Observing Application

Date :	Dec, 10 2009
Proposal ID :	VLBA/09C-147
Legacy ID :	BM331
PI :	James Miller-Jones
Type :	Rapid Response - Target of Opportunity
Category :	Stellar, Galactic
Total Time :	24.0

An unexpected transition to the soft state in a peculiar X-ray binary

Abstract:

The peculiar X-ray binary SWIFT J1753.5-0127 has begun to make a transition to a softer state in the last few days. After a period of 4 years spent in a bright, hard X-ray spectral state, this state transition was completely unexpected. SWIFT J1753.5-0127 has an orbital period of only 3.2 hours, and the other two shortest-period systems remained in the hard state throughout their most recent outbursts. While in the hard state SWIFT J1753.5-0127 was significantly underluminous in the radio band; this discrepancy with the radio/X-ray correlation for other sources became more pronounced at lower flux levels. Studies of this state transition and comparisons to those seen in more typical black hole candidate systems provide a unique opportunity to learn more about the emerging class of radio-faint black hole X-ray binaries, and to constrain the reasons for the faintness in the radio band. This can only be achieved using high-angular resolution radio observations to resolve the evolution of the jets at the state transition. We therefore request the opportunity to monitor the radio emission from this system during its state transition using the VLBA.

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Related proposals:

BM317, BM326

Joint:

Not a Joint Proposal

Observing type(s):

Continuum, Monitoring, Phase Referencing, Triggered Transient

VLBA Resources

Name	Wavelength	Processor	Stations	Observing Parameters	Correlation Parameters

Name	Wavelength	Processor	Stations	Observing Parameters	Correlation Parameters
VLBA-XS	3.6/13 cm	Socorro-DiFX	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 8 Sample Rate (Msample/s) 16 Bits/Sample 2 Polarization RCP & Agg. Bit Rate (Mbits/sec) 256	Full Polarization ☑ Pulsar Gate Correlator Passes 1 Integration Period (sec) 2.0 Spectral Points /BBC 8

Sources:

Name	RA / RA Range	Dec / Dec Range	Epoch	Velocity / z	Group
SWIFTJ1753.5-0127	17:53:28.3 00:00:00.0	-1:27:08 00:00:00	J2000	Velocity : 0.00	SWIFT J1753.5

Sessions:

Name	Session Time (hours)	Repeat	Separation	GST minimum	GST maximum	Elevation Minimum
J1753.5	6.00	4	2 day	21:00:00	05:00:00	0

Session Constraints:

Name	Constraints	Comments
J1753.5		First observations to be taken as soon as possible to cover the ongoing state transition.

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit
J1753.5	SWIFTJ1753.5-0127	VLBA-XS	6.0 hour	0.08 mJy/bm

Staff support: None Plan of Dissertation: no