1730

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.