12906 - Chemical composition of an exo-planetary debris disk

Cycle: 20, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
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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) SDSSJ122859.93+104032.9	COS/FUV	4	15-May-2013 21:09:13.0	yes
51	(1) SDSSJ122859.93+104032.9	COS/FUV	4	15-May-2013 21:09:27.0	yes

8 Total Orbits Used

ABSTRACT

In the recent years, four white dwarfs with gaseous planetary debris disk were discovered. It is thought that they were created by tidally disrupted planetary bodies. This offers the unique possibility to determine directly the composition of exo-planetary material by spectroscopic means. However, only very few bright emission lines from the optically thin gas disk are detectable because the white dwarf's photospheric flux in the near-IR to UV spectral band is rather strong. Here we propose to perform far-UV observations of one of these WDs shortward of 115 nm where the WD flux is effectively blocked by broad and deep photospheric hydrogen Lyman lines. We expect to detect disk emission lines from carbon and silicon. Together with optical and near-UV archival spectra that exhibit lines from Ca, Mg, and Fe, this enables us for the first time to determine the relative abundances of most of the abundant elements in the disk. In particular, we may decide whether the planetary debris was formed from chondritic or

bulk-Earth like material.

OBSERVING DESCRIPTION

We want to observe our single target for 4 orbits with COS/G130M with central wavelength setting 1096 A, where Segments B and A cover 940-1080 A and 1096-1236 A, respectively.

Orbit 1: guide star and target acquisition; science overhead; science integration
Orbits 2-4: guide star re-acquisition; science overhead; science integration

FP-POS change: Each orbit is at one different position, i.e., no overhead

In total, we will achieve S/N=2-4 in the 905-1050A range (when binned over 6px). Further binning to sufficient 2A resolution yields S/N=12-23. At longer wavelengths, S/N increases strongly, e.g. S/N>50 at 1110A.

Visit

Proposal 12906, Visit 01, failed Thu May 16 01:09:36 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: SCHED 100%

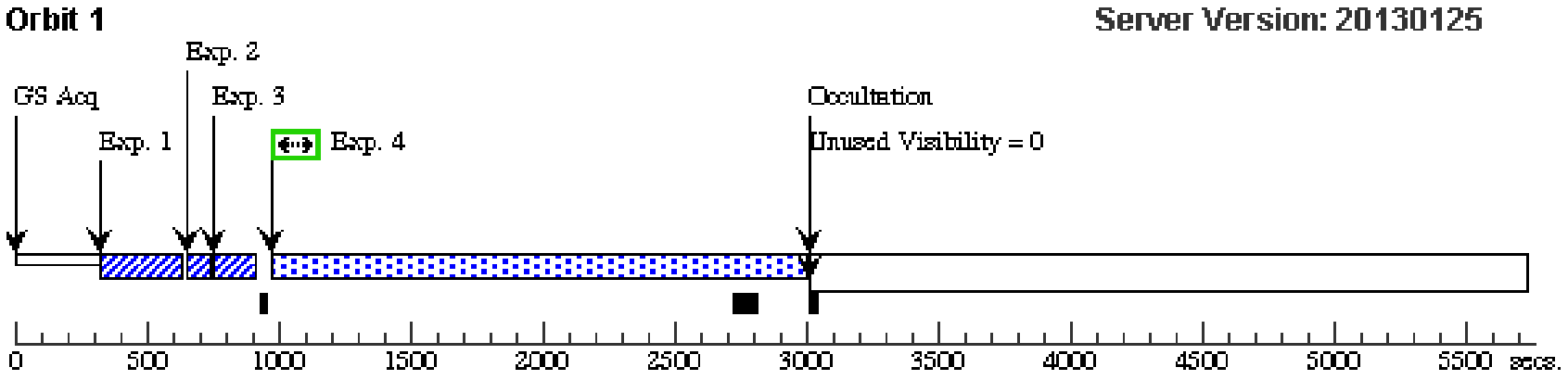
Fixed Targets

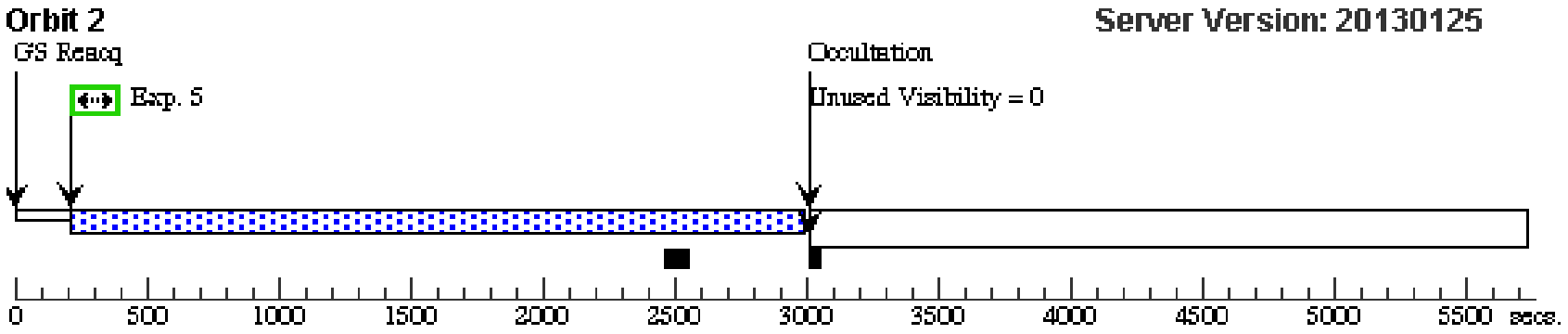
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ122859.93+104032.9	RA: 12 28 59.9300 (187.2497083d) Dec: +10 40 32.90 (10.67581d) Equinox: J2000	Proper Motion RA: -0.047 arcsec/yr Proper Motion Dec: -0.025 arcsec/yr Epoch of Position: 2002.94	V=16.5+/-0.1 6.0E-14 erg/cm2/s/A @ 1150 A	Reference Frame: ICRS

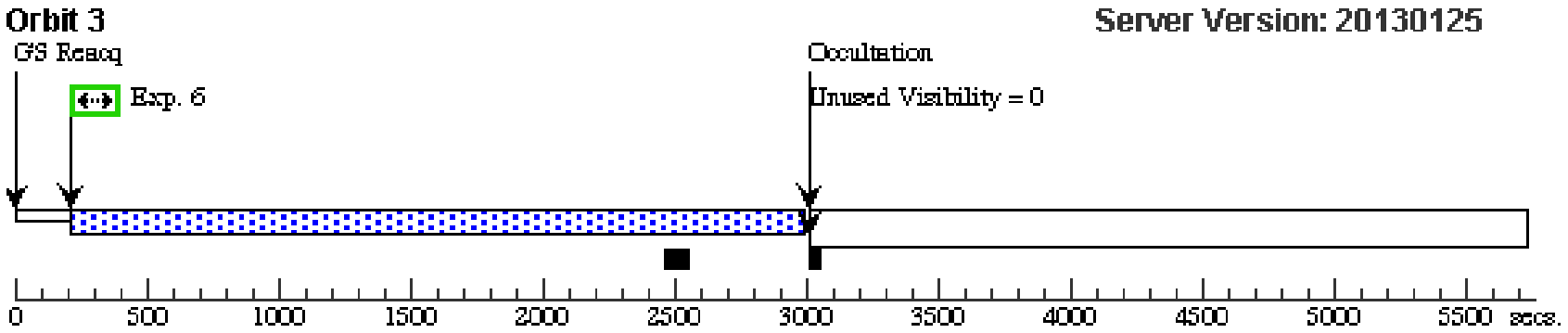
Exposures

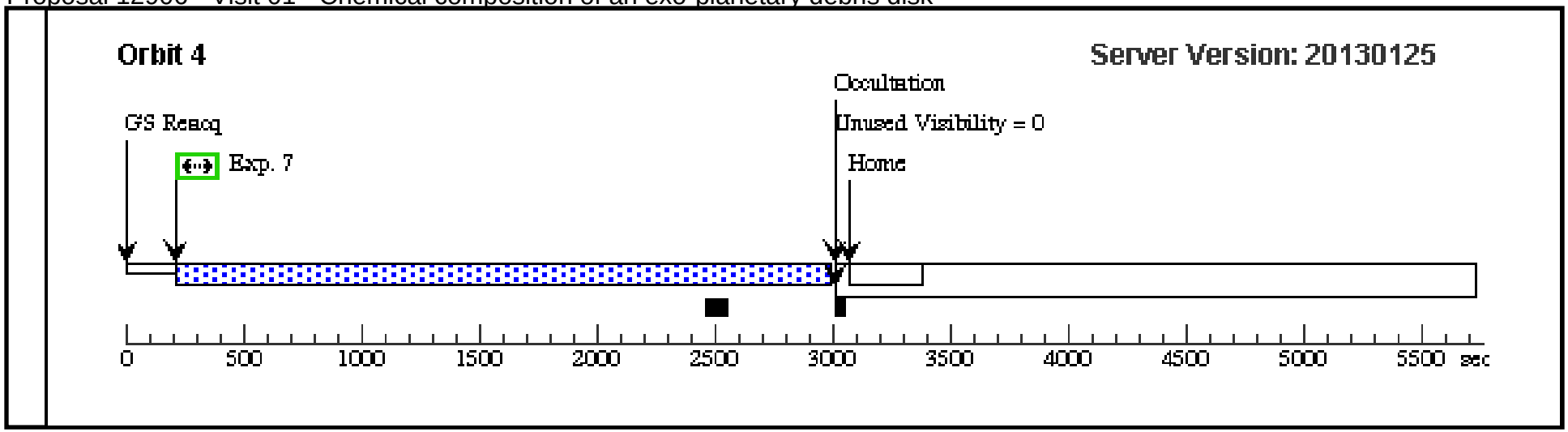
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	(COS.sa.407085)	(1) SDSSJ122859.93+104032.9	COS/FUV, ACQ/SEARCH, PSA	G130M 1309 A	SCAN-SIZE=3; CENTER=FLUX-WT-FLR; STEP-SIZE=1.767			2.5 Secs *[==>]*	***[1]***
2	(COS.ta.40700)	(1) SDSSJ122859.93+104032.9	COS/FUV, ACQ/PEAKXD, PSA	G130M 1309 A				2.5 Secs *[==>]*	***[1]***
3	(COS.ta.4070)	(1) SDSSJ122859.93+104032.9	COS/FUV, ACQ/PEAKD, PSA	G130M 1309 A	CENTER=FLUX-WT-FLR; NUM-POS=5; SEGMENT=BOTH; STEP-SIZE=0.9			2.5 Secs *[==>]*	***[1]***
4	(COS.sp.369970)	(1) SDSSJ122859.93+104032.9	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=1649; FP-POS=1; SEGMENT=BOTH; FLASH=YES; EXTENDED=NO			1905 Secs *[==>]*	***[1]***
5	(COS.sp.369970)	(1) SDSSJ122859.93+104032.9	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=2207; FP-POS=2; SEGMENT=BOTH; FLASH=YES; EXTENDED=NO			2729 Secs *[==>]*	***[2]***
6	(COS.sp.369970)	(1) SDSSJ122859.93+104032.9	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=2207; FP-POS=3; SEGMENT=BOTH; FLASH=YES; EXTENDED=NO			2729 Secs *[==>]*	***[3]***
7	(COS.sp.369970)	(1) SDSSJ122859.93+104032.9	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=2207; FP-POS=4; SEGMENT=BOTH; FLASH=YES; EXTENDED=NO			2729 Secs *[==>]*	***[4]***

Orbit Structure





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sec

Visit

Proposal 12906, Visit 51, implementation Thu May 16 01:09:40 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: SCHED 100%

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ122859.93+104032.9	RA: 12 28 59.9300 (187.2497083d) Dec: +10 40 32.90 (10.67581d) Equinox: J2000	Proper Motion RA: -0.047 arcsec/yr Proper Motion Dec: -0.025 arcsec/yr Epoch of Position: 2002.94	V=16.5+/-0.1 6.0E-14 erg/cm2/s/A @ 1150 A	Reference Frame: ICRS

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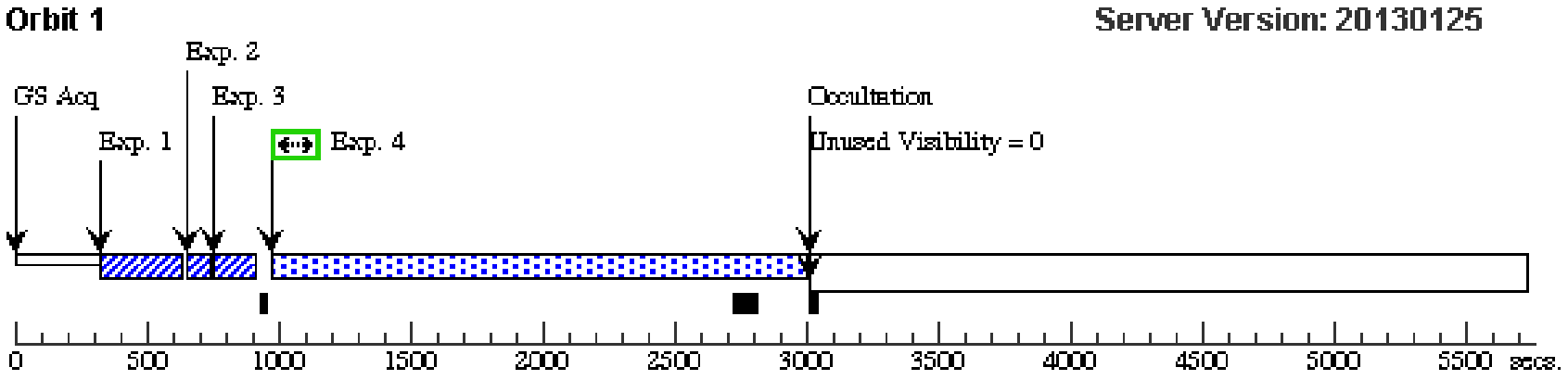
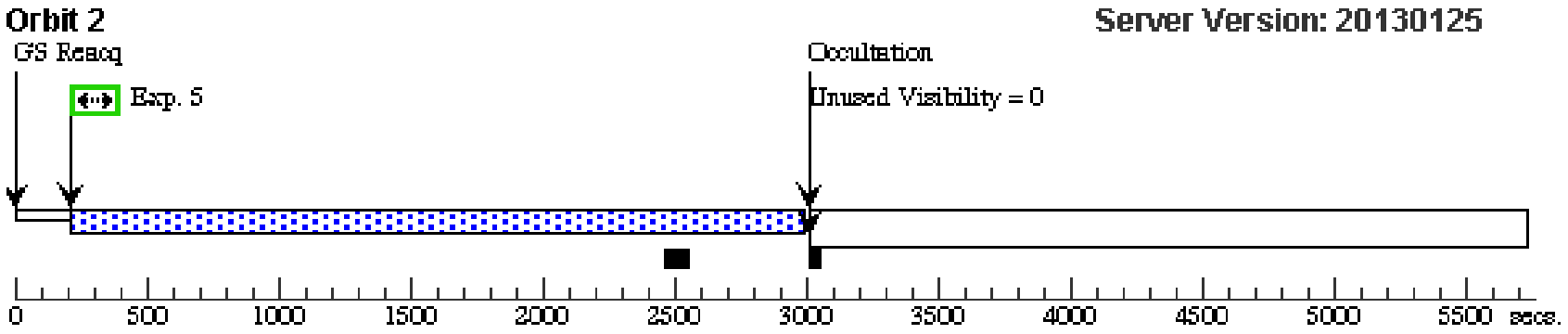
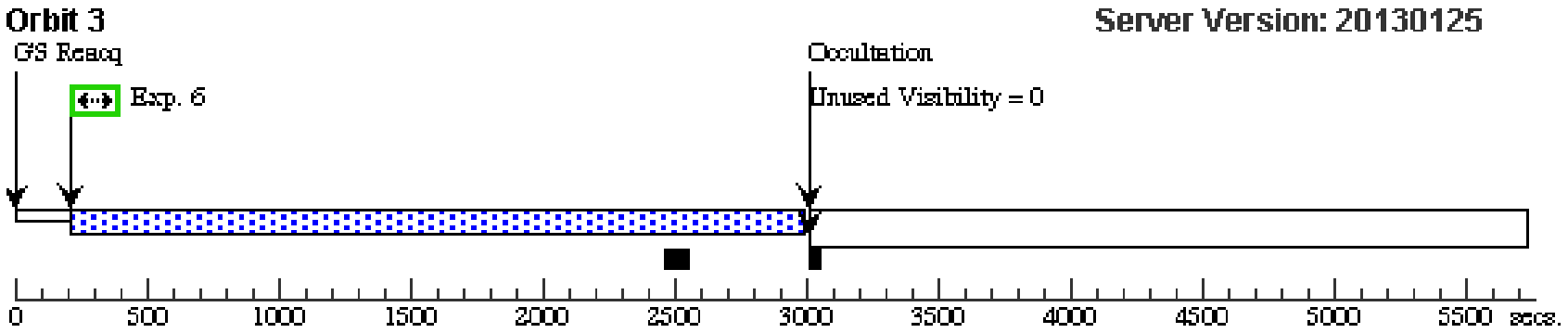
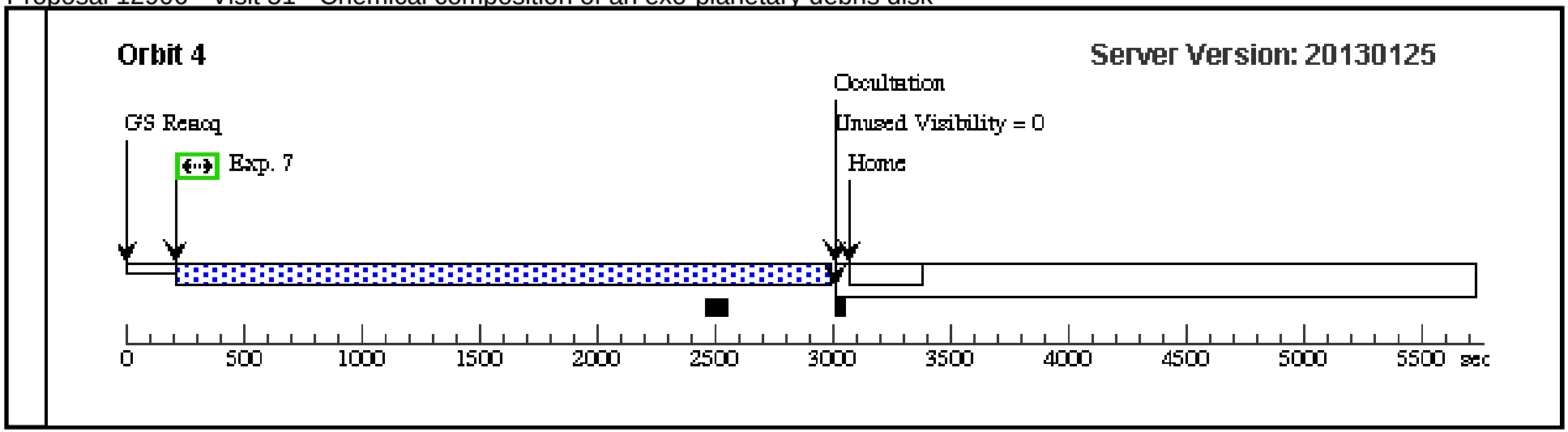
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	(COS.sa.407085)	(1) SDSSJ122859.93+104032.9	COS/FUV, ACQ/SEARCH, PSA	G130M 1309 A	SCAN-SIZE=3; CENTER=FLUX-WT-FLR; STEP-SIZE=1.767	GS ACQ SCENARIO BASE1B3		2.5 Secs *[==>]*	*[1]*
2	(COS.ta.40700)	(1) SDSSJ122859.93+104032.9	COS/FUV, ACQ/PEAKXD, PSA	G130M 1309 A				2.5 Secs *[==>]*	*[1]*
3	(COS.ta.4070)	(1) SDSSJ122859.93+104032.9	COS/FUV, ACQ/PEAKD, PSA	G130M 1309 A	CENTER=FLUX-WT-FLR; NUM-POS=5; SEGMENT=BOTH; STEP-SIZE=0.9			2.5 Secs *[==>]*	*[1]*
4	(COS.sp.369970)	(1) SDSSJ122859.93+104032.9	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=1649; FP-POS=1; SEGMENT=BOTH; FLASH=YES; EXTENDED=NO			1905 Secs *[==>]*	*[1]*
5	(COS.sp.369970)	(1) SDSSJ122859.93+104032.9	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=2207; FP-POS=2; SEGMENT=BOTH; FLASH=YES; EXTENDED=NO			2729 Secs *[==>]*	*[2]*
6	(COS.sp.369970)	(1) SDSSJ122859.93+104032.9	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=2207; FP-POS=3; SEGMENT=BOTH; FLASH=YES; EXTENDED=NO			2729 Secs *[==>]*	*[3]*
7	(COS.sp.369970)	(1) SDSSJ122859.93+104032.9	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=2207; FP-POS=4; SEGMENT=BOTH; FLASH=YES; EXTENDED=NO			2729 Secs *[==>]*	*[4]*

Orbit Structure





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