



# Observing Application

Date : Aug, 01 2011  
 Proposal ID : VLA/11A-294  
 Legacy ID : AR783  
 PI : Rachel Rosen  
 Type : Director's Discretionary  
 Time - Exploratory Time  
 Category : Energetic Transients and  
 Pulsars  
 Total Time : 1.0

## A Pulsar Companion to PSR B1828-11?

### Abstract:

PSR B1828-11 is well known for its characteristic periodic variations in spin-down rate and profile shape. This has variously been explained as free precession (Stairs et al. 2000) or mode-switching between discrete magnetospheric/spin-down states (Lyne et al. 2010), with possible implications for timing noise in all pulsars. In Rosen et al. (2011), we proposed that a non-radial oscillation model may be able to explain these quasi-periodic fluctuations. Currently, we are using the Green Bank Telescope (GBT) to test our theory by fitting our model to single-pulse data from PSR B1828-11 during its different spin-down rate states. Our first GBT observation of PSR B1828-11 revealed a previously unknown pulsar with nearly the same dispersion measure and almost exactly twice the spin period. Subsequent observations revealed that these two pulsars are several parsecs apart, but the high coincidence of the spin periods and dispersion measures raises the question of whether the two pulsars were once physically related, a question possibly resolved with proper motion measurements. We request EVLA time in A configuration to acquire the positional accuracy of the new pulsar before proceeding with the proposed VLBA proper motion measurements.

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### Related proposals:

### Joint:

Joint with GBT and VLBA

### Observing type(s):

Pulsar

## VLA Resources

Name	Conf.	Frontend & Backend	Setup
L band	A	L Band 20 cm 1000 - 2000 MHz WIDAR RSRO	Comments: 1 GHz of bandwidth covering the entire L band. Standard 128 MHz subbands with 64 spectral points will be used - this is standard continuum observing.
C-band	A	C Band 6 cm 4000-8000 MHz WIDAR RSRO	Comments: 2 GHz of bandwidth, allocated at the bottom end (avoiding RFI) of C band. Standard 128 MHz subbands with 64 spectral points will be used - this is standard continuum imaging.

## Sources:

Name	Position		Velocity		Group
B1828-11	Coordinate System	Equatorial	Convention	Radio	PSR B1828-11
	Equinox	J2000			
	Right Ascension	18:30:47.56 00:00:00.0	Ref. Frame	LSRK	
	Declination	-10:59:27.8 00:00:00.0	Velocity	0.00	
J1832-1035	Coordinate System	Equatorial	Convention	Radio	PSR B1828-11
	Equinox	J2000			
	Right Ascension	18:32:20.836 00:00:00.0	Ref. Frame	LSRK	
	Declination	-10:35:11.2 00:00:00.0	Velocity	0.00	
J1834-1237	Coordinate System	Equatorial	Convention	Radio	PSR B1828-11
	Equinox	J2000			
	Right Ascension	18:34:19.2165 00:00:00.0	Ref. Frame	LSRK	
	Declination	-12:37:40.945 00:00:00.0	Velocity	0.00	

## Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
L band	0.50	1	0 day	15:00:00	22:00:00	12
C band	0.50	1	0 day	15:00:00	22:00:00	12

## Session Constraints:

Name	Constraints	Comments
L band		J1834-1237 will be used as phase/amplitude calibrator for L band
C band		J1832-1035 will be used as phase/amplitude calibrator for C band

## Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
L band	B1828-11 J1832-1035 J1834-1237	L band	0.5 hour	0.020 mJy/bm	