Observing Application

Date :	Sep, 14 2011
Proposal ID :	VLBA/11B-225
Legacy ID :	BS214
PI :	Sarah Spolaor
Type :	Director's Discretionary Time - Exploratory Time
Category :	Active Galactic Nuclei
Total Time :	3.0

Investigating NGC3393 as the Nearest Active Galactic Nucleus Pair

Abstract:

We are pursuing Exploratory VLBA Time to provide a quick-response publication on the object NGC3393, which was recently demonstrated to contain a candidate double X-ray active galactic nucleus (AGN) at a projected separation of only 150 pc (Fabbiano et al., Nature, 09/02/2011). If true, NGC3393 would represent only the third known AGN pair separated by less than 1 kpc; such sources represent the progenitors of gravitational-wave targets of pulsar timing arrays. Archival VLA observations of NGC3393 reveal what appears to be a core-jet radio source, with both X-ray AGN coincident with the central radio component. VLBA Director's Time observations will provide sufficient sensitivity and resolution to resolve the radio source's core, potentially revealing a pair of compact radio components (thus supporting the source as a binary black hole), or otherwise probing the nature of any interactions between the radio and diffuse X-ray emission. The proposed observations may lead to a more in-depth study of this object with the VLBA, to be submitted at the upcoming February deadline.

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Related proposals:

Joint:

Not a Joint Proposal

Observing type(s):

Continuum

VLBA Resources

Name	Details	Stations	Observing Parameters	Correlation Parameters

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Primary	**Wavelength:** 3.6/13 cm **Processor:** Socorro-DiFX **Observing** Standard	VLBA ☑ Br ☑Fd ☑Hn ☑Kp ☑ La ☑Mk ☑Kp ☑Ov ☑ Pt ☑Sc ☑ HSA Ar Ef GBT VLA-Y27 VLA-Y1 Geodetic	Bandwidth: 16 MHz Baseband Channels 16 Sample Rate (Msample/s) 32 Bits/Sample 2 Polarization Dual Agg. Bit Rate (Mbits/sec)	Full Polarization Pulsar Gate Correlator Passes 1 Integration Period (sec) 2.0 Spectral Points /BBC 8 No of Fields 2

Sources:

Name	Position		Velocity		Group
NGC3393	**Coordinate System**	Equatorial	**Convention**	Radio	target
	Equinox	J2000			
	Right Ascension	10:48:23.46	**Ref. Frame**	LSRK	
		00:00:00.5			
	Declination	-25:09:43.30	**Velocity**	0.00	
		00:00:00.5			
J1104-2431	**Coordinate System**	Equatorial	**Convention**	Radio	calibrator
	Equinox	J2000			
	Right Ascension	11:04:46.176445	**Ref. Frame**	LSRK	
		00:00:00.0			
	Declination	-24:31:25.80002	**Velocity**	0.00	
		00:00:00.0			

Sessions:

Name	Session Time (hours)	Repeat	Separation	GST minimum	GST maximum	Elevation Minimum
source + calibrator	1.00	3	0 day	08:48:00	12:48:00	0

Session Constraints:

Name	Constraints	Comments
source + calibrator		In total we want to exceed two hours on-source (giving <=30 microJy RMS noise). Three one-hour sessions, fit into directors' time slots, would achieve this goal.

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit
source + calibrator	J1104-2431	Primary	0.25 hour	mJy/bm
source + calibrator	NGC3393	Primary	0.75 hour	0.03 mJy/bm

Staff support: None Plan of Dissertation: no