



13453 - The Elemental Compositions of Extrasolar Minor Planets

Cycle: 21, Proposal Category: GO

(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) GD-408	COS/FUV COS/NUV	2	30-Jan-2014 21:22:09.0	yes
02	(2) GD-303	COS/FUV	1	30-Jan-2014 21:22:21.0	yes
03	(3) WD1425+540	COS/FUV COS/NUV	3	30-Jan-2014 21:22:33.0	yes
04	(4) GD-205	COS/FUV	1	30-Jan-2014 21:22:43.0	yes
05	(5) WD2253+803	COS/FUV COS/NUV	5	30-Jan-2014 21:22:56.0	yes

12 Total Orbits Used

ABSTRACT

Proposal 13453 (STScI Edit Number: 1, Created: Thursday, January 30, 2014 9:23:07 PM EST) - Overview

We propose to observe five white dwarfs known to be polluted by accretion of their own asteroids in order to investigate three related questions. (1) What determines carbon abundances within extrasolar asteroids? (2) Can we identify water-rich extrasolar planetesimals? (3) Can we find evidence for silicon-rich planetesimals, as would be expected if they are largely composed of crustal material? Data from these 5 proposed targets combined with previous COS observations either by ourselves or others of 6 additional targets, will complete an ultraviolet spectroscopic mini-survey of all known highly polluted white dwarfs with helium-dominated atmospheres within 80 pc of the Sun. This study will provide a unique legacy for understanding the formation and evolution of extrasolar rocky planets.

OBSERVING DESCRIPTION

Extrapolating from our ground-based observations of Ca II 3933 Å and Mg II 4481 Å and scaling from optical and ultraviolet data for GD 40 and G241-6 (Klein et al. 2010, 2011, Jura et al. 2012), we expect some photospheric lines such as Si II 1265 Å and O I 1152 Å to be stronger than 50 mÅ and therefore detectable in all of our targets. If C has nearly a "solar" abundance, we also will detect photospheric C II 1336 Å; the detection of Fe is uncertain. With these data, we will be able to investigate all three science questions.

Paralleling the strategy described in Jura et al. (2012), we propose to obtain spectra with the G130M grating in the FUV module with a central wavelength of 1291 Å. For all five targets, we estimate the flux at 1350 Å, near the wavelengths of the important C II lines, from measured GALEX FUV-band (1530 Å) magnitudes and our COS spectra and/or models of stars of similar temperature such as GD 40. We then use the COS ETC 21.1 to determine the required on-target observing time to achieve a signal-to-noise ratio (SNR) of 30 in all targets except HS 2253+8023 where we propose to achieve a SNR of 20. We include the overheads for target acquisition and instrumental set-up to determine the requested number of orbits. Our targets are sufficiently faint that COS safety is not a problem.

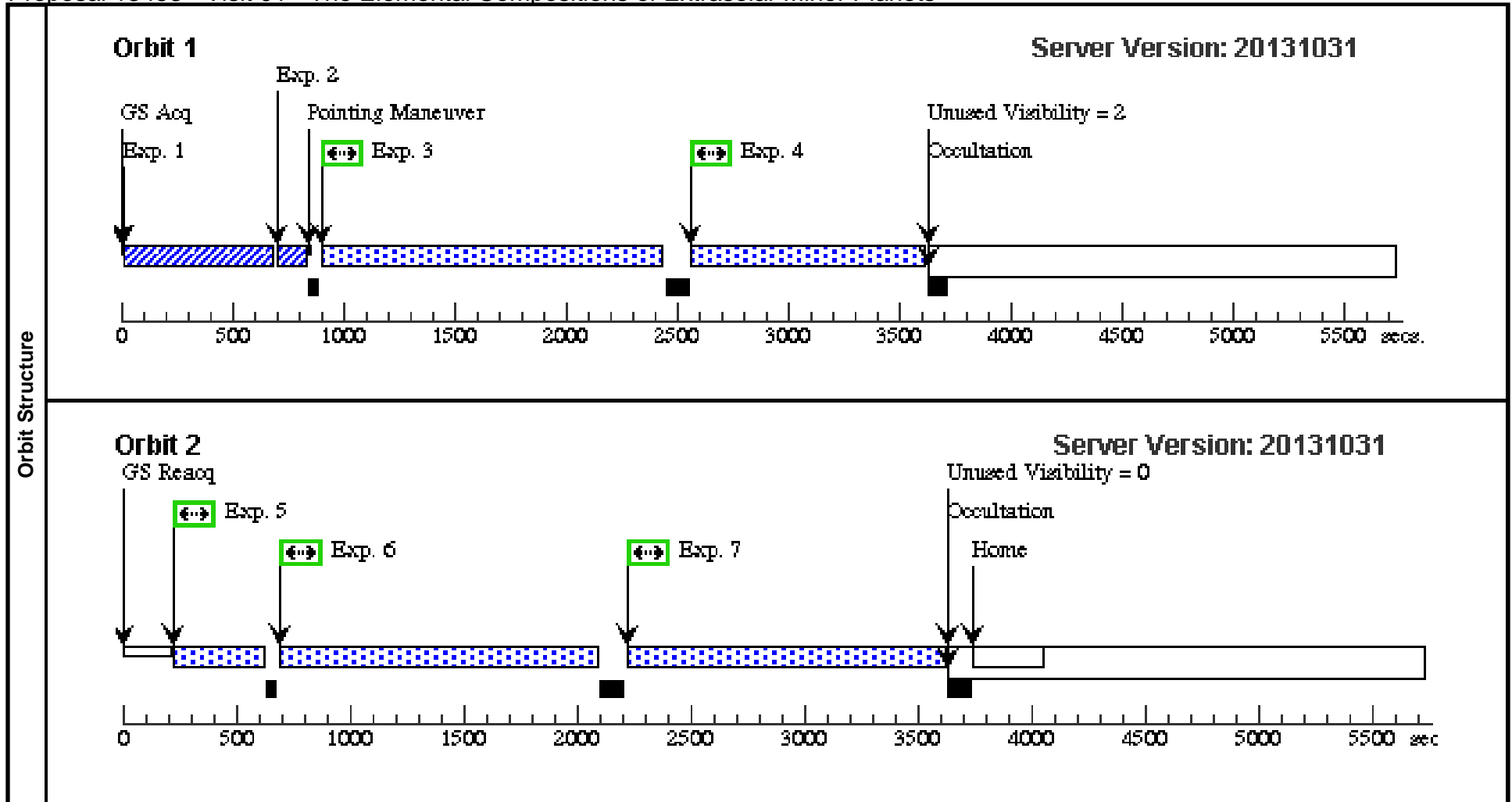
ADDITIONAL COMMENTS

Position and proper motion is from PPMXL catalog (2010).

Proposal 13453 - Visit 01 - The Elemental Compositions of Extrasolar Minor Planets

Fri Jan 31 02:23:07 GMT 2014

Visit	Proposal 13453, Visit 01, completed Diagnostic Status: No Diagnostics Scientific Instruments: COS/NUV, COS/FUV Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	GD-408	RA: 00 05 6.8510 (1.2785458d) Dec: +73 13 9.38 (73.21927d) Equinox: J2000	Proper Motion RA: 186.1 mas/yr Proper Motion Dec: 123.5 mas/yr Epoch of Position: 2000	V=14.4	Reference Frame: ICRS				
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	ACQ/SEAR CH (cos.ta.5100 57)	(1) GD-408	COS/NUV, ACQ/SEARCH, PSA	MIRRORB	CENTER=FLUX-W T-FLR; SCAN-SIZE=3			8 Secs (8 Secs) [==>]	[1]
	2	ACQ/IMAG E (cos.ta.5101 87)	(1) GD-408	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				6 Secs (6 Secs) [==>]	[1]
	3	GD408 (COS.sp.510 752)	(1) GD-408	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=1; BUFFER-TIME=13 73; FLASH=YES; SEGMENT=BOTH			1352 Secs (1352 Secs) [==>]	[1]
	4	GD408 (COS.sp.510 752)	(1) GD-408	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=2; BUFFER-TIME=13 73; FLASH=YES; SEGMENT=BOTH			1000 Secs (1000 Secs) [==>]	[1]
	5	GD408 (COS.sp.510 752)	(1) GD-408	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=2; BUFFER-TIME=13 73; FLASH=YES; SEGMENT=BOTH			352 Secs (348 Secs) [==>348.0 Secs]	[2]
	6	GD408 (COS.sp.510 752)	(1) GD-408	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=13 73; FLASH=YES; SEGMENT=BOTH			1352 Secs (1348 Secs) [==>1348.0 Secs]	[2]
	7	GD408 (COS.sp.510 752)	(1) GD-408	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=13 73; FLASH=YES; SEGMENT=BOTH			1352 Secs (1348 Secs) [==>1348.0 Secs]	[2]

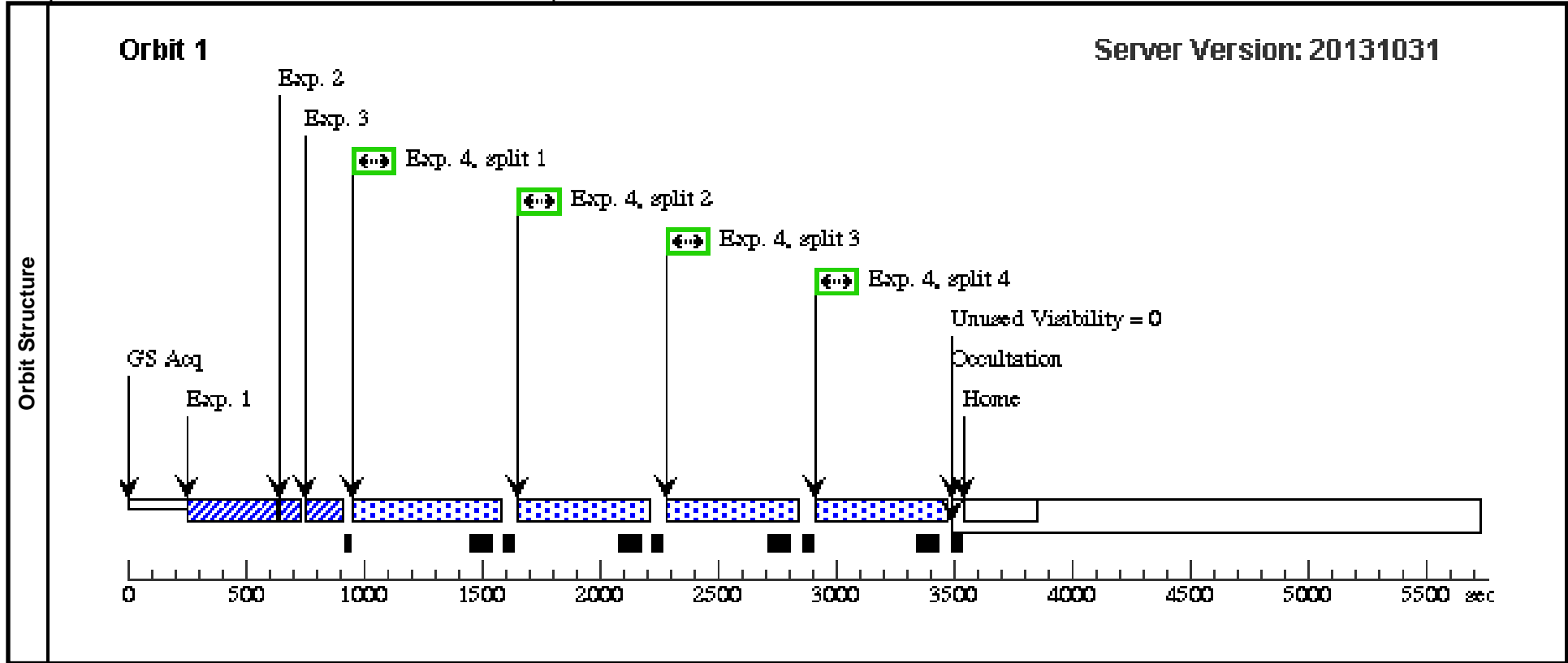


Proposal 13453 - Visit 02 - The Elemental Compositions of Extrasolar Minor Planets

Fri Jan 31 02:23:10 GMT 2014

Fixed Targets	#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous		
		(2)	GD-303	RA: 10 14 37.0960 (153.6545667d) Alt Name1: SDSSJ101437.09+56483 2.6	Dec: +56 48 32.68 (56.80908d) Equinox: J2000	Proper Motion RA: 84.0 mas/yr Proper Motion Dec: -99.1 mas/yr Epoch of Position: 2000	V=14.5	Reference Frame: ICRS	

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	TA(ACQ/S EARCH) (COS.sa.510 262)	(2) GD-303	COS/FUV, ACQ/SEARCH, PSA	G130M 1291 A	CENTER=FLUX-W T-FLR; SCAN-SIZE=3; SEGMENT=BOTH			2 Secs (2 Secs) [==>]	[1]
	2	TA(ACQ/P EAKXD) (COS.sa.510 245)	(2) GD-303	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A	SEGMENT=BOTH			1 Secs (1 Secs) [==>]	[1]
	3	TA(ACQ/P EAKD) (COS.sa.510 245)	(2) GD-303	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	CENTER=FLUX-W T-FLR; SEGMENT=BOTH; NUM-POS=5; STEP-SIZE=0.9			1 Secs (1 Secs) [==>]	[1]
	4	GD303 (COS.sp.510 752)	(2) GD-303	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=39 0; FLASH=YES; FP-POS=ALL; SEGMENT=BOTH			520 Secs (2026 Secs) [==>506.0 Secs (Split 1)] [==>506.0 Secs (Split 2)] [==>507.0 Secs (Split 3)] [==>507.0 Secs (Split 4)]	[1]

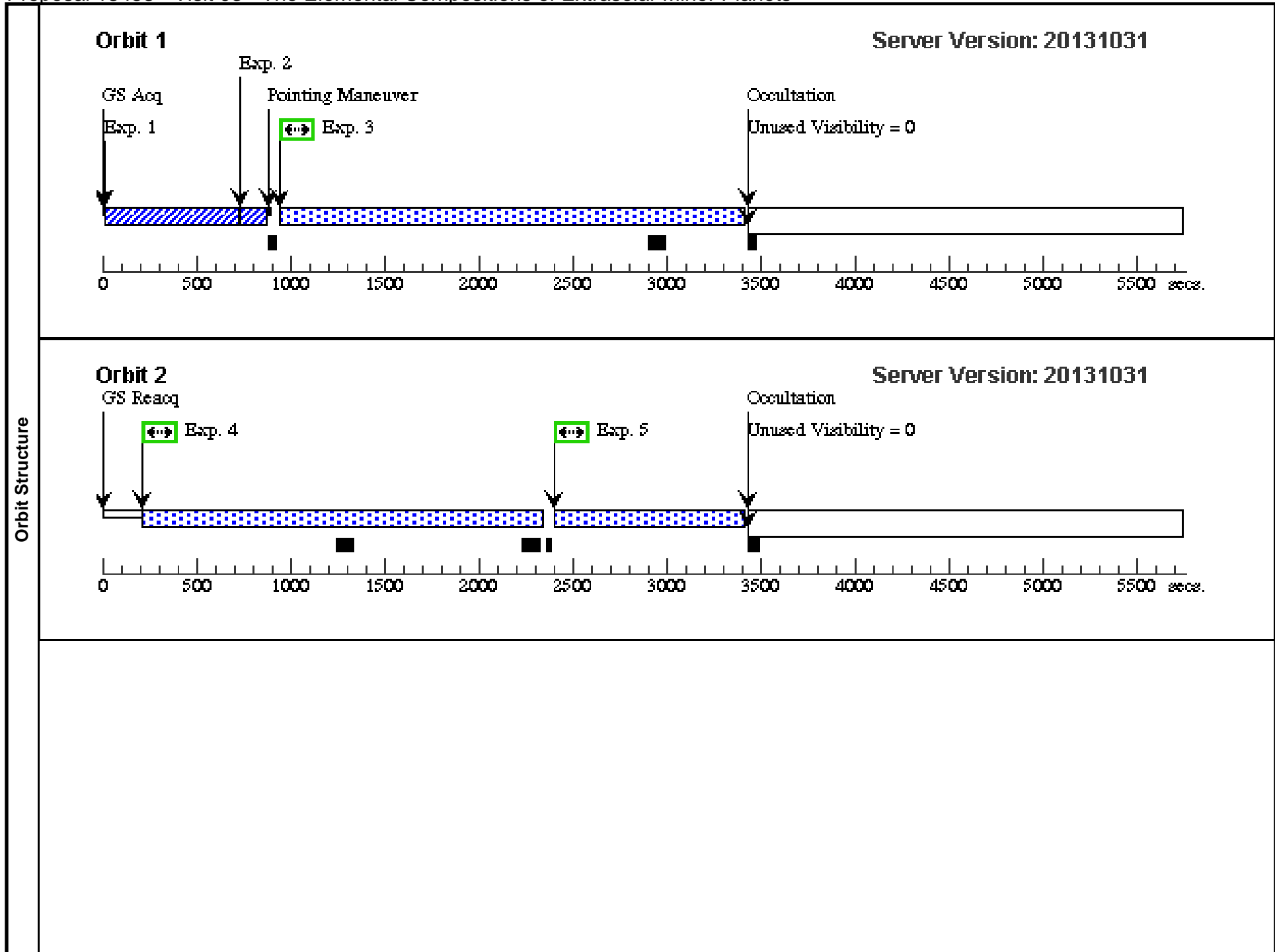


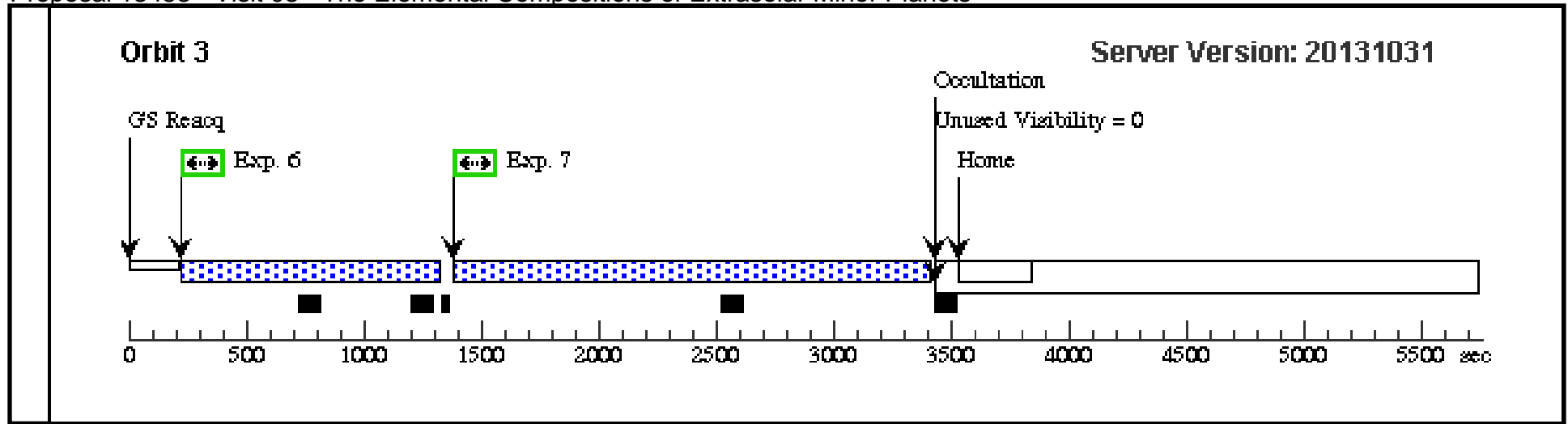
Proposal 13453 - Visit 03 - The Elemental Compositions of Extrasolar Minor Planets

Fri Jan 31 02:23:11 GMT 2014

Fixed Targets	#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous		
		(3)	WD1425+540	RA: 14 27 36.1670 (216.9006958d) Alt Name1: SDSSJ142736.05+53482 8.4	Dec: +53 48 27.98 (53.80777d) Equinox: J2000	Proper Motion RA: -347.3 mas/yr Proper Motion Dec: 141.0 mas/yr Epoch of Position: 2000	V=15.0	Reference Frame: ICRS	

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	TA(ACQ/SEARCH) (COS.ta.510 226)	(3) WD1425+540	COS/NUV, ACQ/SEARCH, PSA	MIRRORB	CENTER=FLUX-W T-FLR; SCAN-SIZE=3			12 Secs (12 Secs) [==>]	[1]
	2	TA(ACQ/IMAGE) (COS.ta.510 227)	(3) WD1425+540	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				8 Secs (8 Secs) [==>]	[1]
	3	WD1425+540 (COS.sp.510 753)	(3) WD1425+540	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=17 95; FLASH=YES; FP-POS=1; SEGMENT=BOTH			2290 Secs (2290 Secs) [==>]	[1]
	4	WD1425+540 (COS.sp.510 753)	(3) WD1425+540	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=98 7; FLASH=YES; FP-POS=2; SEGMENT=BOTH			2078 Secs (2078 Secs) [==>]	[2]
	5	WD1425+540 (COS.sp.510 753)	(3) WD1425+540	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=17 95; FLASH=YES; FP-POS=3; SEGMENT=BOTH			961 Secs (961 Secs) [==>]	[2]
	6	WD1425+540 (COS.sp.510 753)	(3) WD1425+540	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=47 3; FLASH=YES; FP-POS=3; SEGMENT=BOTH			1051 Secs (1051 Secs) [==>]	[3]
	7	WD1425+540 (COS.sp.510 753)	(3) WD1425+540	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=11 00; FLASH=YES; FP-POS=4; SEGMENT=BOTH			1978 Secs (1978 Secs) [==>]	[3]



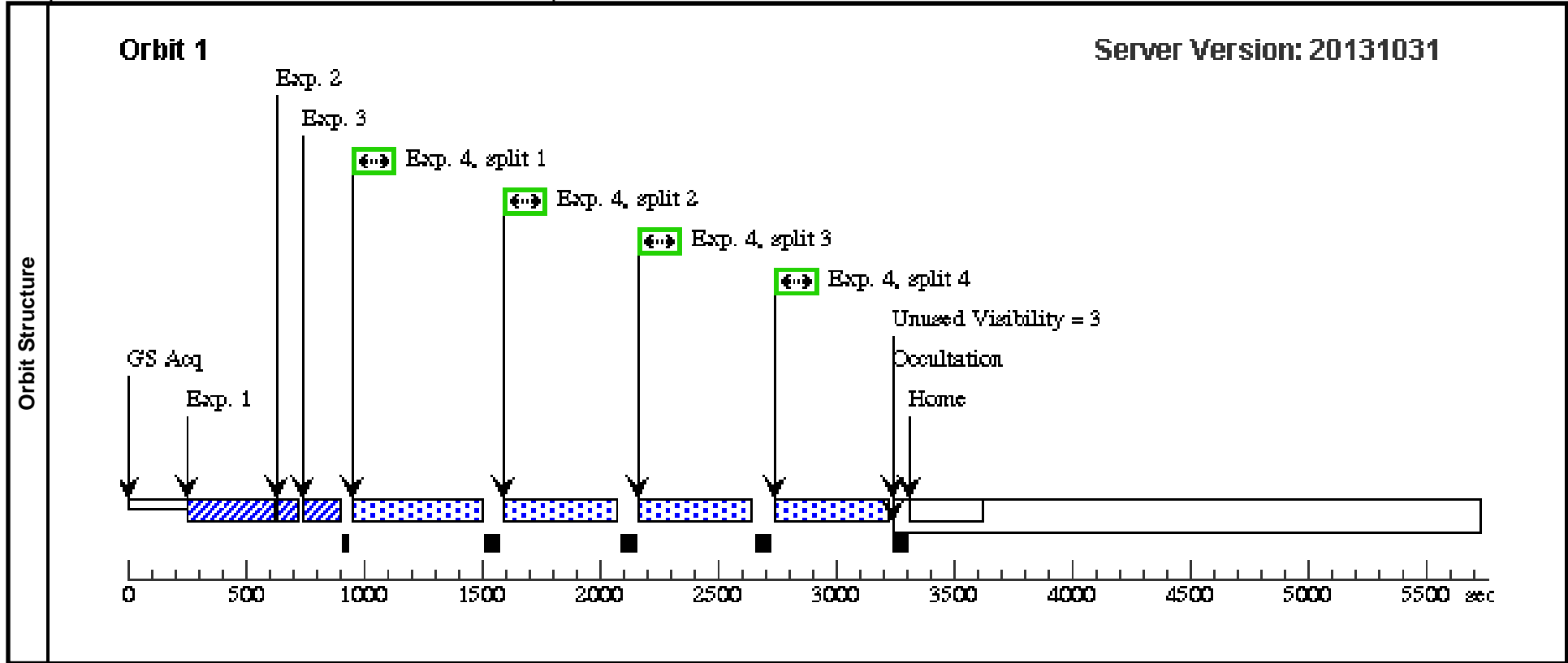


Proposal 13453 - Visit 04 - The Elemental Compositions of Extrasolar Minor Planets

Fri Jan 31 02:23:12 GMT 2014

Fixed Targets	#		Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous		
	(4)		GD-205	RA: 17 11 55.6580 (257.9819083d) Dec: +23 01 1.55 (23.01710d) Equinox: J2000	Proper Motion RA: 7.1 mas/yr Proper Motion Dec: -170.7 mas/yr Epoch of Position: 2000	V=14.9	Reference Frame: ICRS		

Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	TA(ACQ/S EARCH) (COS.sa.510 263)	(4) GD-205	COS/FUV, ACQ/SEARCH, PSA	G130M 1291 A	CENTER=FLUX-W T-FLR; SCAN-SIZE=3; SEGMENT=BOTH			1 Secs (1 Secs) [==>]	[1]
	2	TA(ACQ/P EAKXD) (COS.sa.510 246)	(4) GD-205	COS/FUV, ACQ/PEAKXD, PSA	G130M 1291 A	SEGMENT=BOTH			1 Secs (1 Secs) [==>]	[1]
	3	TA(ACQ/P EAKD) (COS.sa.510 246)	(4) GD-205	COS/FUV, ACQ/PEAKD, PSA	G130M 1291 A	CENTER=FLUX-W T-FLR; NUM-POS=5; STEP-SIZE=0.9; SEGMENT=BOTH			1 Secs (1 Secs) [==>]	[1]
	4	GD205 (COS.sp.510 756)	(4) GD-205	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=88 5; FLASH=YES; FP-POS=ALL; SEGMENT=BOTH			425 Secs (1728 Secs) [==>432.0 Secs (Split 1)] [==>432.0 Secs (Split 2)] [==>432.0 Secs (Split 3)] [==>432.0 Secs (Split 4)]	[1]

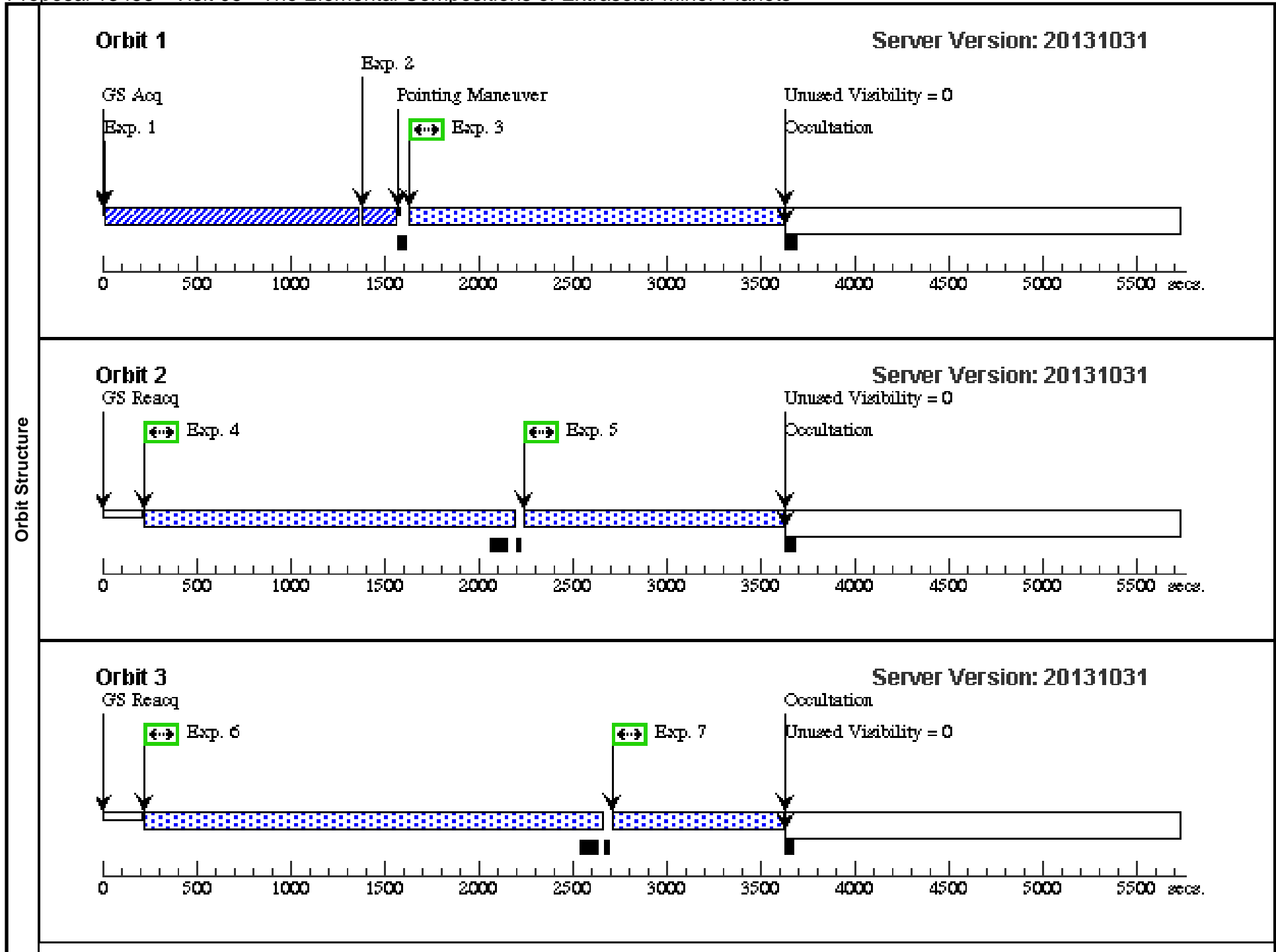


Proposal 13453 - Visit 05 - The Elemental Compositions of Extrasolar Minor Planets

Visit	Proposal 13453, Visit 05, scheduling Fri Jan 31 02:23:13 GMT 2014 Diagnostic Status: No Diagnostics Scientific Instruments: COS/NUV, COS/FUV Special Requirements: (none)					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(5)		WD2253+803	RA: 22 54 35.7290 (343.6488708d) Dec: +80 39 53.81 (80.66495d) Equinox: J2000	Proper Motion RA: -22.1 mas/yr Proper Motion Dec: -17.0 mas/yr Epoch of Position: 2000	V=15.6	Reference Frame: ICRS

Proposal 13453 - Visit 05 - The Elemental Compositions of Extrasolar Minor Planets

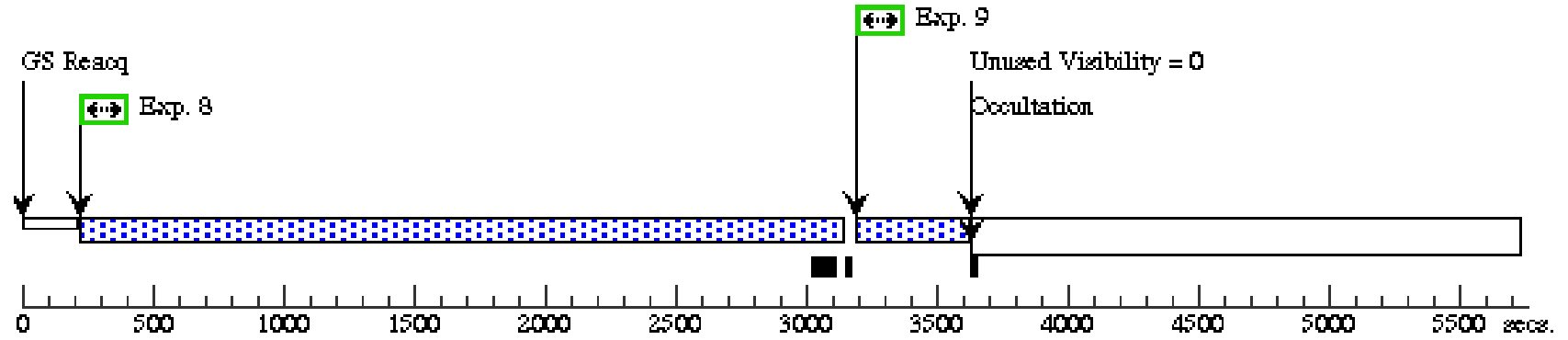
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	TA(ACQ/SEARCH) (COS.ta.510230)	(5) WD2253+803	COS/NUV, ACQ/SEARCH, PSA	MIRRORB	CENTER=FLUX-W T-FLR; SCAN-SIZE=3		84 Secs (84 Secs) [==>]	[1]
	2	TA(ACQ/IMAGE) (COS.ta.510231)	(5) WD2253+803	COS/NUV, ACQ/IMAGE, PSA	MIRRORB			29 Secs (29 Secs) [==>]	[1]
	3	WD2253+803 (COS.sp.510754)	(5) WD2253+803	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=34 51; FLASH=YES; SEGMENT=BOTH; FP-POS=1		1809 Secs (1809 Secs) [==>]	[1]
	4	WD2253+803 (COS.sp.510754)	(5) WD2253+803	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=18 10; FLASH=YES; SEGMENT=BOTH; FP-POS=1		1916 Secs (1916 Secs) [==>]	[2]
	5	WD2253+803 (COS.sp.510754)	(5) WD2253+803	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=34 51; FLASH=YES; SEGMENT=BOTH; FP-POS=2		1332 Secs (1332 Secs) [==>]	[2]
	6	WD2253+803 (COS.sp.510754)	(5) WD2253+803	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=22 87; FLASH=YES; SEGMENT=BOTH; FP-POS=2		2393 Secs (2393 Secs) [==>]	[3]
	7	WD2253+803 (COS.sp.510754)	(5) WD2253+803	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=34 51; FLASH=YES; SEGMENT=BOTH; FP-POS=3		855 Secs (855 Secs) [==>]	[3]
	8	WD2253+803 (COS.sp.510754)	(5) WD2253+803	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=27 65; FLASH=YES; SEGMENT=BOTH; FP-POS=3		2870 Secs (2870 Secs) [==>]	[4]
	9	WD2253+803 (COS.sp.510754)	(5) WD2253+803	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=34 51; FLASH=YES; SEGMENT=BOTH; FP-POS=4		378 Secs (378 Secs) [==>]	[4]
	10	WD2253+803 (COS.sp.510754)	(5) WD2253+803	COS/FUV, TIME-TAG, PSA	G130M 1291 A	BUFFER-TIME=34 51; FLASH=YES; SEGMENT=BOTH; FP-POS=4		3353 Secs (3353 Secs) [==>]	[5]



Orbit Structure

Orbit 4

Server Version: 20131031



Orbit 5

Server Version: 20131031

