



Observing Application

Date : Feb, 01 2013
 Proposal ID : VLBA/12B-413
 Legacy ID : BR178
 PI : Scott Ransom
 Type : Director's Discretionary
 Time - Exploratory Time
 Category : Energetic Transients and
 Pulsars
 Total Time : 3.0

Rapid Astrometry of a Millisecond Pulsar in a Stellar Triple System

Abstract:

We have discovered and are successfully timing a relatively bright millisecond pulsar in a hierarchical triple stellar system. The inner binary comprises a millisecond pulsar in a 1.6-day orbit with a hot, low-mass white dwarf. Yet this inner binary is being orbited by a likely 0.2-0.5 solar-mass star of unknown type in a 327-day orbit. This unique pulsar, and the supremely high-precision measurements of secularly varying orbital parameters provided by millisecond pulsar timing, will eventually be a testbed for the dynamics of 3-body systems. But we need a precise position for the system first. And quickly.

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Related proposals:

Joint:

Not a Joint Proposal

Observing type(s):

Continuum, Pulsar, Astrometry

VLBA Resources

Resource Name: PSR astrometry

| Details | Stations | Observing Parameters | Correlation Parameters | Special Features |
|--|--|---|--|--|
| Wavelength: 18 cm Processor: Socorro-DiFX Observing Mode: Standard | VLBA <input checked="" type="checkbox"/> Br <input checked="" type="checkbox"/> Fd <input checked="" type="checkbox"/> Hn <input checked="" type="checkbox"/> Kp <input checked="" type="checkbox"/> La <input checked="" type="checkbox"/> Mk <input checked="" type="checkbox"/> NI <input checked="" type="checkbox"/> Ov <input checked="" type="checkbox"/> Pt <input checked="" type="checkbox"/> Sc <input checked="" type="checkbox"/> <hr/> HSA <input type="checkbox"/> Ar <input type="checkbox"/> Ef <input type="checkbox"/> GBT <input type="checkbox"/> VLA-Y27 <input type="checkbox"/> <hr/> VLA-Y1 <input type="checkbox"/> <hr/> Geodetic | Observing System: DDC System Bandwidth: 128 MHz Baseband Channels: 4 Polarization: Dual Agg. Bit Rate (Mbits/sec): 2048 | Correlator Passes: 2 Integration Period (sec): 2.0 Spectral Points /BBC: 256 No of Fields: 35 | Full Polarization <input type="checkbox"/> Pulsar Gate <input checked="" type="checkbox"/> Convert to Mark4 <input type="checkbox"/> |

Sources:

| Name | Position | | Velocity | | Group |
|------------|--------------------------|------------------------------|-------------------|-------|------------------|
| J0337+1715 | Coordinate System | Equatorial | Convention | Radio | Pulsar |
| | Equinox | J2000 | | | |
| | Right Ascension | 03:37:43.821 00:00:00.0 | Ref. Frame | LSRK | |
| | Declination | +17:15:14.82 00:00:00.0 | Velocity | 0.00 | |
| | Calibrator | No | | | |
| J0344+1559 | Coordinate System | Equatorial | Convention | Radio | Phase calibrator |
| | Equinox | J2000 | | | |
| | Right Ascension | 03:44:23.17217 00:00:00.0 | Ref. Frame | LSRK | |
| | Declination | +15:59:43.3695 00:00:00.0 | Velocity | 0.00 | |
| | Calibrator | Yes | | | |

Sessions:

| Name | Session Time (hours) | Repeat | Separation | GST minimum | GST maximum | Elevation Minimum |
|-------|----------------------|--------|------------|-------------|-------------|-------------------|
| astro | 3.00 | 1 | 0 day | 00:00:00 | 07:00:00 | 0 |

Session Constraints:

| Name | Constraints | Comments |
|------|-------------|----------|
| | | |

Session Source/Resource Pairs:

| Session Name | Source | Resource | Time | Figure of Merit |
|--------------|------------|----------------|----------|-----------------|
| astro | J0337+1715 | PSR astrometry | 3.0 hour | 0.33 mJy/bm |

Staff support: None

Plan of Dissertation: no