



# 15826 - COS-SAGA: The Circumgalactic Medium of Nearby Milky Way Analogs and their Satellites

Cycle: 27, 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) FBQSJ095820.9+322402	COS/FUV COS/NUV	1	11-Oct-2019 11:02:02.0	yes
02	(3) SDSSJ120233.08+022559.7	COS/FUV COS/NUV	2	11-Oct-2019 11:02:03.0	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>
03	(4) 2MASXJ12022678-0129155	COS/FUV COS/NUV	2	11-Oct-2019 11:02:04.0	yes
04	(5) UVQSJ170043.71+223700.2	COS/FUV COS/NUV	2	11-Oct-2019 11:02:04.0	yes
05	(7) SBS1421+511	COS/FUV COS/NUV	3	11-Oct-2019 11:02:05.0	yes
06	(8) TON1129	COS/FUV COS/NUV	4	11-Oct-2019 11:02:06.0	yes
07	(9) 2MASXJ14515156+5914001	COS/FUV COS/NUV	5	11-Oct-2019 11:02:07.0	yes

19 Total Orbits Used

## **ABSTRACT**

We propose COS FUV spectroscopy for 7 QSOs (complemented by 3 archival observations) around 7 nearby Milky Way-like galaxies to study the gaseous halos of these systems. The galaxies are selected from SAGA, an ongoing survey to characterize the low-luminosity dwarf galaxy satellites around Milky Way analogs. We have identified a set of QSO sightlines to study the gaseous halos of these Milky Way-like hosts and their satellites. The proposed FUV-bright QSOs are within the virial radius ( $\sim 300$  kpc) of each system. Armed with the combination of a complete satellite luminosity function for these hosts ( $M_V < -12$ ) and the corresponding satellites' velocities, we will be in the unique position to directly compare CGM kinematics to that of the host halo. This is only possible because the satellite systems are fully characterized and matched simulations are available as a part of the SAGA project. This proposal's observations will be the first to compare halo gas kinematics with those of the dwarf satellite populations, which will allow assessments of how much of the absorption seen in more distant halos could arise in satellites. The relative kinematics of stars and gas will also constrain models of halo formation from numerical simulations. Hence, this proposal will open a new window on our understanding of the CGM by combining a large ground-based effort with the unique FUV capabilities of HST/COS.

## **OBSERVING DESCRIPTION**

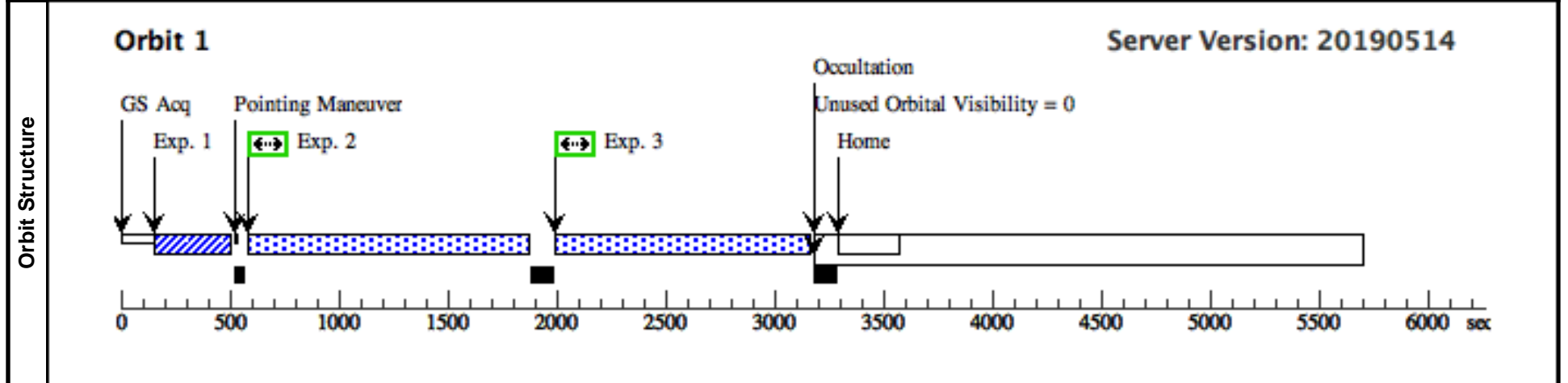
7 QSOs are to be observed for use as tracers of the CGM around several local MW-like galaxies. 3 of the QSOs have some extended redder galaxies they are embedded in, but all are brighter in the UV, so in COS they should be effectively point-sources. G130M with cenwave 1291 is used to hit

Proposal 15826 (STScI Edit Number: 0, Created: Friday, October 11, 2019 at 10:02:08 AM Eastern Standard Time) - Overview  
most of the low-z CGM lines, with only FP-POS 3/4 being used because several of the critical CGM lines at low-z are on the B segment.

<b>Visit</b>	<b>Proposal 15826, FBQSJ095820.9+322402 (01), scheduling</b>				
	<b>Diagnostic Status: No Diagnostics</b>				
	Scientific Instruments: COS/FUV, COS/NUV				
	Special Requirements: (none)				

<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	FBQSJ095820.9+322402	RA: 09 58 20.9436 (149.5872650d) Dec: +32 24 2.24 (32.40062d) Equinox: J2000		V=16.02 FUV=17.14	Reference Frame: ICRS
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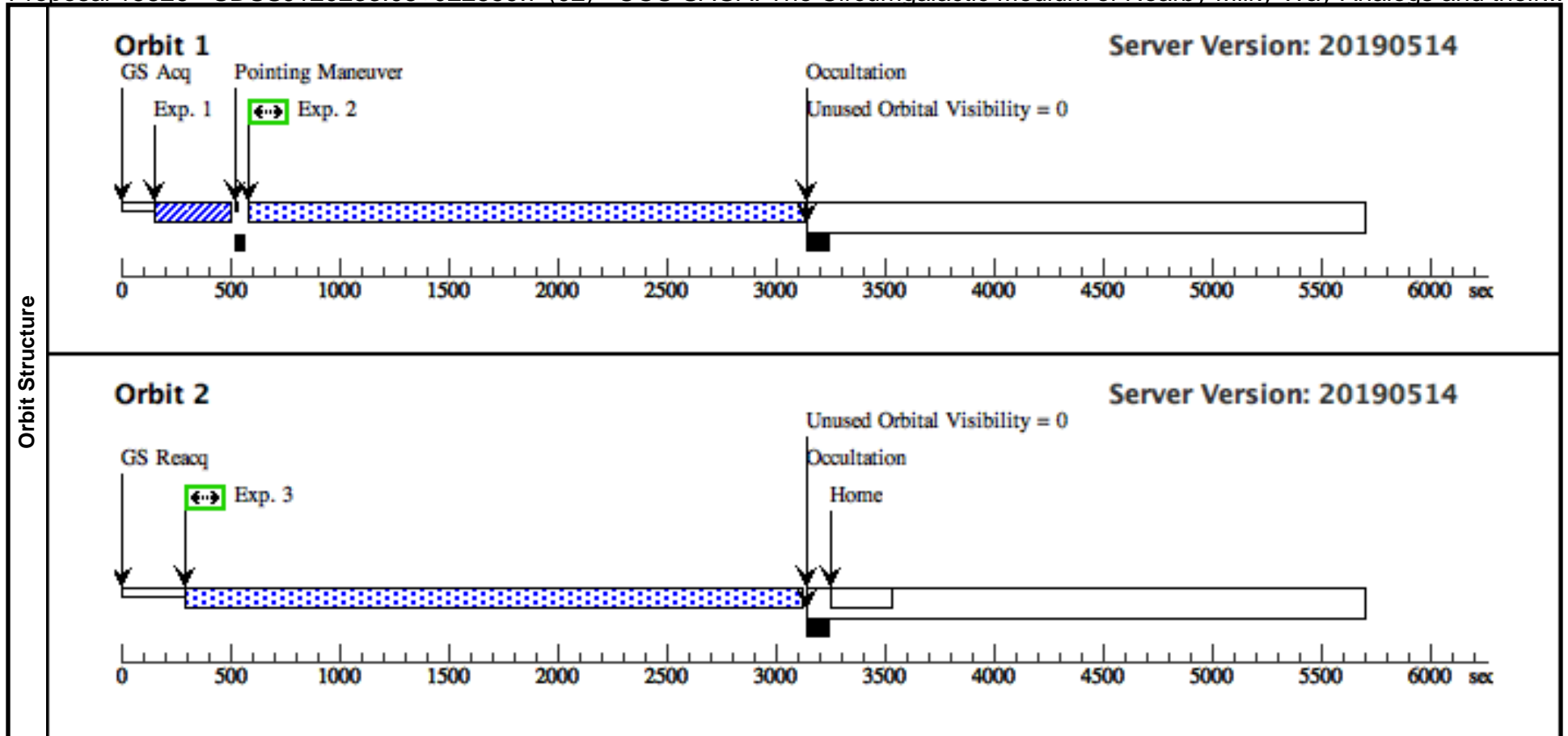
<b>Exposures</b>	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	ACQ/IMAG E (COS.ta.137 1543)	(1) FBQSJ095820.9 +322402	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				30 Secs (30 Secs) [==>]	[1]
	2	(COS.sp.137 0344)	(1) FBQSJ095820.9 +322402	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=11 17; FP-POS=3			1117 Secs (1117 Secs) [==>]	[1]
	3	(COS.sp.137 0344)	(1) FBQSJ095820.9 +322402	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=11 17; FP-POS=4			1117 Secs (1117 Secs) [==>]	[1]



Proposal 15826 - SDSSJ120233.08+022559.7 (02) - COS-SAGA: The Circumgalactic Medium of Nearby Milky Way Analogs and their...

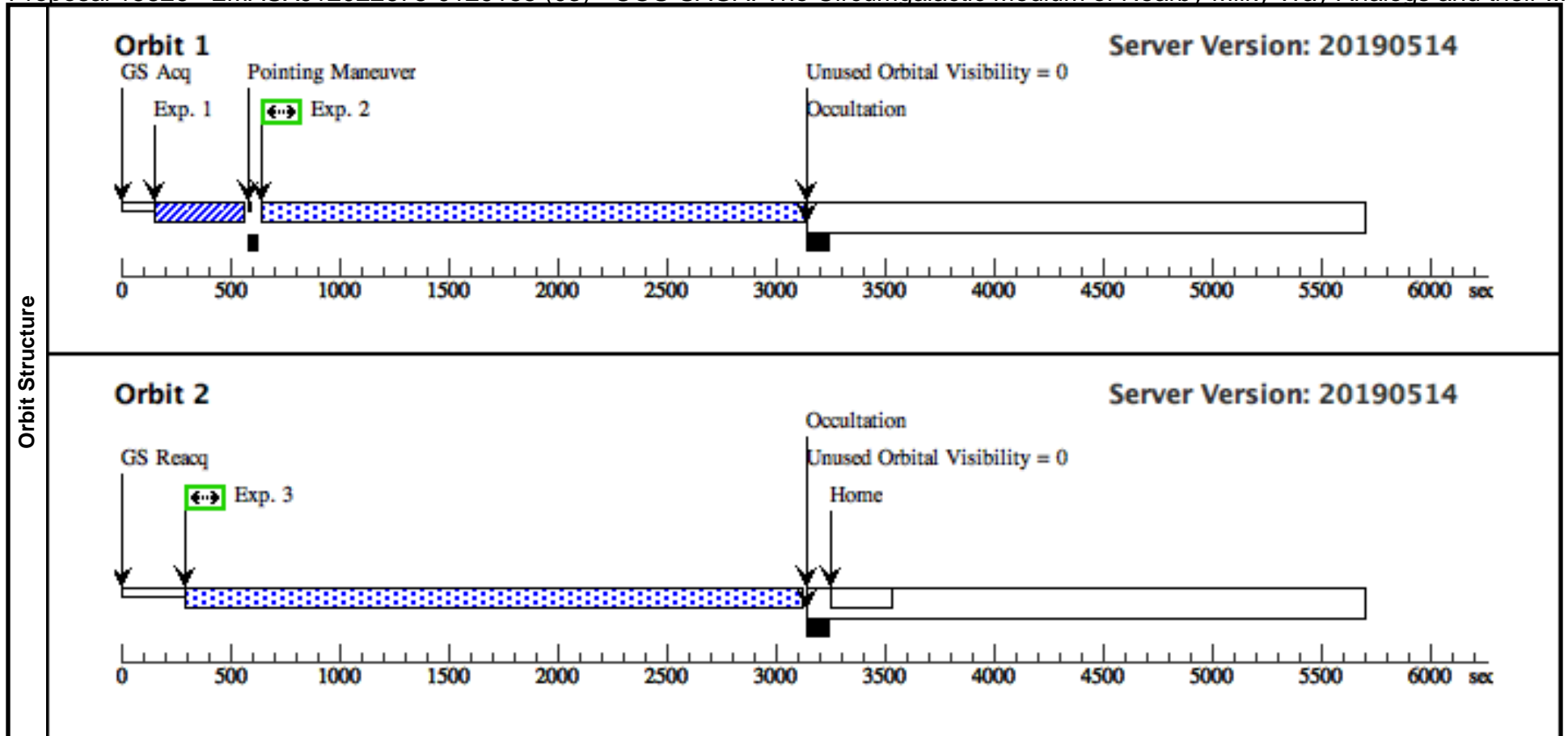
Fri Oct 11 15:02:08 GMT 2019

Visit	<b>Proposal 15826, SDSSJ120233.08+022559.7 (02), implementation</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
		(3)	SDSSJ120233.08+022559.7	RA: 12 02 33.0872 (180.6378633d) Dec: +02 25 59.76 (2.43327d) Equinox: J2000		V=17.27 FUV=17.66	Reference Frame: ICRS			
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Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	ACQ/IMAG E (COS.ta.137 1546)	(3) SDSSJ120233.08 +022559.7	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				30 Secs (30 Secs) [==>]	[1]
	2	(COS.sp.137 0657)	(3) SDSSJ120233.08 +022559.7	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=23 77; FP-POS=3			2000 Secs (2377 Secs) [==>2377.0 Secs ]	[1]
	3	(COS.sp.137 0657)	(3) SDSSJ120233.08 +022559.7	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=27 76; FP-POS=4			2000 Secs (2776 Secs) [==>2776.0 Secs ]	[2]



Proposal 15826 - 2MASXJ12022678-0129155 (03) - COS-SAGA: The Circumgalactic Medium of Nearby Milky Way Analogs and their ...

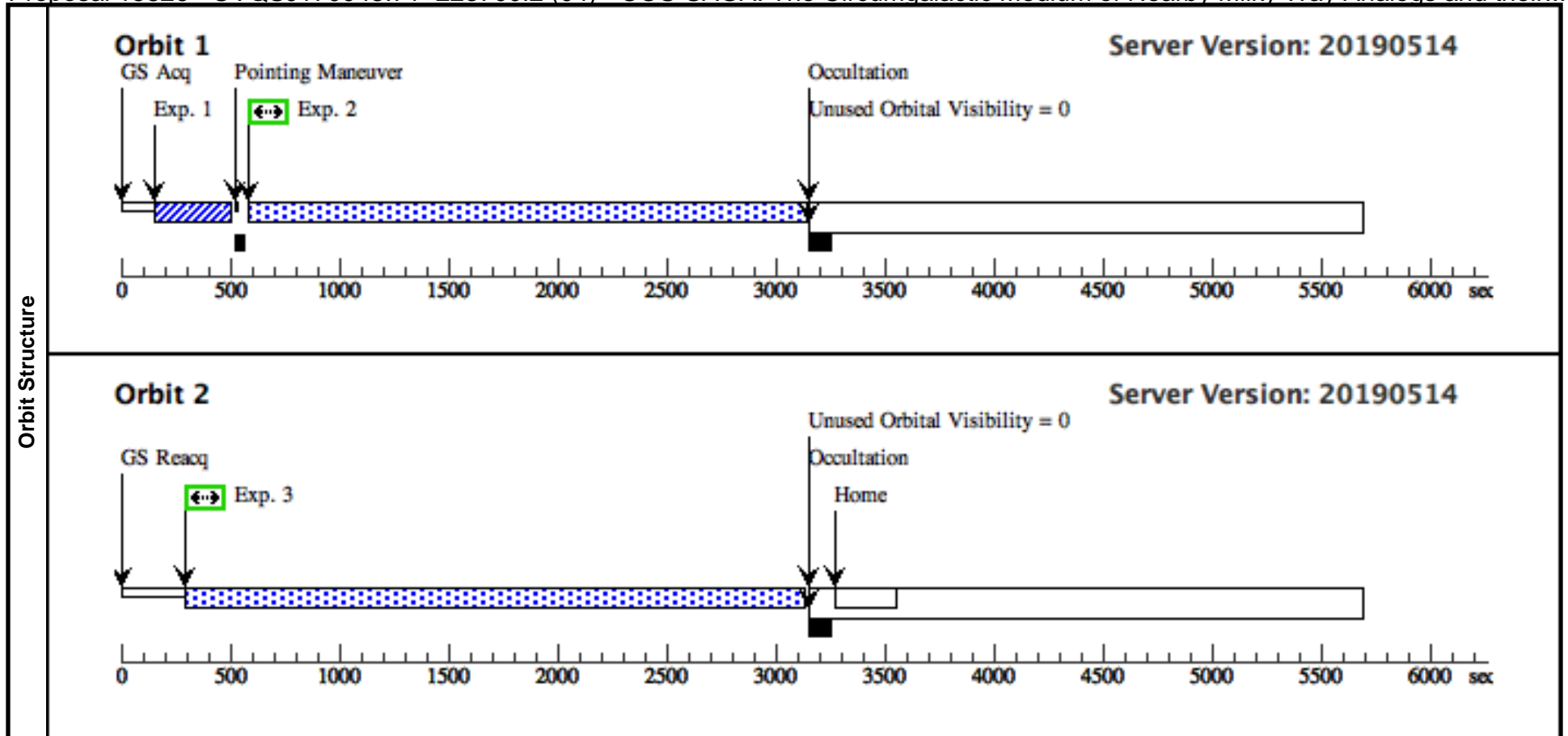
Visit	Proposal 15826, 2MASXJ12022678-0129155 (03), scheduling <span style="float: right;">Fri Oct 11 15:02:08 GMT 2019</span> Diagnostic Status: No Diagnostics Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none)																																								
	Fixed Targets	<table border="1"> <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>(4)</td> <td>2MASXJ12022678-0129155</td> <td>RA: 12 02 26.7590 (180.6114958d) Dec: -01 29 15.28 (-1.48758d) Equinox: J2000</td> <td></td> <td>V=17.13 FUV=17.83</td> <td>Reference Frame: ICRS</td> </tr> <tr> <td colspan="6"> <i>Comments:</i>                      Category=GALAXY                      Description=[QSO, QUASAR]                      Extended=NO                 </td> </tr> </tbody> </table>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous	(4)	2MASXJ12022678-0129155	RA: 12 02 26.7590 (180.6114958d) Dec: -01 29 15.28 (-1.48758d) Equinox: J2000		V=17.13 FUV=17.83	Reference Frame: ICRS	<i>Comments:</i> Category=GALAXY Description=[QSO, QUASAR] Extended=NO																										
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Proposal 15826 - UVQSJ170043.71+223700.2 (04) - COS-SAGA: The Circumgalactic Medium of Nearby Milky Way Analogs and their...

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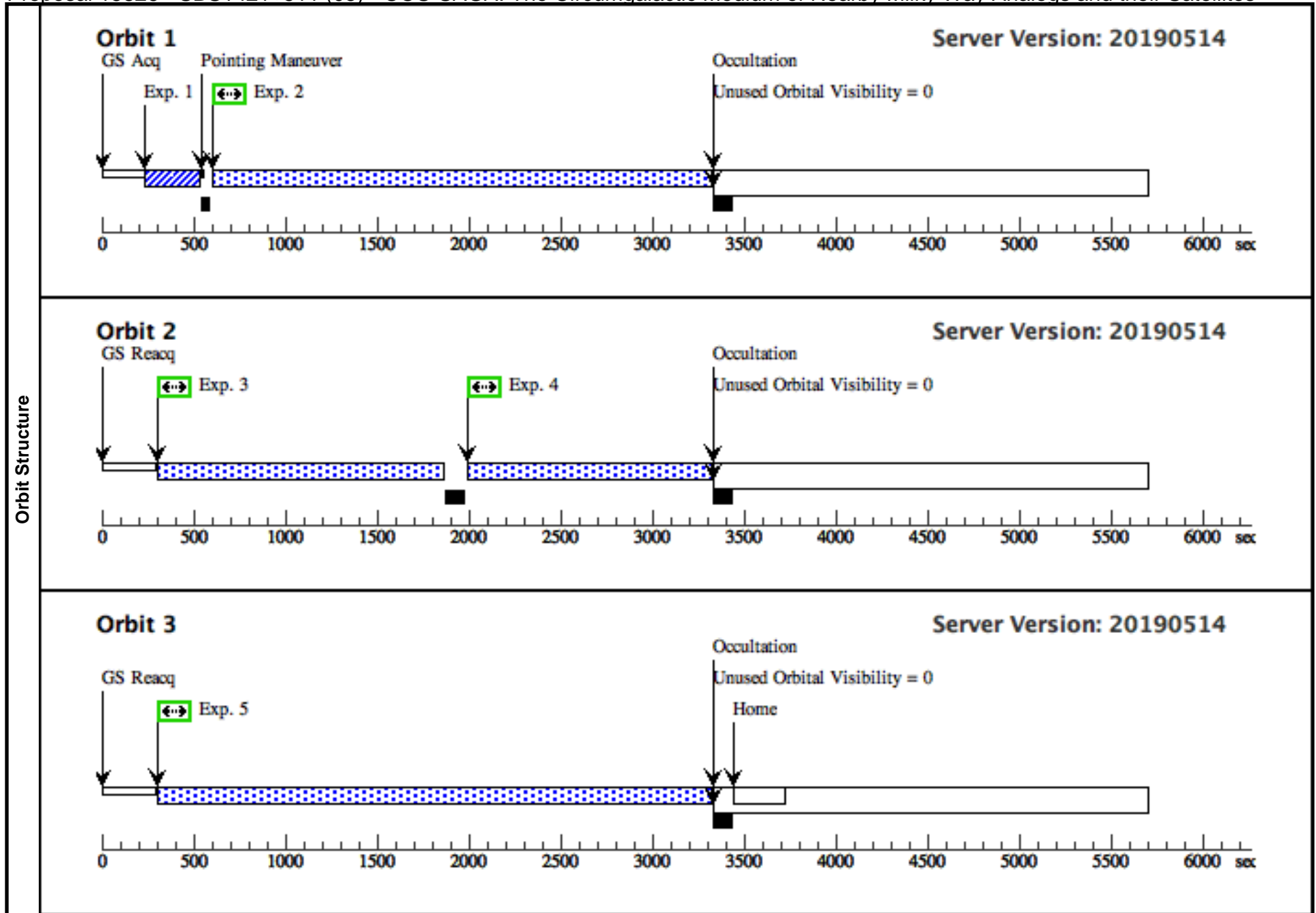
Visit	<b>Proposal 15826, UVQSJ170043.71+223700.2 (04), scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none)																																								
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3	(COS.sp.137 0380)	(5) UVQSJ170043.71+223700.2	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=27 91; FP-POS=4			2000 Secs (2791 Secs) [==>2791.0 Secs ]	[2]																																



Proposal 15826 - SBS1421+511 (05) - COS-SAGA: The Circumgalactic Medium of Nearby Milky Way Analogs and their Satellites

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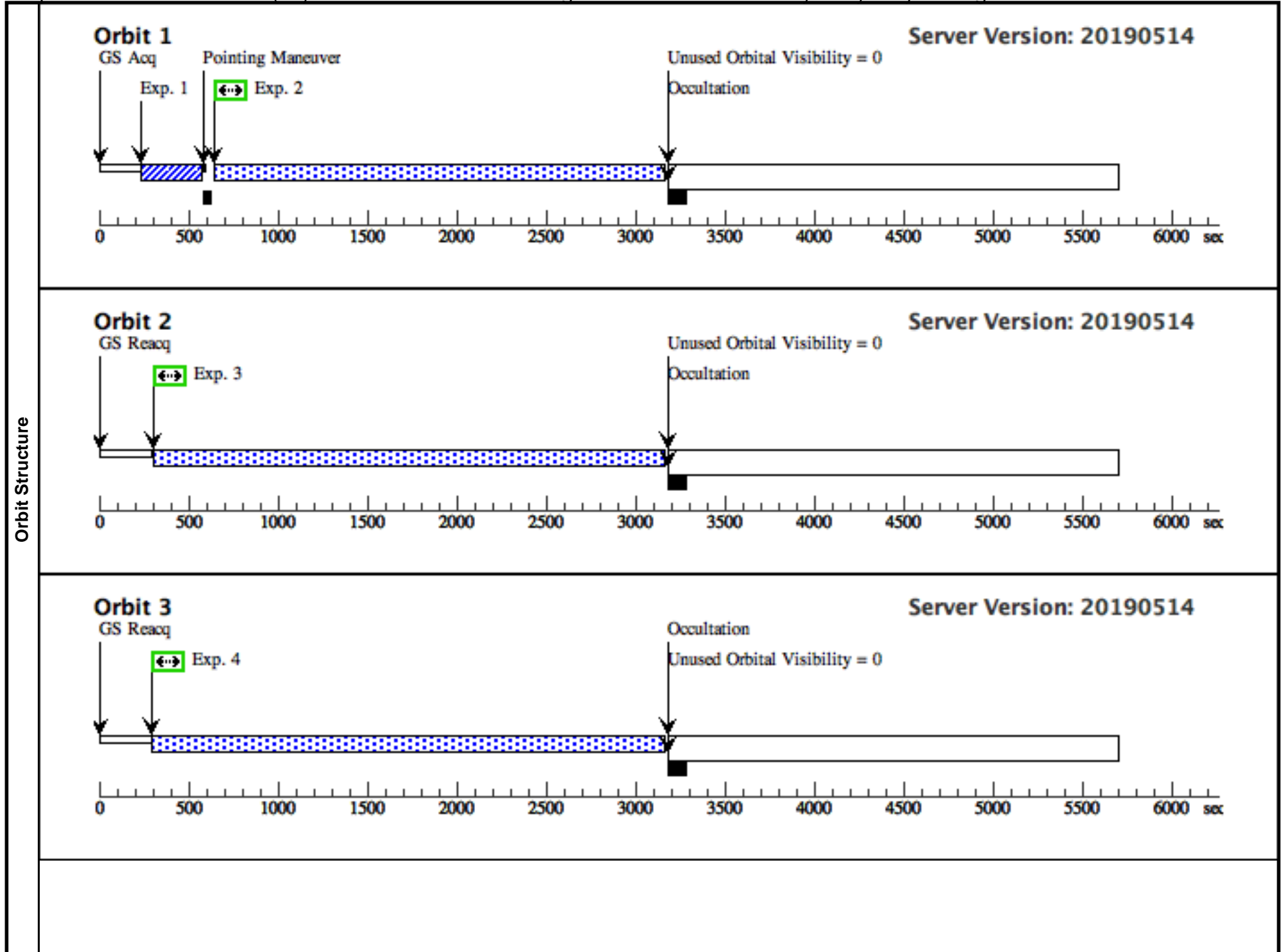
Visit	<b>Proposal 15826, SBS1421+511 (05), scheduling</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(7)	SBS1421+511	RA: 14 23 14.1833 (215.8090971d) Dec: +50 55 37.29 (50.92703d) Equinox: J2000		V=17.67 FUV=18.39	Reference Frame: ICRS				
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Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
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	2	(COS.sp.137 0647)	(7) SBS1421+511	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=25 48; FP-POS=3			2548 Secs (2548 Secs) [==>]	[1]
	3	(COS.sp.137 0647)	(7) SBS1421+511	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=15 10; FP-POS=3			1510 Secs (1510 Secs) [==>]	[2]
	4	(COS.sp.137 0647)	(7) SBS1421+511	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=12 76; FP-POS=4			1276 Secs (1276 Secs) [==>]	[2]
	5	(COS.sp.137 0647)	(7) SBS1421+511	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=29 67; FP-POS=4			2967 Secs (2967 Secs) [==>]	[3]

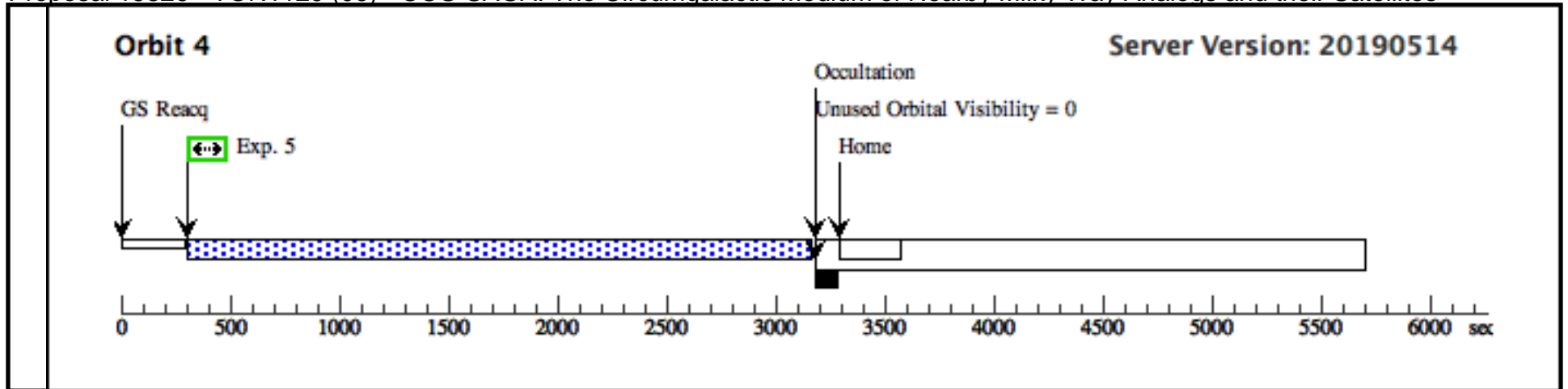


Proposal 15826 - TON1129 (06) - COS-SAGA: The Circumgalactic Medium of Nearby Milky Way Analogs and their Satellites

Fri Oct 11 15:02:09 GMT 2019

Visit	Proposal 15826, TON1129 (06), scheduling Diagnostic Status: No Diagnostics Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(8)	TON1129	RA: 09 56 23.2141 (149.0967254d) Dec: +32 36 21.67 (32.60602d) Equinox: J2000		V=17.57 FUV=18.67	Reference Frame: ICRS				
	Comments: Category=GALAXY Description=[QSO, QUASAR] Extended=NO									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	ACQ/IMAG E (COS.ta.137 0661)	(8) TON1129	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				60 Secs (60 Secs) [==>]	[1]
	2	(COS.sp.137 0650)	(8) TON1129	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=23 55; FP-POS=3			2300 Secs (2355 Secs) [==>2355.0 Secs ]	[1]
	3	(COS.sp.137 0650)	(8) TON1129	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=28 14; FP-POS=3			2800 Secs (2814 Secs) [==>2814.0 Secs ]	[2]
	4	(COS.sp.137 0650)	(8) TON1129	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=28 14; FP-POS=4			2800 Secs (2814 Secs) [==>2814.0 Secs ]	[3]
	5	(COS.sp.137 0650)	(8) TON1129	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=28 14; FP-POS=4			2800 Secs (2814 Secs) [==>2814.0 Secs ]	[4]





Proposal 15826 - 2MASXJ14515156+5914001 (07) - COS-SAGA: The Circumgalactic Medium of Nearby Milky Way Analogs and their...

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	Scientific Instruments: COS/FUV, COS/NUV				
	Special Requirements: (none)				

<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>
	(9)	2MASXJ14515156+5914001	RA: 14 51 51.5369 (222.9647371d) Dec: +59 14 0.08 (59.23336d) Equinox: J2000		V=18.38 FUV=18.98	Reference Frame: ICRS
<i>Comments:</i> Category=GALAXY Description=[QSO, QUASAR] Extended=NO						

<b>Exposures</b>	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	ACQ/IMAG E (COS.ta.137 0662)	(9) 2MASXJ14515156+5914001	COS/NUV, ACQ/IMAGE, PSA	MIRRORA					70 Secs (70 Secs) [==>]	[1]
	2	(COS.sp.137 0651)	(9) 2MASXJ14515156+5914001	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; BUFFER-TIME=25 44; FP-POS=3				2400 Secs (2544 Secs) [==>2544.0 Secs ]	[1]
	3	(COS.sp.137 0651)	(9) 2MASXJ14515156+5914001	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; FP-POS=3; BUFFER-TIME=30 23				2908 Secs (3023 Secs) [==>3023.0 Secs ]	[2]
	4	(COS.sp.137 0651)	(9) 2MASXJ14515156+5914001	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; FP-POS=3; BUFFER-TIME=15 31				1531 Secs (1531 Secs) [==>]	[3]
	5	(COS.sp.137 0651)	(9) 2MASXJ14515156+5914001	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; FP-POS=4; BUFFER-TIME=13 11				1311 Secs (1311 Secs) [==>]	[3]
	6	(COS.sp.137 0651)	(9) 2MASXJ14515156+5914001	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; FP-POS=4; BUFFER-TIME=30 23				3000 Secs (3023 Secs) [==>3023.0 Secs ]	[4]
	7	(COS.sp.137 0651)	(9) 2MASXJ14515156+5914001	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FLASH=YES; FP-POS=4; BUFFER-TIME=30 23				3000 Secs (3023 Secs) [==>3023.0 Secs ]	[5]

