Technical Page

Proposal Type: Large
General Category: Pulsars
Observation Category: Extragalactic
Total Time Requested: 510 Hours
Minimum Useful Time: 2 hours

Proposal Title: Detecting nHz Gravitational Radiation using a Pulsar Timing Array

ABSTRACT:
Direct detection of gravitational radiation (GR) is a major goal in experimental physics and will revolutionize astrophysics, opening an entirely new spectrum for exploration. Pulsar timing is sensitive to GR with periods comparable to the experiment duration (nanohertz frequencies). The nHz GR signal is expected to be dominated by the stochastic background of massive black hole binaries. For the past four years our group has performed regular observations of a set of 17 pulsars, with the goal of obtaining very high-precision (<1 us) timing. We propose to continue this long term precision pulsar timing project for the next three years, through 2012, on an expanded list of sources. The three additional years of measurement being proposed here, when combined with data from our previous observations, will provide the best detection sensitivity to nHz-regime gravitational radiation ever achieved. This proposal is submitted by the authors on behalf of the entire NANOGrav collaboration.

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
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<tbody>
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Remote Observing Request

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

Instrument Setup

430 G L-wide S-low 327

Atmospheric Observation Instruments:

Description of Observer Equipment: ASP pulsar backend

Special Equipment or setup: none
RFI Considerations

Frequency Ranges Planned

310-350
420-440
1120-1620
2300-3000

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