



# 15128 - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

Cycle: 25, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

## INVESTIGATORS

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## VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) V-T-CHA	COS/FUV COS/NUV	4	31-Jan-2018 14:12:16.0	yes
1A	(1) V-T-CHA CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	31-Jan-2018 14:12:19.0	yes
02	(1) V-T-CHA	COS/FUV COS/NUV	4	31-Jan-2018 14:12:23.0	yes

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
2A	(1) V-T-CHA CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	31-Jan-2018 14:12:26.0	yes
03	(1) V-T-CHA	COS/FUV COS/NUV	4	31-Jan-2018 14:12:30.0	yes
3A	(1) V-T-CHA CCDFLAT	STIS/CCD STIS/NUV-MAMA	1	31-Jan-2018 14:12:33.0	yes

15 Total Orbits Used

## ABSTRACT

To better understand how Earth-like planets form around low-mass stars, we propose to study the UV (HST), X-ray (XMM), and optical (LCOGT) variability of the young star T Cha. This variability is caused by obscuration of the star by clumpy material in the rim of its inner disk. Changing sight lines through the disk allow measurement of the temperature and column density of both molecular and atomic gas and the physical properties of the dust grains in the well-mixed inner disk, as well as determining the gas-to-dust ratio. The gas-to-dust ratio affects planetesimal growth and disk stability but is difficult to measure in local regions of disks. Three 5 orbit visits, separated by 3-7 days, are required for use of analysis techniques comprising both differential "pair-method" comparison of spectra with differing  $A_v$  (particularly important for determining the dust extinction curve,  $A_\lambda$ , where removal of the foreground extinction requires multiple epochs) and detailed spectral fitting of gas absorption features at each epoch. The inner disk of T Cha is particularly interesting, because T Cha has a transitional disk with a large gap at 0.2-15 AU in the dust disk and allows study of the gas and dust structure in the terrestrial planet formation zone during this important rapid phase of protoplanetary disk evolution. Characterizing the high energy (UV/X-ray) radiation field is also essential for in-depth studies of the disk in other spectral regions. Results from these observations will have wide relevance to the modeling and understanding of protoplanetary disk structure and evolution, and the complex gas and dust physics and chemistry in disk surface layers.

## OBSERVING DESCRIPTION

### TARGET:

T Cha is a 1.5 solar-mass T Tauri star with a K0 spectral type. It is associated with the Epsilon Cha moving group at a distance of ~100 pc and has an age of ~7 Myr. The H Balmer alpha line profile varies strongly from pure emission to inverse P Cygni on a timescale of one day or less (Alcala et al. 1993, A&A, 272, 225). The extinction towards the star varies by 3 magnitudes in the V band. This variability is not periodic nor predictable, but

## Proposal 15128 (STScI Edit Number: 1, Created: Wednesday, January 31, 2018 2:12:34 PM EST) - Overview

occurs on short timescales and is seen in all studies over the last 25 years (1992-1995: Schisano et al. 2009, A&A, 501, 1013; 2000-2009: Percy et al. 2010, JAAVSO, 38,1 ; 2015: our work). Schisano et al. (2009) analyzed the optical variability of T Cha and concluded that the changes are due to clumps in the inner disk in our line-of-sight to the central star. The position and proper motions of T Cha are well determined by Hipparcos and Gaia. ETC feasibility calculations were performed for a variety of light levels, typically for maximum light ( $V=11.3$ ,  $A_V=1.3$ ) and for 1 and 2 magnitudes of additional  $A_V$ . ETC calculations used the UV/optical spectrum of a very similar proxy target (GM Aur) scaled appropriately for magnitude difference and appropriate amounts of circumstellar and interstellar/cloud absorption. Scisano et al showed that the circumstellar absorption has  $R_V=5.5$ .

We expect the target to be unpredictably variable with decreases in flux throughout the UV and optical on timescales of days certainly and probably measurably on timescales of a few hours.

### OBSERVING STRATEGY:

We shall use three 5 orbit visits (constructed as a 4 orbit COS visit immediately followed by a 1 orbit STIS visit) to obtain medium resolution ( $R\sim 18,000$ ) FUV spectra of T Cha using the COS G160M+G130M gratings (covering 1150-1770 Å). The three visits are to be separated by 3-7 days. G130M will be used with the 1291 setting and G160M with the 1577 and 1600 settings. These spectra will record the UV transition region and chromospheric emission line spectrum of the central star, sampling a wide range of elements and ionization states -- e.g. strong lines of H I, C I-IV, O III-IV, Si I-IV, N V, He II (plus Mg II and Fe II from STIS G230L) --- and also the strong molecular hydrogen ( $H_2$ ) and CO emission produced by H Lyman alpha fluorescent excitation of warm molecular gas on the surface of the proto-planetary disk. The G130M 1291 FP-POS=4 setting is used exclusively so that as much as possible of the red wing of H Lyman alpha is recorded -- we will measure changes in circumstellar  $H_2$  absorptions on the red wing of this emission line in the 1218-1220 Å region. The COS observations end with G140L exposures that will record the full FUV spectrum at the same time; thereby allowing better linkage to the STIS low resolution spectra.

In the final orbit of each visit we shall obtain low resolution ( $R\sim 500$ ) STIS spectra using the MAMA G230L (1570-3180 Å) and CCD G430L (2900-5700 Å) + G750L (5399-10000 Å) gratings that will allow us to measure the variable level and shape of the dust extinction ( $A_\lambda$ ) throughout the FUV, NUV and far into the optical. It is vital that the STIS and COS spectra be obtained in adjacent orbits. A separate orbit is needed for the STIS observations because a significant spacecraft maneuver (best hidden in Earth occultation) and new acquisition are required to change from COS to STIS. The STIS data insure that the optical status is recorded independent of weather-dependent ground-based data.

### COS OBSERVATIONS:

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COS target acquisition will use a 120 sec exposure NUV ACQ/IMAGE using MIRRORB+PSA, which gives S/N = 50, 25, 13 for A\_V=1.3, 2.3, 3.3. For maximum light (A\_V=1.3) the peak pixel count rate is 5.8 ct/s (the limit is 50 ct/s.) With this exposure time adequate signal is reached for all expected target brightness levels.

COS FUV observations will be split between the G130M 1291 setting and the G160M 1577/1600 settings. The 1390-1430 Å region is covered by both gratings providing continuous coverage of Si IV, 3 CO bandheads, and many H<sub>2</sub> fluorescent lines. The spectra would be interleaved in a repeated G130M 1291 -G160M 1577 -G160M 1600 sequence spread over most of the 4 orbits. The final part of the fourth orbit is used to obtain a lower resolution G140L spectrum.

### STIS OBSERVATIONS:

A 0.1 sec exposure CCD ACQ with F28X50LP will be used to acquire the target. This exposure time is sufficient for all plausible target brightness levels. This will be followed G430L (100 s) and G750L (10 s) CCD ACCUMs and a much longer (850 s) G230L NUV-MAMA TIME-TAG observation. The G430L and G750L exposures are repeated to complete the orbit followed by a G750L CCDFLAT.

### COORDINATED OBSERVATIONS:

75 kiloseconds (three 25 ksec observations) of XMM-Newton time was approved by the HST review to provide coordinated (ideally simultaneous) X-ray observations at the times of the HST UV/optical observations.

We shall obtain ground-based photometric and spectroscopic monitoring of T Cha during the weeks surrounding the HST observations. The ground-based observations do not drive any scheduling requirements but do imply that the January-July time window would be the preferred season from that perspective.

# Proposal 15128 - TCha\_visit1 (01) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

Wed Jan 31 19:12:34 GMT 2018

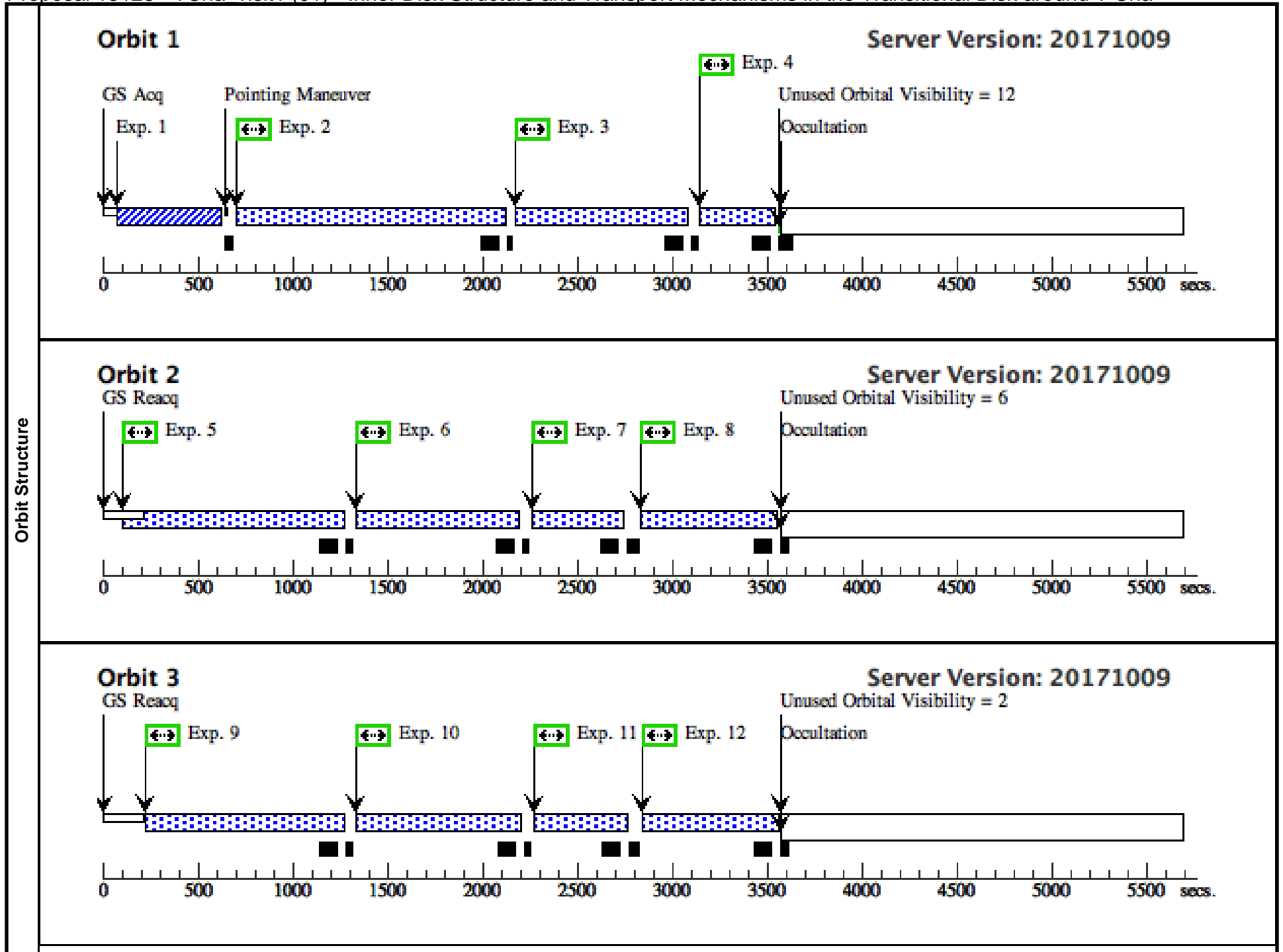
<b>Visit</b>	<b>Proposal 15128, TCha_visit1 (01), implementation</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: COS/FUV, COS/NUV Special Requirements: SEQ 01,1A WITHIN 4.1 Orbits																
<b>Diagnostics</b>	(TCha_visit1 (01)) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.																
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>V-T-CHA</td> <td>                     RA: 11 57 13.5500 (179.3064583d)                      Dec: -79 21 31.54 (-79.35876d)                      Equinox: J2000                 </td> <td>                     Proper Motion RA: -41.66 mas/yr                      Proper Motion Dec: -8.65 mas/yr                      Parallax: 0.0093"                      Epoch of Position: 2000.0                 </td> <td>V=11.3</td> <td>Reference Frame: ICRS</td> </tr> </tbody> </table>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	V-T-CHA	RA: 11 57 13.5500 (179.3064583d) Dec: -79 21 31.54 (-79.35876d) Equinox: J2000	Proper Motion RA: -41.66 mas/yr Proper Motion Dec: -8.65 mas/yr Parallax: 0.0093" Epoch of Position: 2000.0	V=11.3	Reference Frame: ICRS	<p><i>Comments: Coordinates, parallax, and proper motions from van Leeuwen (2007, "Hipparcos, the New Reduction") and Gaia DR1. Proper motions confirmed by Teixeira et al (2000, A&amp;A, 361, 1143). Gaia DR1 provides accurate sub-mas positions at epoch 2015.0.</i></p> <p><i>Typical V magnitudes for this star range from V=11.3 down to at least V=13.3.</i></p> <p><i>Only BOT warnings are from the target star itself and are invalidated by ETC runs.</i></p> <p><i>Category=STAR</i>  <i>Description=[PROTOPLANETARY DISK, T TAURI STAR]</i>  <i>Extended=NO</i></p>			
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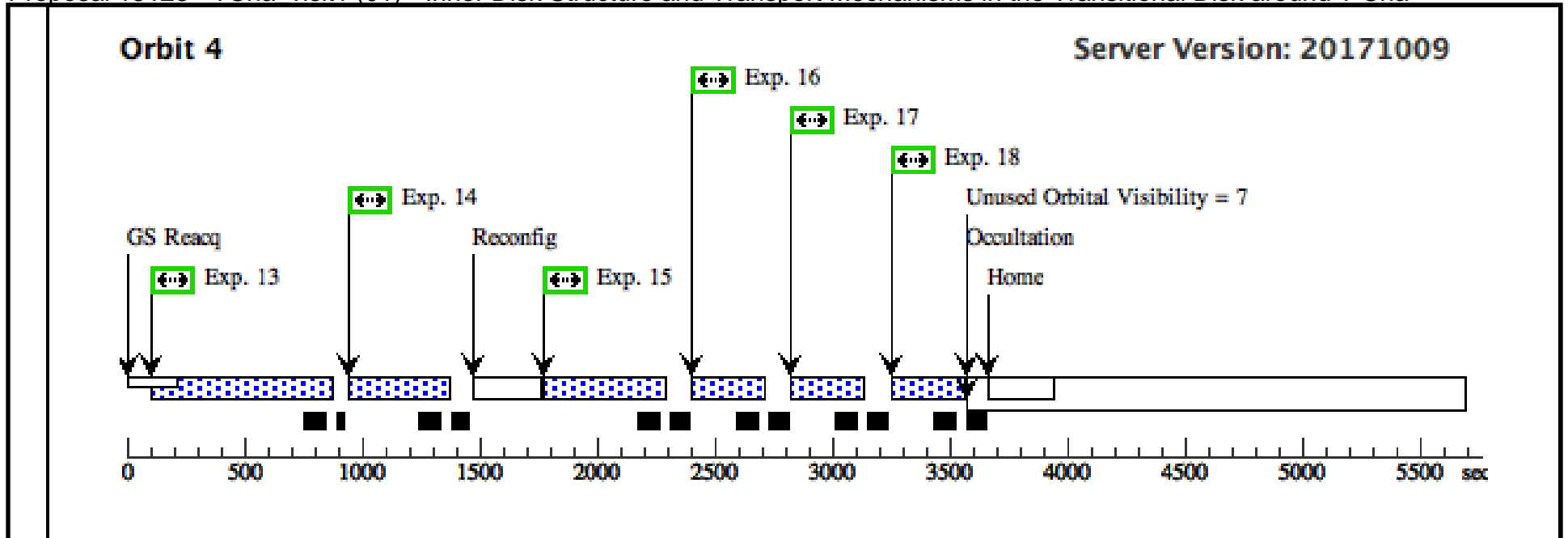
Proposal 15128 - TCha\_visit1 (01) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
Exposures	1	(COS.ta.100 9011)	(1) V-T-CHA	COS/NUV, ACQ/IMAGE, PSA	MIRRORB			120 Secs (120 Secs) [==>]	[1]	
	<p><i>Comments: NUV target acquisition with MIRRORB. Exposure time of 120 seconds to accomodate target variability. At maximum light (V=11.3) achieve S/N~70 with brightest pixel at 5.75 c/s (COS.ta.1009011). At minimum light (V=13.3) achieve S/N~18 with brightest pixel at 0.40 c/s (COS.ta.1009008).</i></p>									
	2	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=11 40; SEGMENT=BOTH; FP-POS=4		1250 Secs (1250 Secs) [==>]	[1]	
	<p><i>Comments: All G130M observations obtained at 1291 setting to allow use of both SEGMENTS A and B. FP-POS=4 used for all G130M 1291 exposures because of need to observe molecular hydrogen absorption lines on the red wing of H Lyman alpha between 1218 and 1220 A. ETC run is for maximum light conditions.</i></p>									
	3	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=64 0; SEGMENT=BOTH; FP-POS=1		750 Secs (750 Secs) [==>]	[1]	
	4	(COS.sp.101 0627)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=16 5; SEGMENT=BOTH; FP-POS=1		275 Secs (275 Secs) [==>]	[1]	
	5	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=89 0; SEGMENT=BOTH; FP-POS=4		1000 Secs (1000 Secs) [==>]	[2]	
	6	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=59 0; SEGMENT=BOTH; FP-POS=2		700 Secs (700 Secs) [==>]	[2]	
	7	(COS.sp.101 0627)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=24 5; SEGMENT=BOTH; FP-POS=2		355 Secs (355 Secs) [==>]	[2]	
	8	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=44 0; SEGMENT=BOTH; FP-POS=4		550 Secs (550 Secs) [==>]	[2]	
9	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=89 0; SEGMENT=BOTH; FP-POS=4		1000 Secs (1000 Secs) [==>]	[3]		
<p><i>Comments: A</i></p>										
10	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=60 0; SEGMENT=BOTH; FP-POS=3		710 Secs (710 Secs) [==>]	[3]		

Proposal 15128 - TCha\_visit1 (01) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

11	(COS.sp.101 (1) V-T-CHA 0627)	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=25 0; SEGMENT=BOTH; FP-POS=3	360 Secs (360 Secs) [==>]	[3]
12	(COS.sp.101 (1) V-T-CHA 0625)	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=44 0; SEGMENT=BOTH; FP-POS=4	550 Secs (550 Secs) [==>]	[3]
13	(COS.sp.101 (1) V-T-CHA 0625)	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=50 0; SEGMENT=BOTH; FP-POS=4	610 Secs (610 Secs) [==>]	[4]
14	(COS.sp.101 (1) V-T-CHA 0626)	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=19 0; SEGMENT=BOTH; FP-POS=4	300 Secs (300 Secs) [==>]	[4]
15	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=1; BUFFER-TIME=14 5	255 Secs (255 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
16	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=2; BUFFER-TIME=15 0	260 Secs (260 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
17	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=3; BUFFER-TIME=15 0	260 Secs (260 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
18	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=4; BUFFER-TIME=14 5	255 Secs (255 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-16 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						

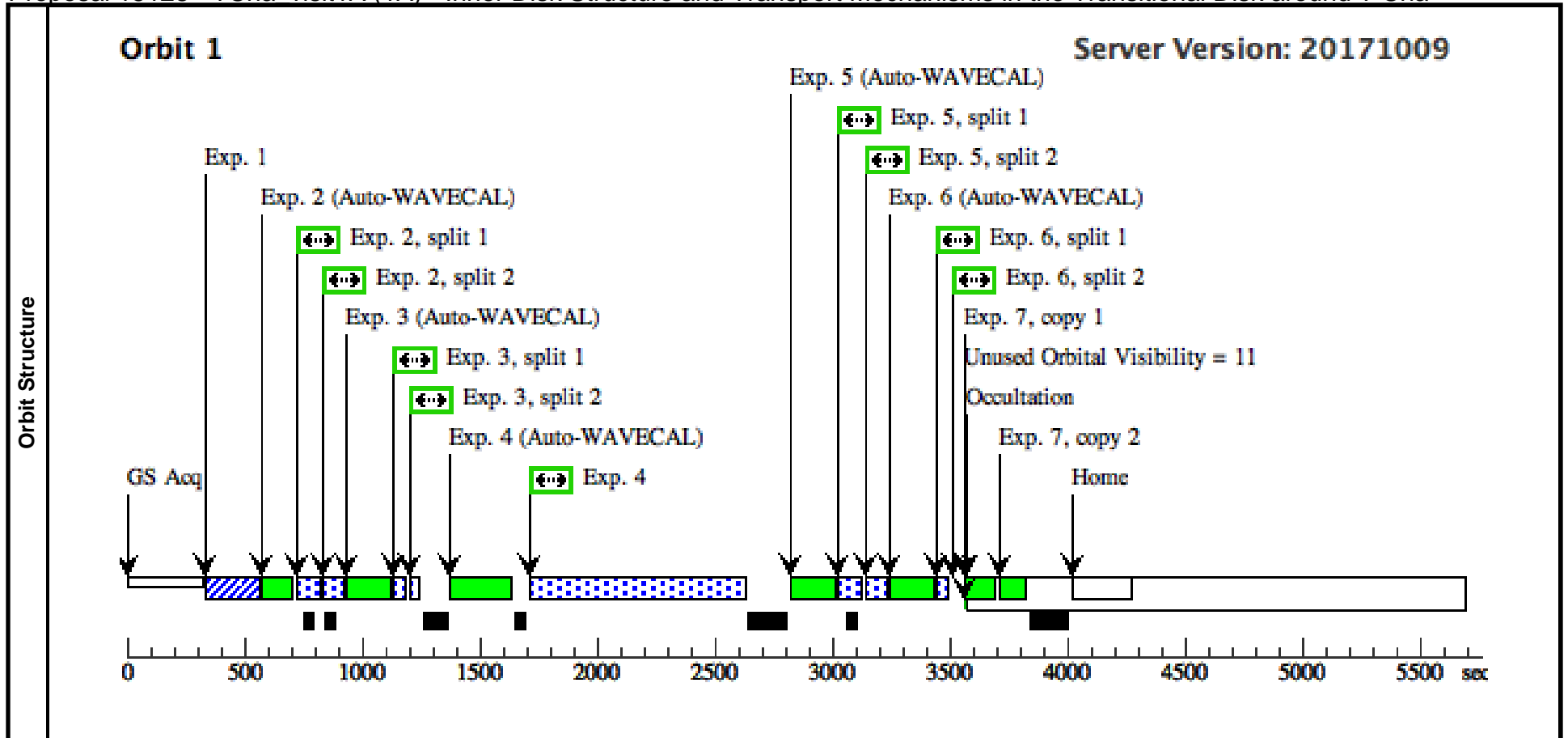




Proposal 15128 - TCha\_visit1A (1A) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

Wed Jan 31 19:12:34 GMT 2018

Visit	<b>Proposal 15128, TCha_visit1A (1A), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/NUV-MAMA, STIS/CCD Special Requirements: AFTER 01									
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
Fixed Targets	(1)	V-T-CHA	RA: 11 57 13.5500 (179.3064583d) Dec: -79 21 31.54 (-79.35876d) Equinox: J2000	Proper Motion RA: -41.66 mas/yr Proper Motion Dec: -8.65 mas/yr Parallax: 0.0093" Epoch of Position: 2000.0	V=11.3	Reference Frame: ICRS				
	<p><i>Comments: Coordinates, parallax, and proper motions from van Leeuwen (2007, "Hipparcos, the New Reduction") and Gaia DR1. Proper motions confirmed by Teixeira et al (2000, A&amp;A, 361, 1143). Gaia DR1 provides accurate sub-mas positions at epoch 2015.0.</i></p> <p><i>Typical V magnitudes for this star range from V=11.3 down to at least V=13.3.</i></p> <p><i>Only BOT warnings are from the target star itself and are invalidated by ETC runs.</i></p> <p>Category=STAR Description=[PROTOPLANETARY DISK, T TAURI STAR] Extended=NO</p>									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.101 6210)	(1) V-T-CHA	STIS/CCD, ACQ, F28X50LP	MIRROR				0.1 Secs (0.1 Secs) [==>]	[1]
	<p><i>Comments: ETC checks made for wide variety of source brightness: For typical current era maximum brightness (V=11.3) 0.1 sec exposure gives S/N=156 (STIS.ta.1016403). For very faint level (V=14.5) S/N=30 (STIS.ta.1016211). For unexpectedly high brightness (V=10.4 -- largest very long-term number) the S/N=238 (STIS.ta.1016210). Under all these scenarios the 0.1 second exposure has a better than factor of 5 cushion compared to the "Time to Saturation".</i></p>									
	2	(STIS.sp.10 10633)	(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G430L 4300 A				100 Secs (100 Secs) [==>(Split 1)] [==>(Split 2)]	[1]
	3		(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G750L 7751 A				10 Secs (10 Secs) [==>(Split 1)] [==>(Split 2)]	[1]
	4	(STIS.sp.10 10632)	(1) V-T-CHA	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	G230L 2376 A	BUFFER-TIME=81 0			850 Secs (850 Secs) [==>]	[1]
	5	(STIS.sp.10 10633)	(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G430L 4300 A				100 Secs (100 Secs) [==>(Split 1)] [==>(Split 2)]	[1]
	6		(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G750L 7751 A				10 Secs (10 Secs) [==>(Split 1)] [==>(Split 2)]	[1]
7		CCDFLAT	STIS/CCD, ACCUM, 0.2X0.06	G750L 7751 A				[==>(Copy 1)] [==>(Copy 2)]	[1]	



# Proposal 15128 - TCha\_visit2 (02) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

Wed Jan 31 19:12:35 GMT 2018

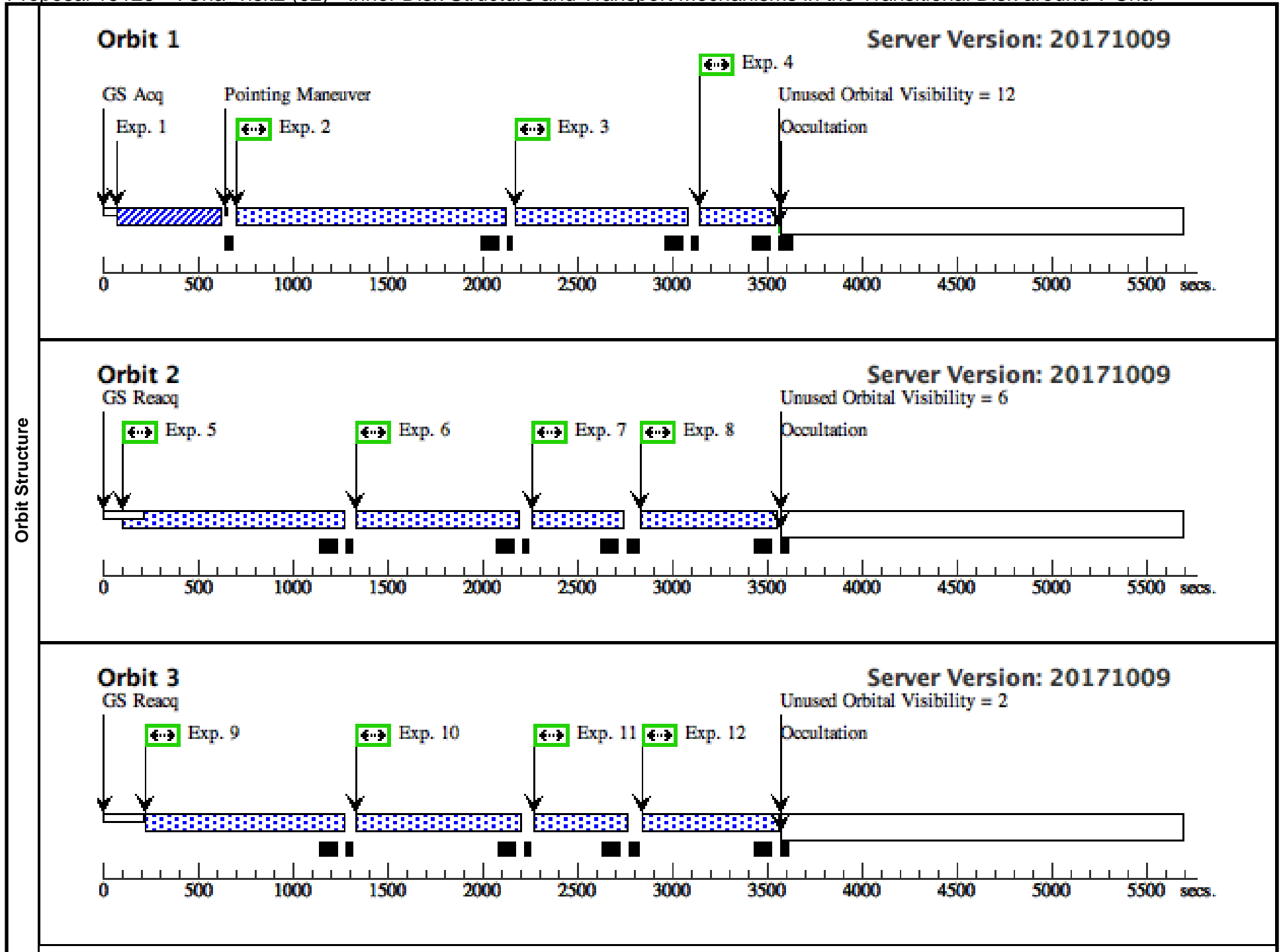
<b>Visit</b>	<b>Proposal 15128, TCha_visit2 (02), implementation</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: COS/FUV, COS/NUV Special Requirements: AFTER 01 BY 3 D TO 7 D; SEQ 02.2A WITHIN 4.1 Orbits																	
<b>Diagnostics</b>	(TCha_visit2 (02)) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.																	
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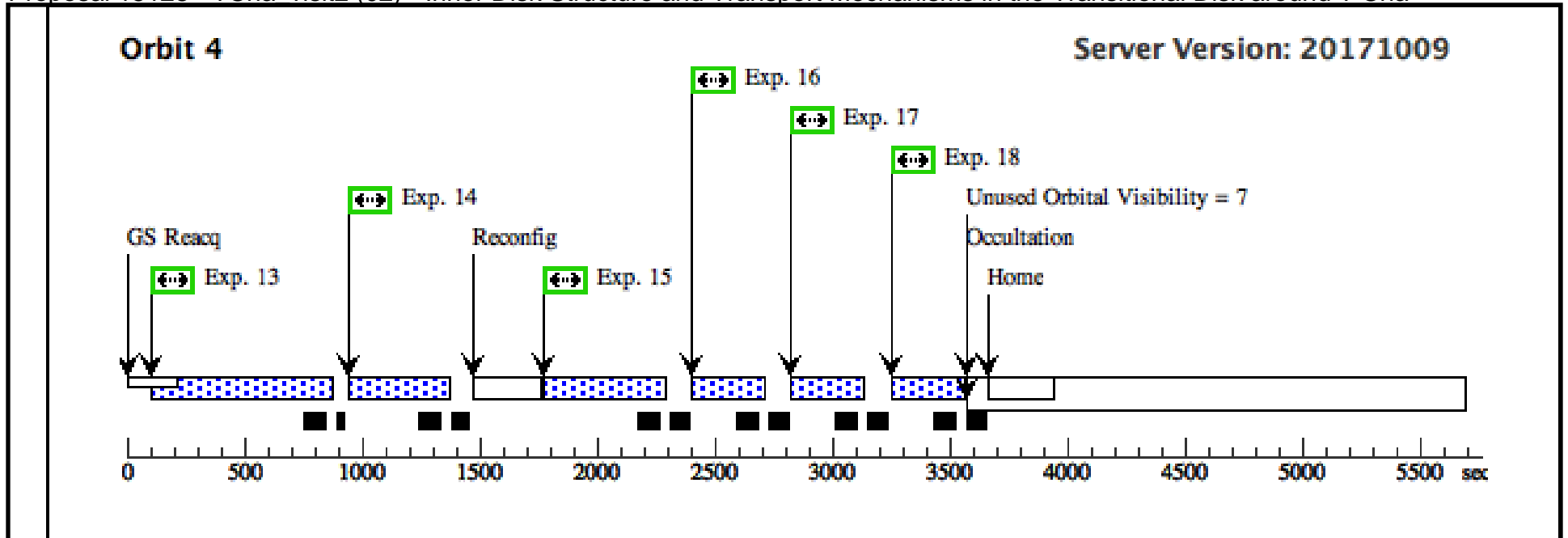
Proposal 15128 - TCha\_visit2 (02) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
Exposures	1	(COS.ta.100 9011)	(1) V-T-CHA	COS/NUV, ACQ/IMAGE, PSA	MIRRORB			120 Secs (120 Secs) [==>]	[1]	
	<p><i>Comments: NUV target acquisition with MIRRORB. Exposure time of 120 seconds to accomodate target variability. At maximum light (V=11.3) achieve S/N~70 with brightest pixel at 5.75 c/s (COS.ta.1009011). At minimum light (V=13.3) achieve S/N~18 with brightest pixel at 0.40 c/s (COS.ta.1009008).</i></p>									
	2	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=11 40; SEGMENT=BOTH; FP-POS=4		1250 Secs (1250 Secs) [==>]	[1]	
	<p><i>Comments: All G130M observations obtained at 1291 setting to allow use of both SEGMENTS A and B. FP-POS=4 used for all G130M 1291 exposures because of need to observe molecular hydrogen absorption lines on the red wing of H Lyman alpha between 1218 and 1220 A. ETC run is for maximum light conditions.</i></p>									
	3	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=64 0; SEGMENT=BOTH; FP-POS=1		750 Secs (750 Secs) [==>]	[1]	
	4	(COS.sp.101 0627)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=16 5; SEGMENT=BOTH; FP-POS=1		275 Secs (275 Secs) [==>]	[1]	
	5	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=89 0; SEGMENT=BOTH; FP-POS=4		1000 Secs (1000 Secs) [==>]	[2]	
	6	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=59 0; SEGMENT=BOTH; FP-POS=2		700 Secs (700 Secs) [==>]	[2]	
	7	(COS.sp.101 0627)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=24 5; SEGMENT=BOTH; FP-POS=2		355 Secs (355 Secs) [==>]	[2]	
	8	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=44 0; SEGMENT=BOTH; FP-POS=4		550 Secs (550 Secs) [==>]	[2]	
9	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=89 0; SEGMENT=BOTH; FP-POS=4		1000 Secs (1000 Secs) [==>]	[3]		
<p><i>Comments: A</i></p>										
10	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=60 0; SEGMENT=BOTH; FP-POS=3		710 Secs (710 Secs) [==>]	[3]		

Proposal 15128 - TCha\_visit2 (02) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

11	(COS.sp.101 (1) V-T-CHA 0627)	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=25 0; SEGMENT=BOTH; FP-POS=3	360 Secs (360 Secs) [==>]	[3]
12	(COS.sp.101 (1) V-T-CHA 0625)	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=44 0; SEGMENT=BOTH; FP-POS=4	550 Secs (550 Secs) [==>]	[3]
13	(COS.sp.101 (1) V-T-CHA 0625)	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=50 0; SEGMENT=BOTH; FP-POS=4	610 Secs (610 Secs) [==>]	[4]
14	(COS.sp.101 (1) V-T-CHA 0626)	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=19 0; SEGMENT=BOTH; FP-POS=4	300 Secs (300 Secs) [==>]	[4]
15	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=1; BUFFER-TIME=14 5	255 Secs (255 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
16	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=2; BUFFER-TIME=15 0	260 Secs (260 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
17	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=3; BUFFER-TIME=15 0	260 Secs (260 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
18	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=4; BUFFER-TIME=14 5	255 Secs (255 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						

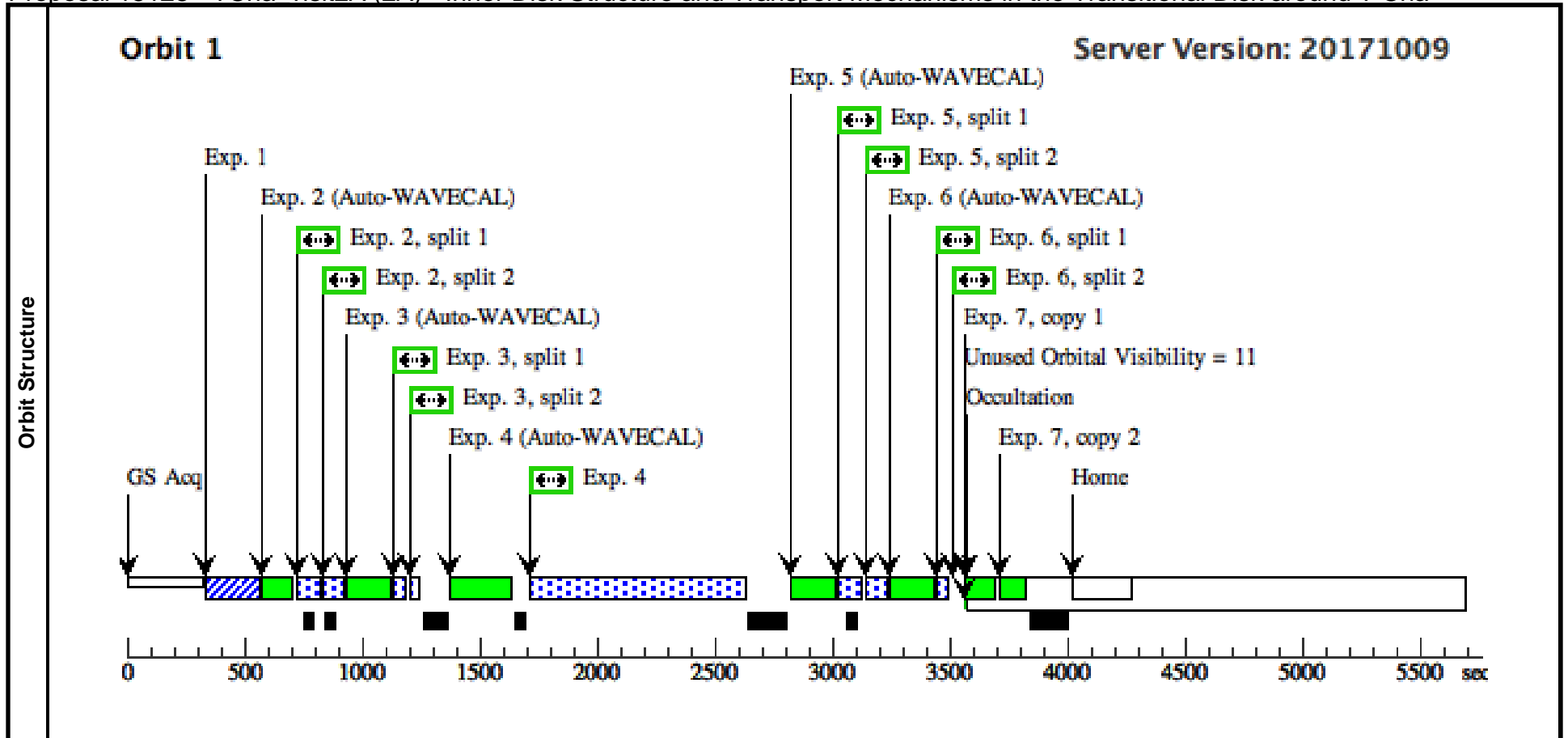




Proposal 15128 - TCha\_visit2A (2A) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

Wed Jan 31 19:12:35 GMT 2018

Visit	<b>Proposal 15128, TCha_visit2A (2A), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/NUV-MAMA, STIS/CCD Special Requirements: AFTER 02									
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
Fixed Targets	(1)	V-T-CHA	RA: 11 57 13.5500 (179.3064583d) Dec: -79 21 31.54 (-79.35876d) Equinox: J2000	Proper Motion RA: -41.66 mas/yr Proper Motion Dec: -8.65 mas/yr Parallax: 0.0093" Epoch of Position: 2000.0	V=11.3	Reference Frame: ICRS				
	<p><i>Comments: Coordinates, parallax, and proper motions from van Leeuwen (2007, "Hipparcos, the New Reduction") and Gaia DR1. Proper motions confirmed by Teixeira et al (2000, A&amp;A, 361, 1143). Gaia DR1 provides accurate sub-mas positions at epoch 2015.0.</i></p> <p><i>Typical V magnitudes for this star range from V=11.3 down to at least V=13.3.</i></p> <p><i>Only BOT warnings are from the target star itself and are invalidated by ETC runs.</i></p> <p><i>Category=STAR</i>  <i>Description=[PROTOPLANETARY DISK, T TAURI STAR]</i>  <i>Extended=NO</i></p>									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.101 6210)	(1) V-T-CHA	STIS/CCD, ACQ, F28X50LP	MIRROR				0.1 Secs (0.1 Secs)	
									[==>]	[1]
	2	(STIS.sp.10 10633)	(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G430L 4300 A				100 Secs (100 Secs)	
									[==>(Split 1)]	[1]
									[==>(Split 2)]	
	3		(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G750L 7751 A				10 Secs (10 Secs)	
									[==>(Split 1)]	[1]
								[==>(Split 2)]		
4	(STIS.sp.10 10632)	(1) V-T-CHA	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	G230L 2376 A		BUFFER-TIME=81 0			850 Secs (850 Secs)	
									[==>]	[1]
5	(STIS.sp.10 10633)	(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G430L 4300 A					100 Secs (100 Secs)	
									[==>(Split 1)]	[1]
									[==>(Split 2)]	
6		(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G750L 7751 A					10 Secs (10 Secs)	
									[==>(Split 1)]	[1]
									[==>(Split 2)]	
7		CCDFLAT	STIS/CCD, ACCUM, 0.2X0.06	G750L 7751 A					[==>(Copy 1)]	[1]
									[==>(Copy 2)]	



# Proposal 15128 - TCha\_visit3 (03) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

Wed Jan 31 19:12:35 GMT 2018

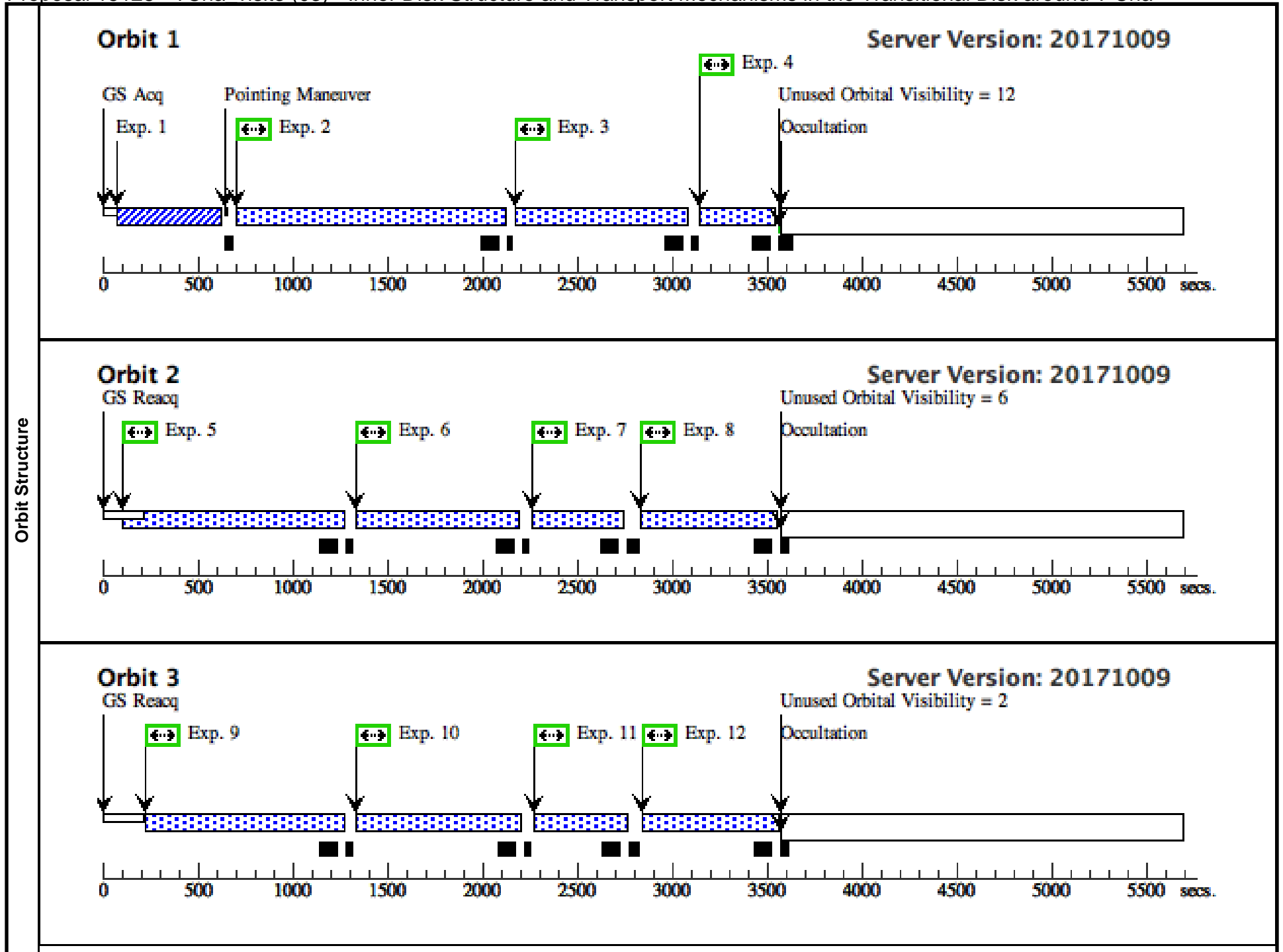
<b>Visit</b>	<b>Proposal 15128, TCha_visit3 (03), implementation</b> <b>Diagnostic Status: Warning</b> Scientific Instruments: COS/FUV, COS/NUV Special Requirements: AFTER 02 BY 3 D TO 7 D; SEQ 03,3A WITHIN 4.1 Orbits																	
<b>Diagnostics</b>	(TCha_visit3 (03)) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.																	
<b>Fixed Targets</b>	<table border="1"> <thead> <tr> <th>#</th> <th>Name</th> <th>Target Coordinates</th> <th>Targ. Coord. Corrections</th> <th>Fluxes</th> <th>Miscellaneous</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>V-T-CHA</td> <td>                     RA: 11 57 13.5500 (179.3064583d)                      Dec: -79 21 31.54 (-79.35876d)                      Equinox: J2000                 </td> <td>                     Proper Motion RA: -41.66 mas/yr                      Proper Motion Dec: -8.65 mas/yr                      Parallax: 0.0093"                      Epoch of Position: 2000.0                 </td> <td>V=11.3</td> <td>Reference Frame: ICRS</td> </tr> </tbody> </table>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(1)	V-T-CHA	RA: 11 57 13.5500 (179.3064583d) Dec: -79 21 31.54 (-79.35876d) Equinox: J2000	Proper Motion RA: -41.66 mas/yr Proper Motion Dec: -8.65 mas/yr Parallax: 0.0093" Epoch of Position: 2000.0	V=11.3	Reference Frame: ICRS	<p><i>Comments: Coordinates, parallax, and proper motions from van Leeuwen (2007, "Hipparcos, the New Reduction") and Gaia DR1. Proper motions confirmed by Teixeira et al (2000, A&amp;A, 361, 1143). Gaia DR1 provides accurate sub-mas positions at epoch 2015.0.</i></p> <p><i>Typical V magnitudes for this star range from V=11.3 down to at least V=13.3.</i></p> <p><i>Only BOT warnings are from the target star itself and are invalidated by ETC runs.</i></p> <p><i>Category=STAR</i></p> <p><i>Description=[PROTOPLANETARY DISK, T TAURI STAR]</i></p> <p><i>Extended=NO</i></p>				
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous													
(1)	V-T-CHA	RA: 11 57 13.5500 (179.3064583d) Dec: -79 21 31.54 (-79.35876d) Equinox: J2000	Proper Motion RA: -41.66 mas/yr Proper Motion Dec: -8.65 mas/yr Parallax: 0.0093" Epoch of Position: 2000.0	V=11.3	Reference Frame: ICRS													

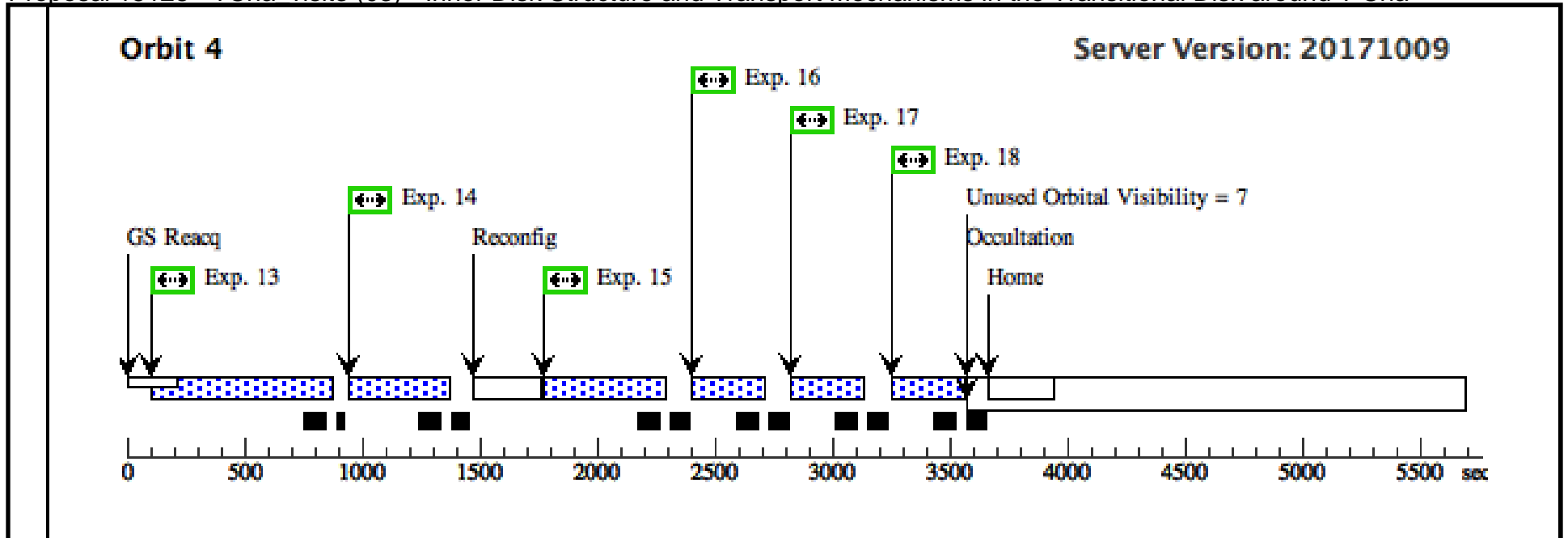
Proposal 15128 - TCha\_visit3 (03) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
Exposures	1	(COS.ta.100 9011)	(1) V-T-CHA	COS/NUV, ACQ/IMAGE, PSA	MIRRORB			120 Secs (120 Secs) [==>]	[1]	
	<p><i>Comments: NUV target acquisition with MIRRORB. Exposure time of 120 seconds to accomodate target variability. At maximum light (V=11.3) achieve S/N~70 with brightest pixel at 5.75 c/s (COS.ta.1009011). At minimum light (V=13.3) achieve S/N~18 with brightest pixel at 0.40 c/s (COS.ta.1009008).</i></p>									
	2	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=11 40; SEGMENT=BOTH; FP-POS=4		1250 Secs (1250 Secs) [==>]	[1]	
	<p><i>Comments: All G130M observations obtained at 1291 setting to allow use of both SEGMENTS A and B. FP-POS=4 used for all G130M 1291 exposures because of need to observe molecular hydrogen absorption lines on the red wing of H Lyman alpha between 1218 and 1220 A. ETC run is for maximum light conditions.</i></p>									
	3	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=64 0; SEGMENT=BOTH; FP-POS=1		750 Secs (750 Secs) [==>]	[1]	
	4	(COS.sp.101 0627)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=16 5; SEGMENT=BOTH; FP-POS=1		275 Secs (275 Secs) [==>]	[1]	
	5	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=89 0; SEGMENT=BOTH; FP-POS=4		1000 Secs (1000 Secs) [==>]	[2]	
	6	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=59 0; SEGMENT=BOTH; FP-POS=2		700 Secs (700 Secs) [==>]	[2]	
	7	(COS.sp.101 0627)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=24 5; SEGMENT=BOTH; FP-POS=2		355 Secs (355 Secs) [==>]	[2]	
	8	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=44 0; SEGMENT=BOTH; FP-POS=4		550 Secs (550 Secs) [==>]	[2]	
9	(COS.sp.101 0625)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=89 0; SEGMENT=BOTH; FP-POS=4		1000 Secs (1000 Secs) [==>]	[3]		
<p><i>Comments: A</i></p>										
10	(COS.sp.101 0626)	(1) V-T-CHA	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=60 0; SEGMENT=BOTH; FP-POS=3		710 Secs (710 Secs) [==>]	[3]		

Proposal 15128 - TCha\_visit3 (03) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

11	(COS.sp.101 (1) V-T-CHA 0627)	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=25 0; SEGMENT=BOTH; FP-POS=3	360 Secs (360 Secs) [==>]	[3]
12	(COS.sp.101 (1) V-T-CHA 0625)	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=44 0; SEGMENT=BOTH; FP-POS=4	550 Secs (550 Secs) [==>]	[3]
13	(COS.sp.101 (1) V-T-CHA 0625)	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=50 0; SEGMENT=BOTH; FP-POS=4	610 Secs (610 Secs) [==>]	[4]
14	(COS.sp.101 (1) V-T-CHA 0626)	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=19 0; SEGMENT=BOTH; FP-POS=4	300 Secs (300 Secs) [==>]	[4]
15	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=1; BUFFER-TIME=14 5	255 Secs (255 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
16	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=2; BUFFER-TIME=15 0	260 Secs (260 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
17	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=3; BUFFER-TIME=15 0	260 Secs (260 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						
18	(COS.sp.101 (1) V-T-CHA 0611)	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=4; BUFFER-TIME=14 5	255 Secs (255 Secs) [==>]	[4]
<i>Comments: Combined exposures 15-18 should provide S/N~5 per res.el. in continuum for V=11.3 (COS.sp.1009024) and S/N~1.5 per res. el. in continuum for V=13.3 (COS.sp.1009023).</i>						





Proposal 15128 - TCha\_visit3A (3A) - Inner Disk Structure and Transport Mechanisms in the Transitional Disk around T Cha

Wed Jan 31 19:12:35 GMT 2018

Visit	<b>Proposal 15128, TCha_visit3A (3A), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/NUV-MAMA, STIS/CCD Special Requirements: AFTER 03									
	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
Fixed Targets	(1)	V-T-CHA	RA: 11 57 13.5500 (179.3064583d) Dec: -79 21 31.54 (-79.35876d) Equinox: J2000	Proper Motion RA: -41.66 mas/yr Proper Motion Dec: -8.65 mas/yr Parallax: 0.0093" Epoch of Position: 2000.0	V=11.3	Reference Frame: ICRS				
	<i>Comments: Coordinates, parallax, and proper motions from van Leeuwen (2007, "Hipparcos, the New Reduction") and Gaia DR1. Proper motions confirmed by Teixeira et al (2000, A&amp;A, 361, 1143). Gaia DR1 provides accurate sub-mas positions at epoch 2015.0.</i>									
	<i>Typical V magnitudes for this star range from V=11.3 down to at least V=13.3.</i>									
	<i>Only BOT warnings are from the target star itself and are invalidated by ETC runs.                      Category=STAR                      Description=[PROTOPLANETARY DISK, T TAURI STAR]                      Extended=NO</i>									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.101 6210)	(1) V-T-CHA	STIS/CCD, ACQ, F28X50LP	MIRROR				0.1 Secs (0.1 Secs)	
									[==>]	[1]
	2	(STIS.sp.10 10633)	(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G430L 4300 A				100 Secs (100 Secs)	
									[==>(Split 1)]	[1]
									[==>(Split 2)]	
	3		(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G750L 7751 A				10 Secs (10 Secs)	
									[==>(Split 1)]	[1]
								[==>(Split 2)]		
4	(STIS.sp.10 10632)	(1) V-T-CHA	STIS/NUV-MAMA, TIME-TAG, 0.2X0.2	G230L 2376 A		BUFFER-TIME=81 0		850 Secs (850 Secs)		
								[==>]	[1]	
5	(STIS.sp.10 10633)	(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G430L 4300 A				100 Secs (100 Secs)		
								[==>(Split 1)]	[1]	
								[==>(Split 2)]		
6		(1) V-T-CHA	STIS/CCD, ACCUM, 0.2X0.2	G750L 7751 A				10 Secs (10 Secs)		
								[==>(Split 1)]	[1]	
								[==>(Split 2)]		
7		CCDFLAT	STIS/CCD, ACCUM, 0.2X0.06	G750L 7751 A				[==>(Copy 1)]	[1]	
								[==>(Copy 2)]		

