17241 - Examining the Variability of High-Redshift Jets

Cycle: 30, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) QSO-B0727+409	WFC3/IR	1	30-Sep-2022 18:00:28.0	yes
02	(2) 7C-1754+6737	WFC3/IR	1	30-Sep-2022 18:00:29.0	yes
03	(3) 6C-123945+373654	WFC3/IR	1	30-Sep-2022 18:00:30.0	yes
04	(4) QSO-B1713+218	WFC3/IR	1	30-Sep-2022 18:00:31.0	yes

4 Total Orbits Used

ABSTRACT

Recent work has shown that kpc-scale X-ray jets are variable on timescales of weeks to a few years. Variability places very strong constraints on the characteristics of the emitting region, and rules out inverse-Compton upscattered CMB as the origin for the unidentified hard X-ray component. However, very few X-ray jets at redshifts z>2 have the multiple Chandra observations required to test for variability. Here we propose moderate-depth snapshots (20 ks each) of 14 X-ray jets previously detected by Chandra with redshifts ranging from 2-5. This will enable both variability studies and better spectral constraints to understand the nature of extragalactic X-ray jets at high redshift.

OBSERVING DESCRIPTION

This is a joint request from a primary Chandra X-ray GO Program, targeting arcsecond-scale X-ray jets from super-massive black holes. This program provides Hubble near-IR observations of 4 of our targets (1 orbit each) which have never previously been observed by HST. This will bring our high-redshift sample of 13 to complete optical/IR coverage as all other targets have previously been observed by HST. A detection or upper limit in the optical will allow us to actually evaluate the full SED of these sources and verify the number of spectral components. A single orbit will yield a deep enough upper limit (0.1 uJy at 160 nm at 3 sigma) to clearly indicate that the X-rays and radio are not from the same emission component, and a detection will similarly allow us to evaluate the spectral components. HST resolution is needed in order to accurately measure the radio-optical spectrum for each knot individually (good radio maps of all our sources already exist). We request a single orbit with WFC3 in the F160W filter. H band is ideally situated very near to the typical peak of the radio-optical synchrotron spectrum when optical emission is detected.

Visit

Proposal 17241, B0727+409 (01) Fri Sep 30 22:00:32 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Comments: The science target, the X-ray emitting jet, extends out approximately 40" so a sub-array cannot be used to limit persistence. The selected exposure times are a compromise between saturating targets in the FOV and efficiency as shorter times would result in significant reduction in total time. There is a H-mag 14.5 source about 6" from the center of the target.

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=4 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(1), (2)

Fixed Targets

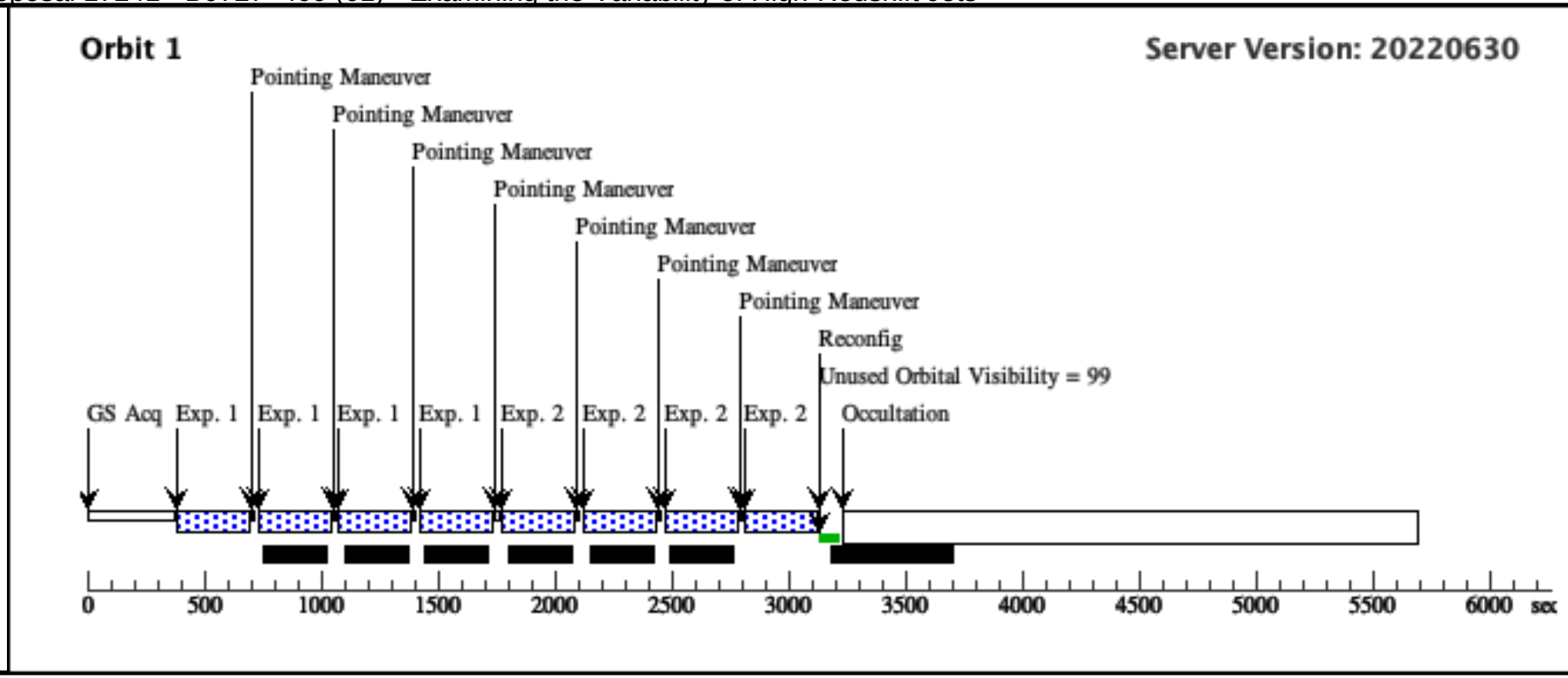
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	QSO-B0727+409	RA: 07 30 51.3466 (112.7139442d) Dec: +40 49 50.83 (40.83079d) Equinox: J2000	Proper Motion RA: 3.7886604418026643E-6 sec of time/yr Proper Motion Dec: -1.1000020094797947E-5 arcsec/yr Epoch of Position: 2015.5	V=18.47	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[JET, QUASAR, RADIO GALAXY]
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) QSO-B0727+409	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 1-1 in B0727+409 (01) (1)	277.937956 Secs (1111.752 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(1) QSO-B0727+409	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 2-2 in B0727+409 (01) (1)	277.937956 Secs (1111.752 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 17241, J1754+6737 (02) Fri Sep 30 22:00:32 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=4 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(1), (2)

Fixed Targets

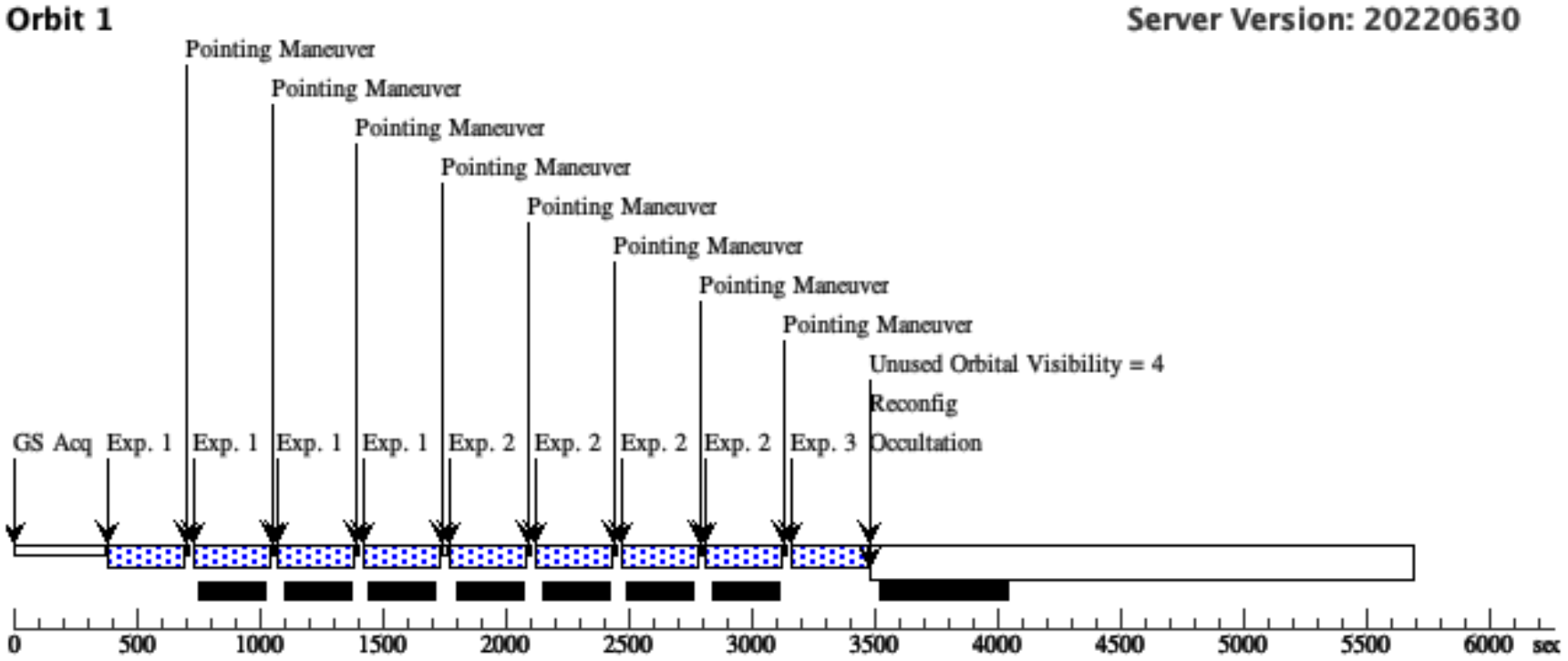
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	7C-1754+6737	RA: 17 54 19.5000 (268.5812500d) Dec: +67 37 34.00 (67.62611d) Equinox: J2000	Epoch of Position: 2015.5	V=14	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[JET, QUASAR, RADIO GALAXY]
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(2) 7C-1754+6737	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 1-1 in J1754+6737 (02) (1)	277.937956 Secs (1111.752 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(2) 7C-1754+6737	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 2-2 in J1754+6737 (02) (1)	277.937956 Secs (1111.752 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
3		(2) 7C-1754+6737	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12	POS TARG 7,7		277.937956 Secs (277.938 Secs) *[==>]*	***[1]***

Orbit Structure



Visit

Proposal 17241, J1239+3736 (03) Fri Sep 30 22:00:32 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=4 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(1), (2)

Fixed Targets

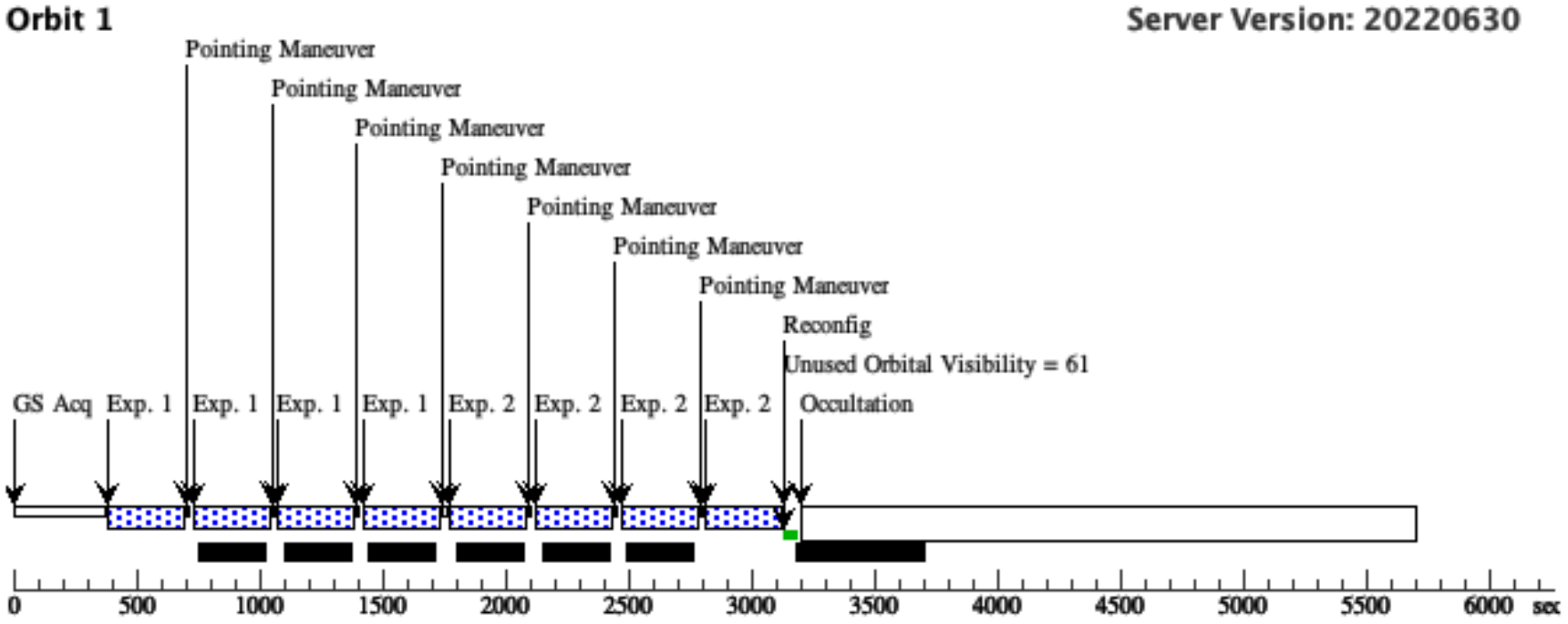
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	6C-123945+373654	RA: 12 42 9.8124 (190.5408850d) Dec: +37 20 5.69 (37.33491d) Equinox: J2000	Proper Motion RA: 8.887725577125947E-6 sec of time/yr Proper Motion Dec: -1.0400005976407556E-4 arcsec/yr Epoch of Position: 2015.5	V=19.82	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[JET, QUASAR, RADIO GALAXY]
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(3) 6C-123945+373654	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 1-1 in J1239+3736 (03) (1)	277.937956 Secs (1111.752 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(3) 6C-123945+373654	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 2-2 in J1239+3736 (03) (1)	277.937956 Secs (1111.752 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 17241, B1713+218 (04) Fri Sep 30 22:00:32 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=4 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true		(1), (2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	QSO-B1713+218	RA: 17 15 21.2530 (258.8385542d) Dec: +21 45 31.84 (21.75884d) Equinox: J2000	Epoch of Position: 2015.5	V=21.0	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[JET, QUASAR, RADIO GALAXY]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(4) QSO-B1713+218	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 1-1 in B1713+218 (04) (1)	277.937956 Secs (1111.752 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2		(4) QSO-B1713+218	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=SPARS25; NSAMP=12		Pattern 1, Exps 2-2 in B1713+218 (04) (1)	277.937956 Secs (1111.752 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure