

Technical Page

Proposal Type: Regular
 General Category: Pulsars
 Sub-Category: Continuum
 Observation Category: Galactic
 Total Time Requested: 12.5 Hours

Proposal Title: The Nonlinear Dynamics of Drifting Subpulses

ABSTRACT:

Approximately 30 pulsars are known to exhibit the intriguing phenomenon of drifting subpulses. One of the out-standing and important unanswered questions regarding subpulse drift is whether the variation in drift rate seen for some of these pulsars is due to changes in the physical conditions governing the radio emission. We hypothesize that in general subpulse drift is governed by nonlinear dynamics; that variable drift is the norm rather than the exception and is a result of those dynamics under stable physical conditions. As an initial test we propose observations of PSR J2018+2839 at 430 MHz to search for evidence of low-dimensional chaotic drift. If detected, the implication of a stable physical environment at the pulsar would provide an important constraint for theories of subpulse drift, the pulsar magnetosphere and the emission mechanism. To investigate the frequency dependence of the dynamics we also propose a one-hour observation at 1720 MHz.

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Instrument Setup

L-wide 430 CH receiver

Atmospheric Optical Instruments:

Special Equipment or setup: We plan to use the AOFTM at both frequencies and possibly the WAPP at 1720 MHz if it is available. With regard to the AOFTM, we do not have a mammoth tape drive at our institution and will need to transfer the data to another tape format prior to leaving the observatory.

RFI Considerations

Frequency Ranges Planned

425-435
1715-1725

This proposal requires coordination with AFTWF within the band 425-435 MHz.