15214 - The 3C111 Jet: X-ray Variability, Spectrum & Broadband SED

Cycle: 25, 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) 3C-111-NORTH	WFC3/IR	3	20-Jul-2017 15:26:49.0	yes

3 Total Orbits Used

ABSTRACT

The discovery of X-ray emission from AGN jets is a touchstone of the Chandra mission. Their X-ray emission processes have become the source of much debate, with implications for both jet physics and cluster feedback models. 3C111 has an extraordinary 2-arcminute long jet that is seen in X-ray, near-IR and radio. At least 8 knots, plus both approaching and receding hotspots and lobes, are seen in the Chandra image. We request additional Chandra, HST and NuSTAR observations, to follow up on possible evidence of variability in two knots, pin down the knots' X-ray spectrum and SED, detect the jet above 10 keV, and study the morphology and X-ray spectrum of the extended lobes. These observations will place the tightest

constraints yet on the physics of this fascinating system.

OBSERVING DESCRIPTION

We will obtain images of 3C 111, its jet, hotspots, and lobes with WFC3/IR (F110W, F140W, and F160W). This will allow us to characterize all jet components as well as the hotspots in the near-IR, obtain morphological information, and also optical and broadband spectral energy distributions. The latter will allow the fitting of synchrotron emission models.

These observations are to occur within 30 days of the approved Chandra observations (this program was approved in the Chandra review).

The northern jet pointing (Visit 01) is restricted to an orientation range of 70 degrees in order to include both the AGN core and the hotspot, while avoiding diffraction spikes overlapping the jet. A -90 degree rotation from this would fit everything in the field of view, however there would be a danger of the "Death Star" overlapping the hotspot region, and so we have not included that orientation range. Other rotations of 90 degrees would exclude either the core or the hotspot.

Visit

Proposal 15214, Visit 01, implementation Thu Jul 20 19:26:51 GMT 2017

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 70D TO 70 D

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(1)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false	(1), (2), (3)

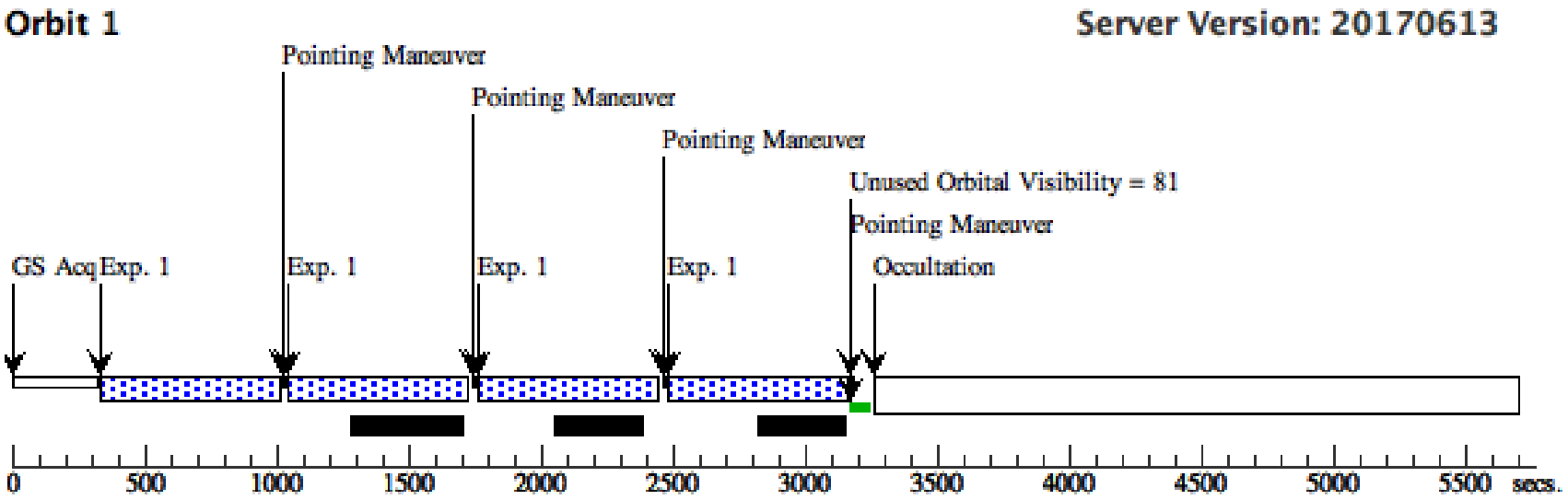
Fixed Targets

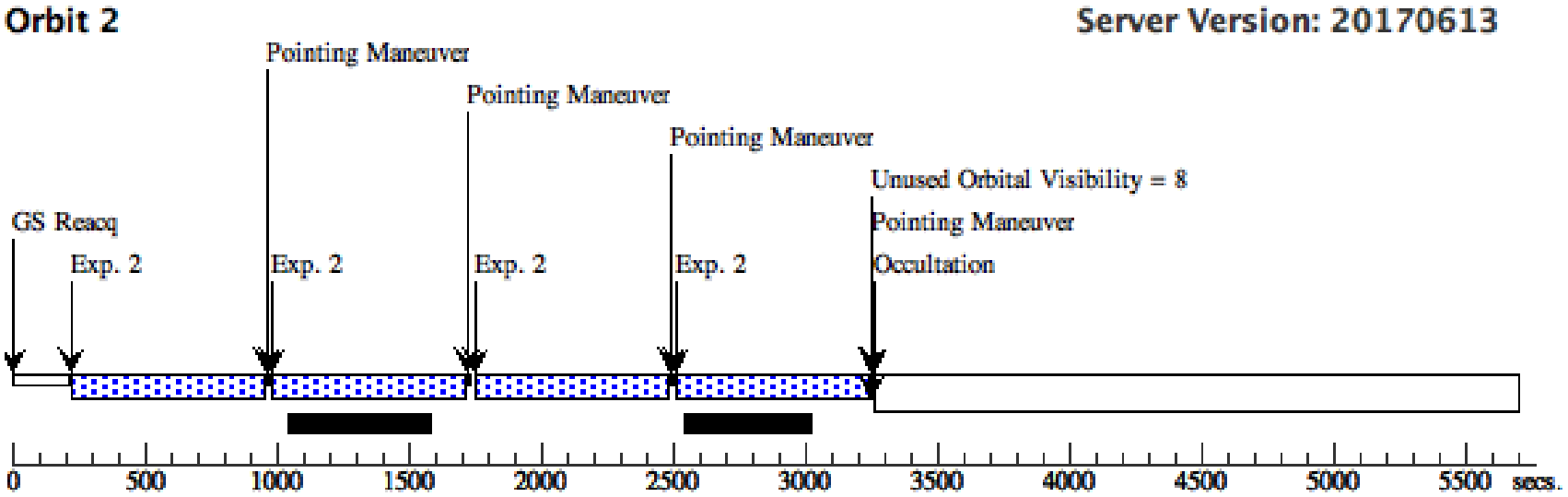
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	3C-111-NORTH	RA: 04 18 25.5000 (64.6062500d) Dec: +38 02 2.03 (38.03390d) Equinox: J2000		V=18.05	Reference Frame: ICRS

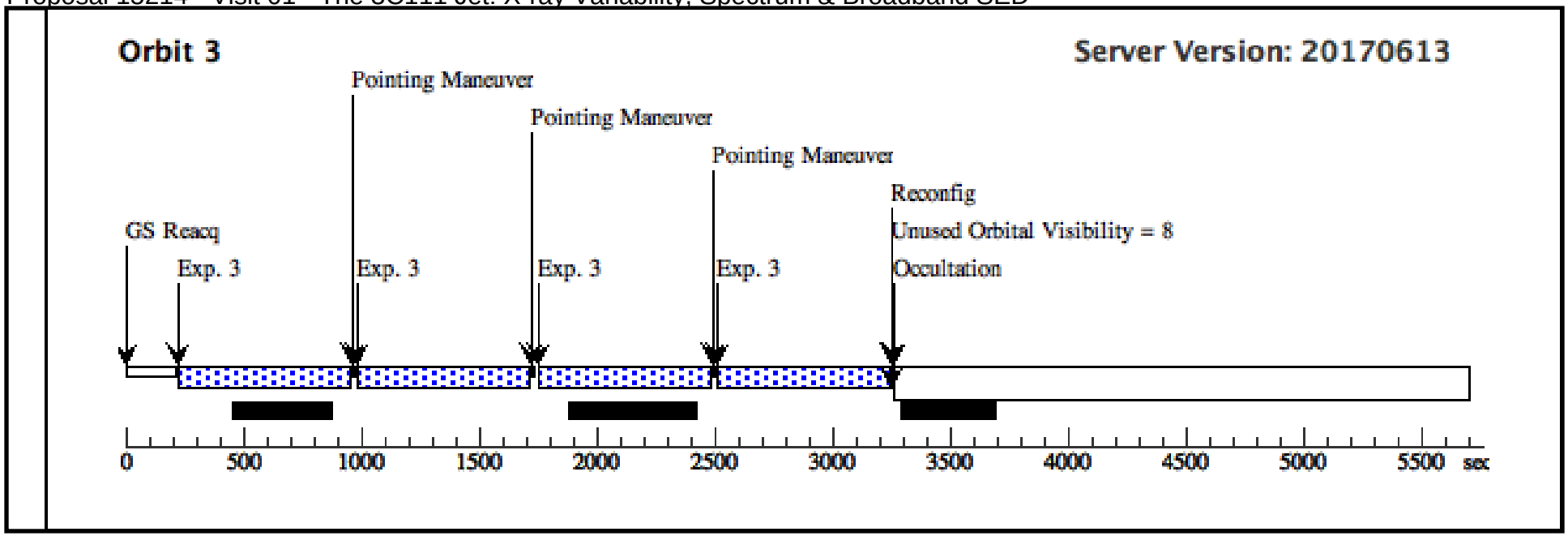
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) 3C-111-NORTH	WFC3/IR, MULTIACCUM, IR	F110W	SAMP-SEQ=SPARS50; NSAMP=14	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 01 (1)	652.938154 Secs (2611.753 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]*	***[1]***
2		(1) 3C-111-NORTH	WFC3/IR, MULTIACCUM, IR	F140W	SAMP-SEQ=STEP100; NSAMP=13		Pattern 1, Exps 2-2 in Visit 01 (1)	699.232615 Secs (2796.93 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]*	***[2]***
3		(1) 3C-111-NORTH	WFC3/IR, MULTIACCUM, IR	F160W	SAMP-SEQ=STEP100; NSAMP=13		Pattern 1, Exps 3-3 in Visit 01 (1)	699.232615 Secs (2796.93 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]*	***[3]***

Orbit Structure






Orbit 3
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Reconfig
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Unused Orbital Visibility = 8
Exp. 3
Exp. 3
Exp. 3
Exp. 3
Occultation
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