Proposal Identification No.: P2067 Date Received: 2005-Feb-01 21:58:55

Technical Page

Proposal Type:	Regular
General Category:	Pulsars
Observation Category:	Galactic
Total Time Requested:	8 Hours

Proposal Title: Estimation of Pulse Arrival Times for PSR B1937+21 Using Interstellar Holography

ABSTRACT:

The millisecond pulsar B1937+21 is observed along a line of sight where refraction and diffraction in the ionised interstellar medium limit our ability to determine accurate pulse arrival times at low frequencies where the signal is strongest. We have developed a new technique for quantifying the timing error due to interstellar scattering, based on decomposition of the dynamic spectrum into its constituent wave field components. The dynamic spectrum contains information on the phase relationships between the various scattered waves – it is a hologram of the scattering centres – as well as their amplitude, Doppler-shift and delay (relative to the unscattered wave). B1937+21 is important test case to develop this technique owing to its strength as well as the presence of giant pulses which provide further information. We will record voltage samples over a wide-bandwidth and construct high resolution dynamic spectra and pulse TOAs off-line. We will monitor the source at 430M̃Hz, and our corrected pulse TOAs will be compared to the emphemeris generated from L-band timing data obtained in our regular timing programs.

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Service Observing Request

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

Remot e Observing Request

- [ ] No
- [X] Maybe
- [ ] Yes

Instrument Setup

430 G 430 CH receiver

Atmospheric Observation Instruments:

Special Equipment or setup: We will be using either the Gregorian feed at 430 MHz, or the line feed, depending on interference level and other runtime factors. We will be using the ASP backend for our observations.

RFI Considerations

Frequency Ranges Planned