Observing Application

Date :	May, 03 2013
Proposal ID :	VLBA/13A-513
Legacy ID :	BB336
PI :	Geoffrey Bower
Type :	Director's Discretionary Time - Target of Opportunity
Category :	Energetic Transients and Pulsars
Total Time :	12.0

Proper Motion of the Galactic Center Soft Gamma Ray epeater

Abstract:

Recently, SWIFT discovered an unusually extended bright X-ray flare from the Galactic Center (GC). Identification of a 3.76 s period in X-rays and later in the radio quickly led to the identification of this source as a magnetar and Soft Gamma Ray Repeater (SGR). While radio detection of these objects are rare in any case, this marks the very first radio pulsar found in the GC, providing a unique tool to study the gravitational potential of the supermassive black hole candidate, constrain the origin of this magnetar in the GC region, measure the scattering properties of the plasma in the GC, and address the puzzling question why so far no other pulsars in this region have been found. The emission of SGRs is intermittent and hence rapid response is needed.

Here we propose to first establish an astrometric VLBI position of the sources as a reference and, in a second epoch - if the source is still active or repeats later, measure a proper motion of the source. Sgr A* itself will actually provide an excellent in-beam calibrator. Secondly, we want to precisely measure the size of the source, which will be dominated by interstellar scattering.

Authors:

Name	Institution	Email	Status
Andreas Brunthaler	Max-Planck-Institut für Radioastronomie	brunthal@mpifr-bonn.mpg.de	
Geoffrey Bower	California at Berkeley, University of	gbower@astro.berkeley.edu	
Heino Falcke	Radboud Universiteit Nijmegen	h.falcke@astro.ru.nl	
Michael Kramer	Max-Planck-Institut für Radioastronomie	mkramer@mpifr.de	
Paulo Freire	Max-Planck-Institut für Radioastronomie	pfreire@mpifr-bonn.mpg.de	
Patrick Lazarus	Max-Planck-Institut für Radioastronomie	plazarus@mpifr-bonn.mpg.de	Graduating: N/A Thesis: false
Ralph Eatough	Max-Planck-Institut für Radioastronomie	reatough@mpifr-bonn.mpg.de	

Principal Investigator: Geoffrey Bower
Contact: Geoffrey Bower
Telephone: 5108471722
Email: gbower@astro.berkeley.edu

Related proposals:

Joint:

Not a Joint Proposal

Observing type(s):

Continuum, Pulsar, Astrometry

VLBA Resources

Resource Name: X-band

Details	Stations	Observing Parameters	Correlation Parameters	Special Features
Wavelength: 3.6 cm **Processor:** Socorro-DiFX **Observing Mode:** Standard	VLBA ☐ Br ☑ Fd ☑ Hn ☑ Kp ☑ La ☑ Mk ☐ Nl ☑ Ov ☑ Pt ☑ Sc ☐ HSA ☐ Ar ☐ Ef ☐ GBT ☐ VLA-Y27 ☑ VLA-Y1 ☐ Geodetic	Observing System: DDC System Bandwidth: 128 MHz Baseband Channels 4 Polarization Dual Agg. Bit Rate (Mbits/sec) 2048	Correlator Passes 1 Integration Period (sec) 2.0 Spectral Points /BBC 256 No of Fields 1	Full Polarization ☐ Pulsar Gate ☑ Convert to Mark4 ☐

Sources:

Name	Position		Velocity		Group
J1745-2900	**Coordinate System**	Equatorial	**Convention**	Radio	SGR J1745-2900
	Equinox	J2000			
	Right Ascension	17:45:40.19	**Ref. Frame**	LSRK	
		00:00:00.0			
	Declination	-29:00:30.37	**Velocity**	0.00	
		00:00:00.0			
	Calibrator	No			

Sessions:

Name	Session Time (hours)	Repeat	Separation	GST minimum	GST maximum	Elevation Minimum
J1745-2900	6.00	2	10 day	00:00:00	24:00:00	0

Session Constraints:

Name	Constraints	Comments

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit
J1745-2900	J1745-2900	X-band	6.0 hour	0.01 mJy/bm