14243 - True Jet Rotation Probed in NUV Jet Core

Cycle: 23, 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) V-RY-TAU WAVE	STIS/CCD STIS/NUV-MAMA	3	19-Apr-2017 21:00:23.0	yes
02	(2) NAME-DG-TAU-B (3) V-DG-TAU WAVE	STIS/CCD STIS/NUV-MAMA	3	19-Apr-2017 21:00:25.0	yes
03	(2) NAME-DG-TAU-B (3) V-DG-TAU WAVE	STIS/CCD STIS/NUV-MAMA	3	19-Apr-2017 21:00:27.0	yes

9 Total Orbits Used

ABSTRACT

Recent observations searching for jet rotation in newly forming stars have the potential to support theories of magneto-centrifugal jet launching. However, whether or not we can claim to observe jet rotation has been hotly debated. Past HST studies have revealed differences across the radial

velocity profile of the jet close to the base, but subsequent observations and simulations suggest the outer layers of the jet may be disrupted by shocks or instabilities. On the other hand, the jet core, which is probed at NUV wavelengths, may be protected from these contaminations by the outer jet layers. This idea is supported so far by the fact that the NUV jet rotation direction matches the disk rotation direction in 2 of 2 cases examined. This seems to suggest that NUV data is the only real window on jet rotation, where the signature is not disrupted by other kinematic signatures that may be present in other wavelength regimes. Indeed IR IFU data reveal that the jet kinematics are not simple, and that IFU-style observations are critical in interpreting potential jet rotation signatures. Therefore, we propose STIS/MAMA observations to investigate the jet rotation signature of the jet core in 3 targets. We will map these observations to existing IFU and other data to aid interpretation. Targets are chosen because the sense of disk rotation is already known, and so we can have a definitive answer as to whether we have full agreement in jet and disk rotation sense for the NUV jet core.

OBSERVING DESCRIPTION

We request observations on 3 jets: 1 from RY Tau and 2 from DG Tau B. The target is the jet, not the star.

We request the STIS slit placed perpendicular to the jet propagation direction (jet PA), and offset from the star along the jet such that the starlight does not enter the slit.
Please see fig 1 of this paper for a picture of the observing mode required:
http://iopscience.iop.org/0004-637X/663/1/350/pdf/0004-637X_663_1_350.pdf

For RY Tau, the blue jet is at PA=294 (E of N).
The slit should be perpendicular to the jet PA.
i.e. ORIENT = 294+45-90=249 or 294+45+90=69
The slit should then be offset from the star in the direction along the jet.
i.e. POS TARG = (+0.4,0.0) or POS TARG = (-0.4,0.0), depending on the ORIENT value (which in turn depends on guide star availability).

Note that DG Tau B is not optically visible. Hence DG Tau is used as a reference target, and an offset specified to reach DG Tau B.

For DG Tau B, the blue jet is at PA=116 (McGroarty et al 2004, Fig 5) and hence the red jet is at PA=296. Guide star availability dictates ORIENT=71, and Aladdin jet emission dictates optimum POS TARG=+1.3" for the blue jet and -4.6" for the red jet.

Visit

Proposal 14243, RY Tau Blue Jet PA=294 (01), completed Thu Apr 20 01:00:28 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: ORIENT 249D TO 249 D

Comments: The slit should be perpendicular to the jet PA.
i.e. ORIENT = 294+45-90=249 or 294+45+90=69
The slit should then be offset from the star in the direction along the jet.
i.e. POS TARG = (+0.4,0.0) or POS TARG = (-0.4,0.0), depending on the ORIENT value (which in turn depends on guide star availability).

Diagnostics

(RY Tau Blue Jet PA=294 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

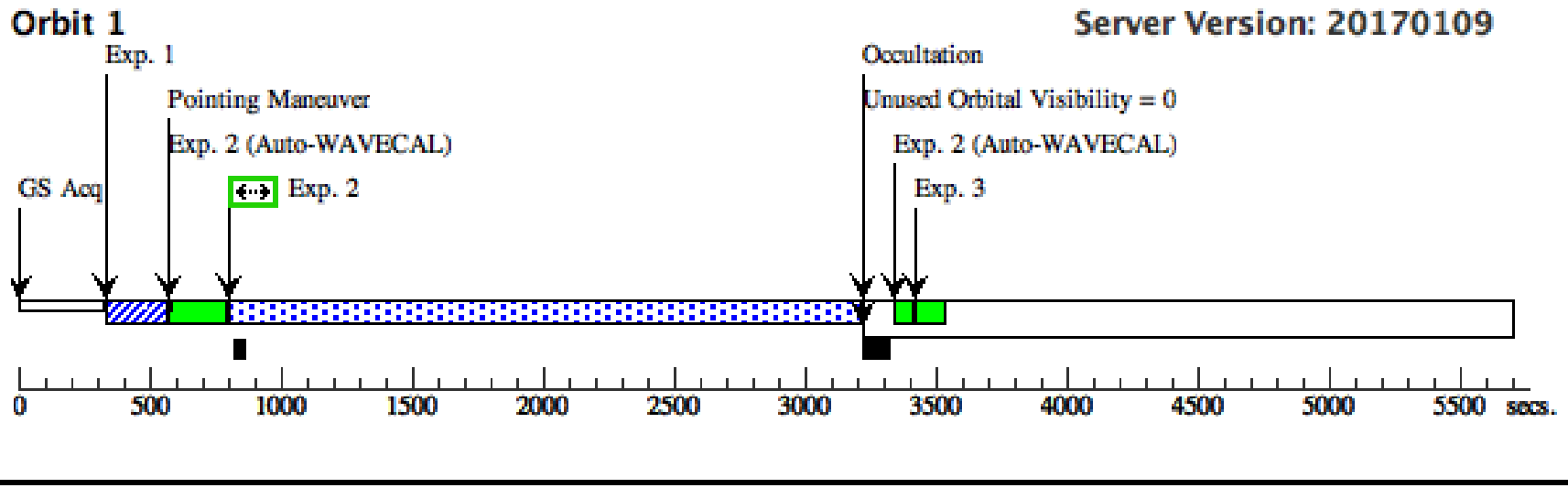
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	V-RY-TAU	RA: 04 21 57.4100 (65.4892083d) Dec: +28 26 35.57 (28.44321d) Equinox: J2000		V=9.3	Reference Frame: ICRS

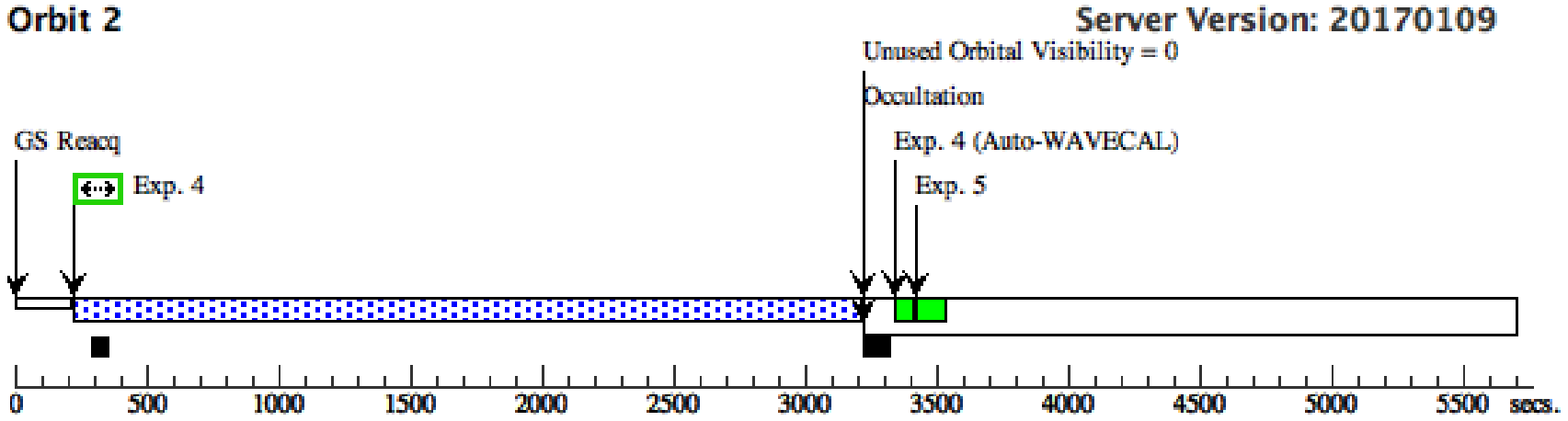
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

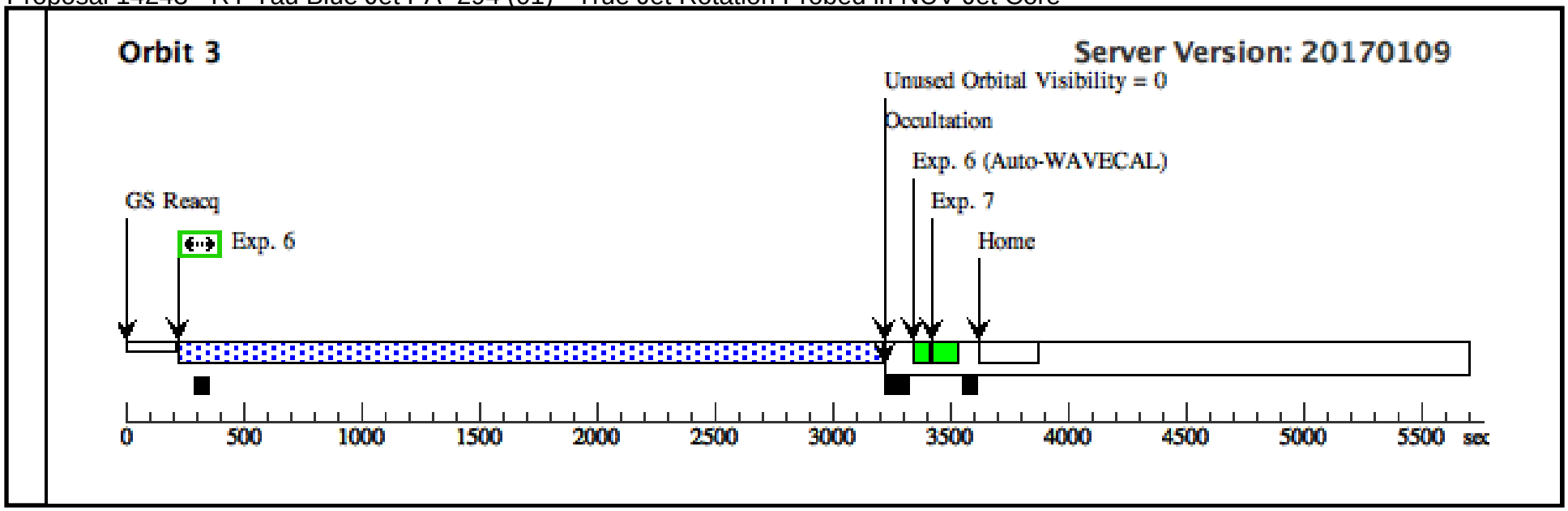
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	RY Tau ACQ (720527)	(1) V-RY-TAU	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARIO BASE1B3		0.1 Secs (0.1 Secs) *[==>]*	***[1]***
2	RY Tau - Blue Jet PA=294 Exp 1 (720357)	(1) V-RY-TAU	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		POS TARG +0.4,0.0		2395 Secs (2395 Secs) *[==>]*	***[1]***
3	RY Tau - GO-WaveCal 1 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	***[1]***
4	RY Tau - Blue Jet PA=294 Exp 2 (720357)	(1) V-RY-TAU	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		SAME POS AS 2		2929 Secs (2929 Secs) *[==>]*	***[2]***
5	RY Tau - GO-WaveCal 2 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	***[2]***
6	RY Tau - Blue Jet PA=294 Exp 3 (720357)	(1) V-RY-TAU	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		SAME POS AS 2		2929 Secs (2929 Secs) *[==>]*	***[3]***
7	RY Tau - GO-WaveCal 3 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	***[3]***

Orbit Structure






Orbit 3
Server Version: 20170109
Unused Orbital Visibility = 0
Occultation
Exp. 6 (Auto-WAVECAL)
Exp. 7
Home
GS Reacq
Exp. 6
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14243, DG Tau B - Blue Jet PA=116 (02), completed Thu Apr 20 01:00:29 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: ORIENT 71D TO 71 D

Comments: The slit should be perpendicular to the jet PA.
i.e. ORIENT = 296+45-90=251 or 296+45+90=71
The slit should then be offset from the star in the direction along the jet.
i.e. POS TARG = (-1.3,0.0) or POS TARG = (+1.3,0.0), depending on the ORIENT value (which in turn depends on guide star availability).

Diagnostics

(DG Tau B - Blue Jet PA=116 (02)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NAME-DG-TAU-B	Offset from V-DG-TAU RA Offset: -2.032 Secs Dec Offset: -45.93 Arcsec		V=9.3 J 14.576; H 12.932; K 11.594; The star DG Tau B is completely obscured in the optical by its edg e-on disk/flattened envelope.	Offset Position (NAME-DG-TAU-B)
(3)	V-DG-TAU	RA: 04 27 4.6980 (66.7695750d) Dec: +26 06 16.31 (26.10453d) Equinox: J2000		V=10.5	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
V-Mag not available. Value inserted here to satisfy warnings of BOT requirement.

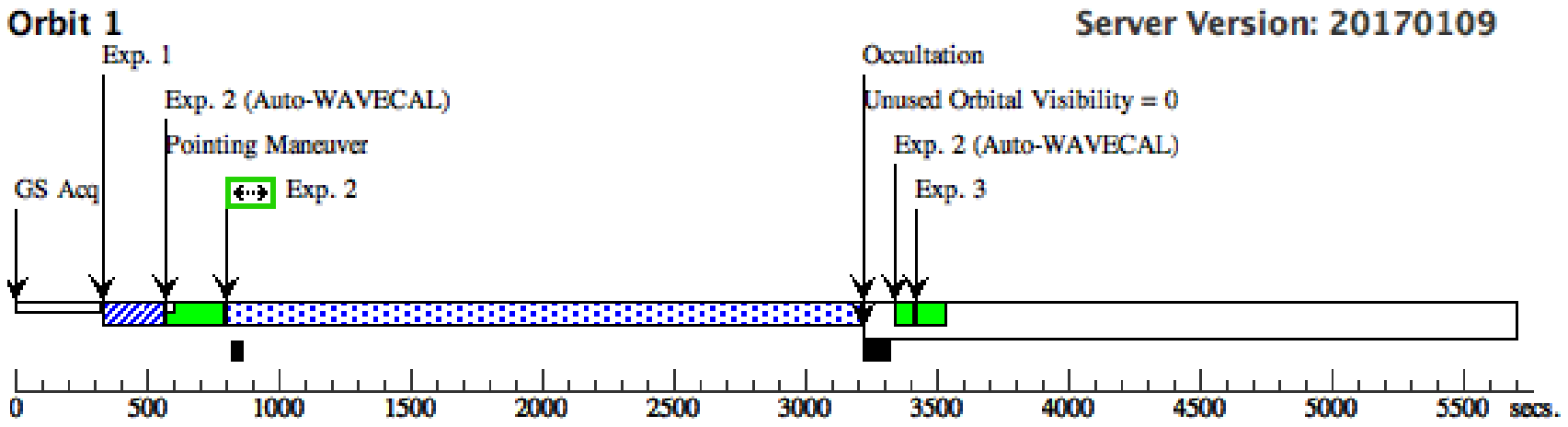
Position w.r.t. DG TAU:
RA-OFF=-2.032 s
DEC-OFF=-45.93 "

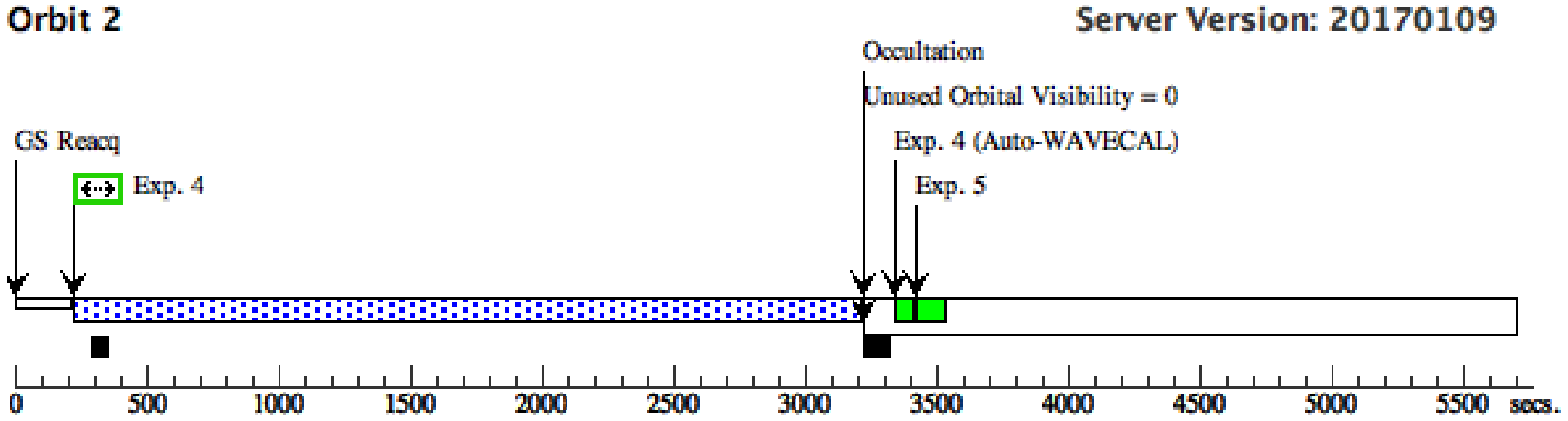
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

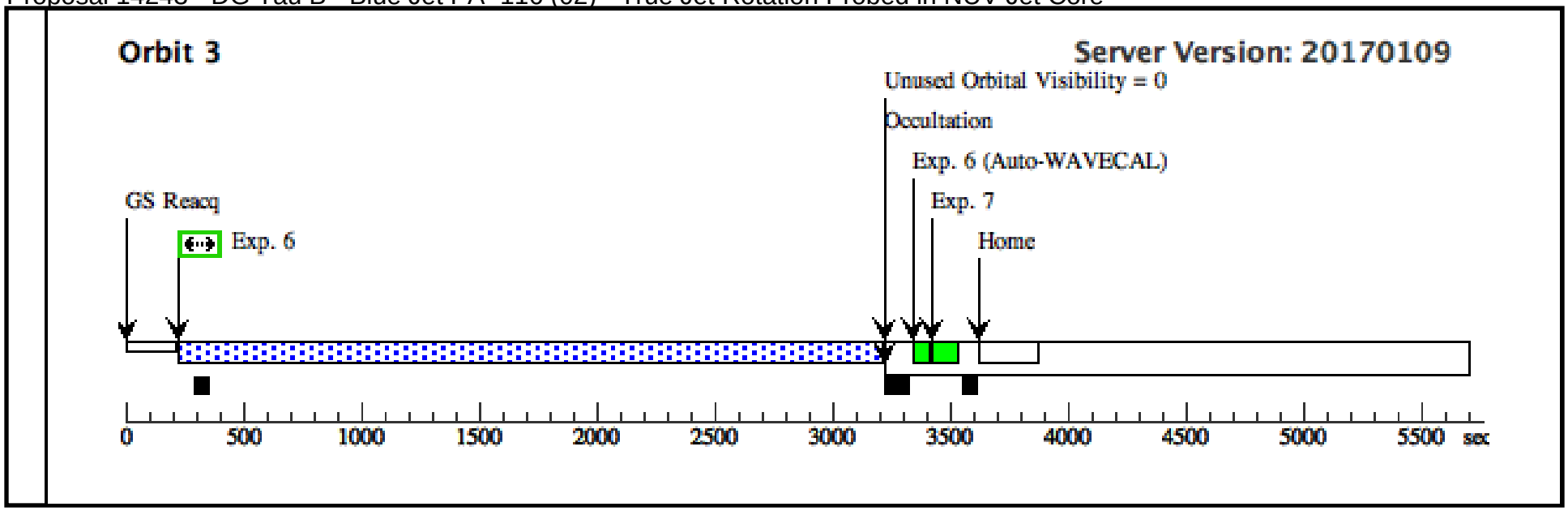
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	DG Tau - ACQ (720527)	(3) V-DG-TAU	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARIO BASE1B3		0.1 Secs (0.1 Secs) *[==>]*	*[1]*
2	DG Tau B - Blue Jet Exp 1 (720357)	(2) NAME-DG-TAU-B	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		POS TARG +1.3,0.0		2395 Secs (2395 Secs) *[==>]*	*[1]*
3	DG Tau B - GO-WaveCal 1 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	*[1]*
4	DG Tau B - Blue Jet Exp 2 (720357)	(2) NAME-DG-TAU-B	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		SAME POS AS 2		2929 Secs (2929 Secs) *[==>]*	*[2]*
5	DG Tau B - GO-WaveCal 2 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	*[2]*
6	DG Tau B - Blue Jet Exp 3 (720357)	(2) NAME-DG-TAU-B	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		SAME POS AS 2		2929 Secs (2929 Secs) *[==>]*	*[3]*
7	DG Tau B - GO-WaveCal 3 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	*[3]*

Orbit Structure






Orbit 3
Server Version: 20170109
Unused Orbital Visibility = 0
Occultation
Exp. 6 (Auto-WAVECAL)
Exp. 7
Home
GS Reacq
Exp. 6
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14243, DG Tau B - Red Jet PA=296 (03) Thu Apr 20 01:00:29 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: STIS/NUV-MAMA, STIS/CCD

Special Requirements: ORIENT 71D TO 71 D

Comments: The slit should be perpendicular to the jet PA.
i.e. ORIENT = 296+45-90=251 or 296+45+90=71
The slit should then be offset from the star in the direction along the jet.
i.e. POS TARG = (+4.6,0.0) or POS TARG = (-4.6,0.0), depending on the ORIENT value (which in turn depends on guide star availability).

Diagnostics

(DG Tau B - Red Jet PA=296 (03)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE

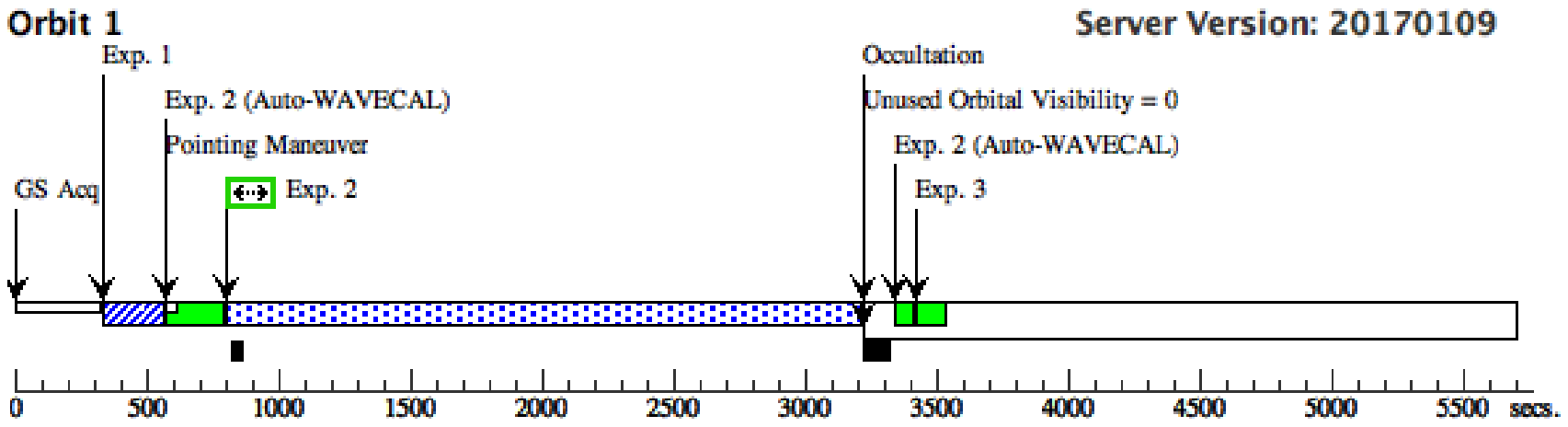
Fixed Targets

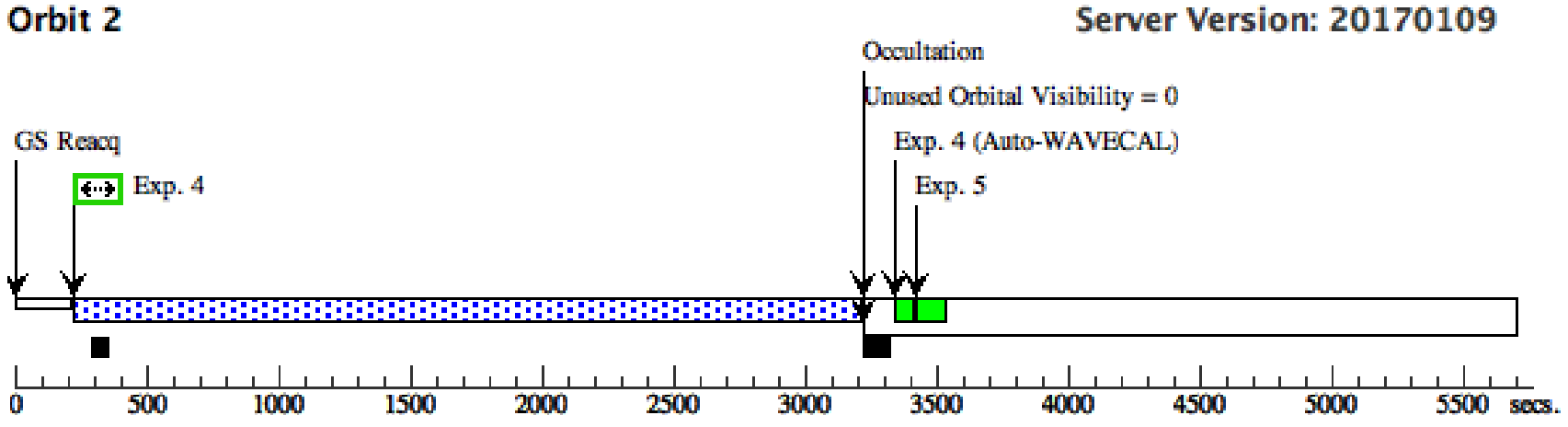
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NAME-DG-TAU-B	Offset from V-DG-TAU RA Offset: -2.032 Secs Dec Offset: -45.93 Arcsec		V=9.3 J 14.576; H 12.932; K 11.594; The star DG Tau B is completely obscured in the optical by its edg e-on disk/flattened envelope.	Offset Position (NAME-DG-TAU-B)
		Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *V-Mag not available. Value inserted here to satisfy warnings of BOT requirement.* *Position w.r.t. DG TAU:* *RA-OFF=-2.032 s* *DEC-OFF=-45.93 "*			
(3)	V-DG-TAU	RA: 04 27 4.6980 (66.7695750d) Dec: +26 06 16.31 (26.10453d) Equinox: J2000		V=10.5	Reference Frame: ICRS
		Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.			

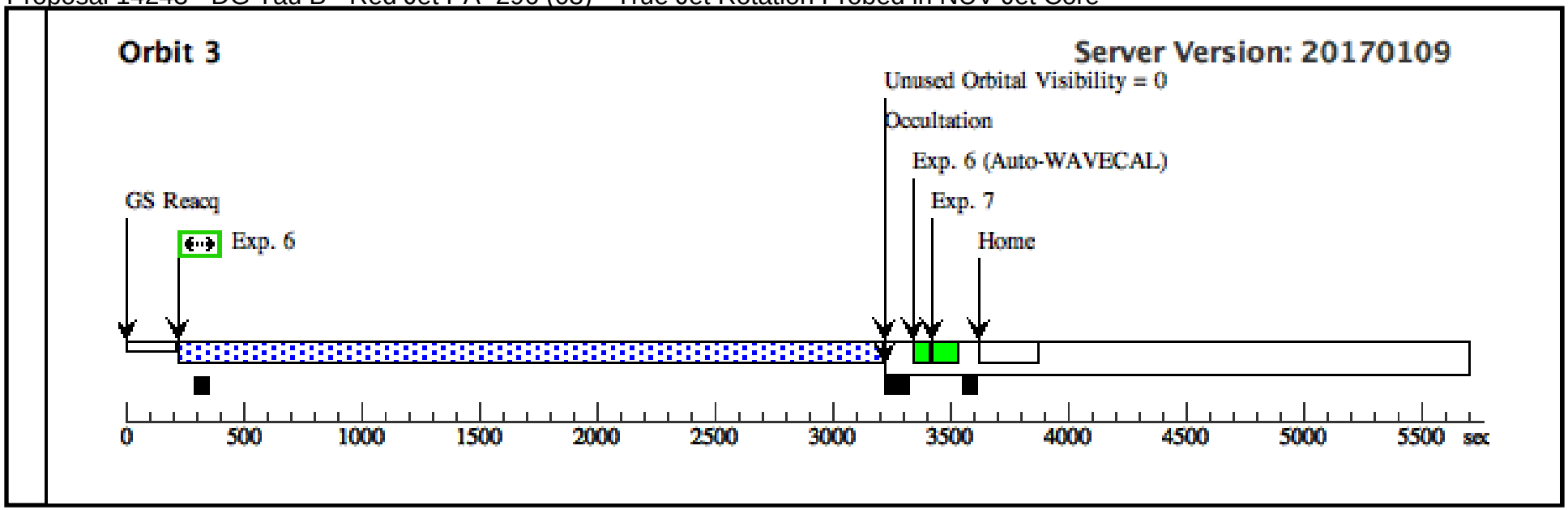
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	DG Tau - ACQ (720527)	(3) V-DG-TAU	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARIO BASE1B3		0.1 Secs (0.1 Secs) *[==>]*	*[1]*
2	DG Tau B - Red Jet Exp 1 (720357)	(2) NAME-DG-TAU-B	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		POS TARG -5.0,0.0		2395 Secs (2395 Secs) *[==>]*	*[1]*
3	DG Tau B - GO-WaveCal 1 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	*[1]*
4	DG Tau B - Red Jet Exp 2 (720357)	(2) NAME-DG-TAU-B	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		SAME POS AS 2		2929 Secs (2929 Secs) *[==>]*	*[2]*
5	DG Tau B - GO-WaveCal 2 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	*[2]*
6	DG Tau B - Red Jet Exp 3 (720357)	(2) NAME-DG-TAU-B	STIS/NUV-MAMA, ACCUM, 6X0.2	E230M 2707 A		SAME POS AS 2		2929 Secs (2929 Secs) *[==>]*	*[3]*
7	DG Tau B - GO-WaveCal 3 in occultation	WAVE	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				20 Secs (20 Secs) *[==>]*	*[3]*

Orbit Structure






Orbit 3
Server Version: 20170109
Unused Orbital Visibility = 0
Occultation
Exp. 6 (Auto-WAVECAL)
Exp. 7
Home
GS Reacq
Exp. 6
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec