



# 15286 - Unobstructed Observations of the Intrinsic Lyman-alpha Emission of Low-mass Stars

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) ROSS-825	STIS/CCD STIS/FUV-MAMA	3	10-Jul-2017 21:07:43.0	yes
02	(1) ROSS-825	STIS/CCD STIS/FUV-MAMA	3	10-Jul-2017 21:07:46.0	yes
03	(1) ROSS-825	STIS/CCD STIS/FUV-MAMA	2	10-Jul-2017 21:07:47.0	yes
04	(2) ROSS-1044	STIS/CCD STIS/FUV-MAMA	3	10-Jul-2017 21:07:49.0	yes
05	(2) ROSS-1044	STIS/CCD STIS/FUV-MAMA	3	10-Jul-2017 21:07:50.0	yes

14 Total Orbits Used

## **ABSTRACT**

Recent discoveries of potentially habitable planets around low-mass stars have highlighted the need for a comprehensive understanding of the radiation environments in which such planets reside. Of particular importance is knowledge of the FUV radiation, as low-mass stars are typically much more active than solar-type stars and the proximity of their habitable zones (HZs) can be one tenth the distance. Such radiation has the potential to strip away a planet's atmosphere and alter its photochemistry. The vast majority of the flux emitted by low-mass stars at FUV wavelengths occurs in the Lyman-alpha line at 1216 Angstroms. However, measuring a low-mass star's direct Lyman-alpha emission is almost always impossible because of the contaminating effects of interstellar hydrogen and geocoronal airglow. By focusing on two stars with very large radial velocities ( $>150$  km/s), emission due to Lyman-alpha will be Doppler shifted away from the contaminating sources allowing for rare opportunities to measure the intrinsic Lyman-alpha emission for K and M stars. Such observations will be vital for empirically guiding UV upper-atmosphere models of low-mass stars and for informing us how accurate reconstructed Lyman-alpha emission and correlations from other UV diagnostic lines are for known planet hosts. We have identified the only K and M dwarfs for which a complete and accurate measurement of Lyman-alpha line profile is possible.

## **OBSERVING DESCRIPTION**

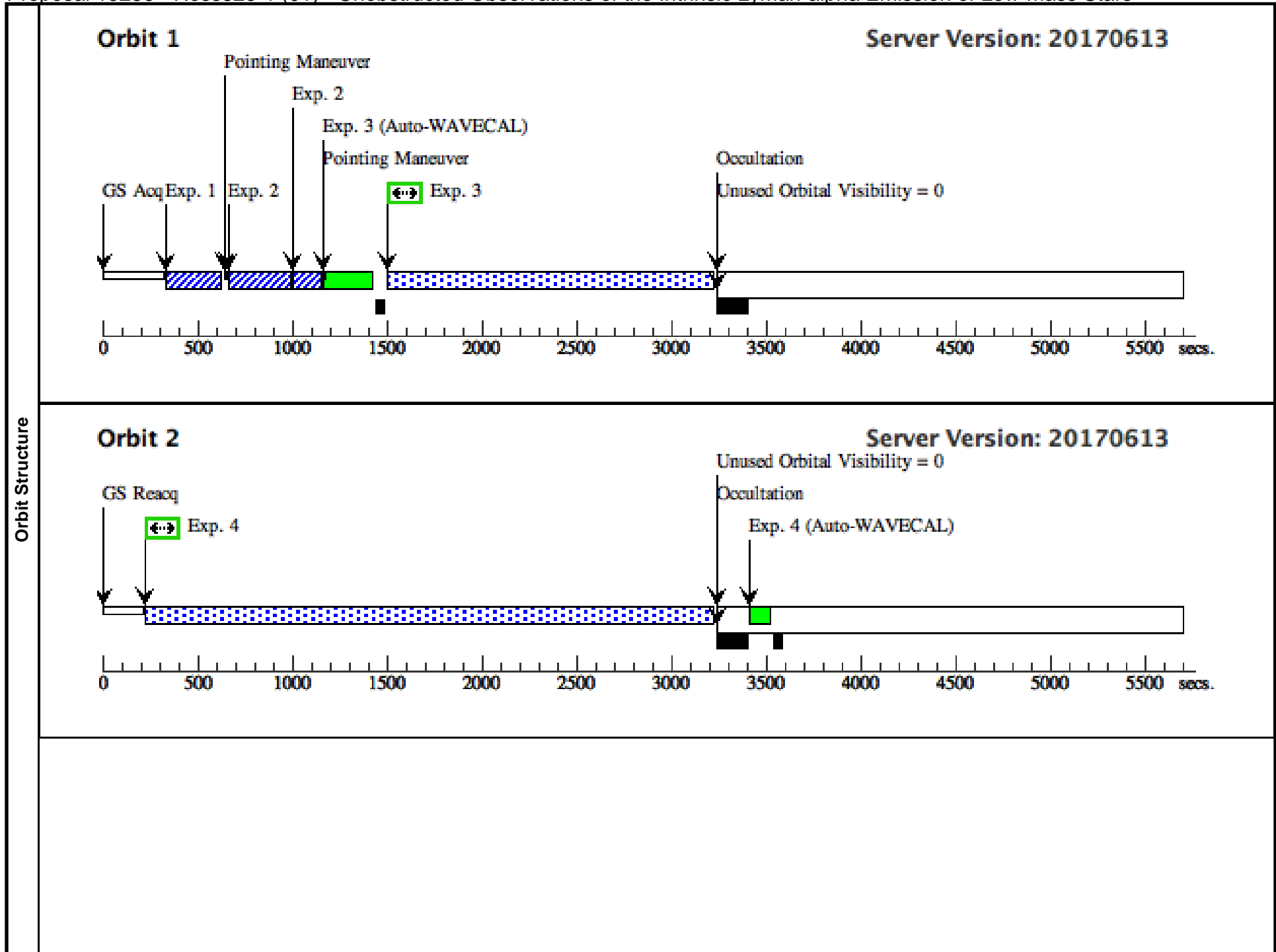
We will use HST/STIS to observe unobstructed Lyman-alpha emission from two low-mass stars, Ross 825 (K3) and Ross 1044 (M2), with exceptionally large radial velocities ( $>150$  km/s).

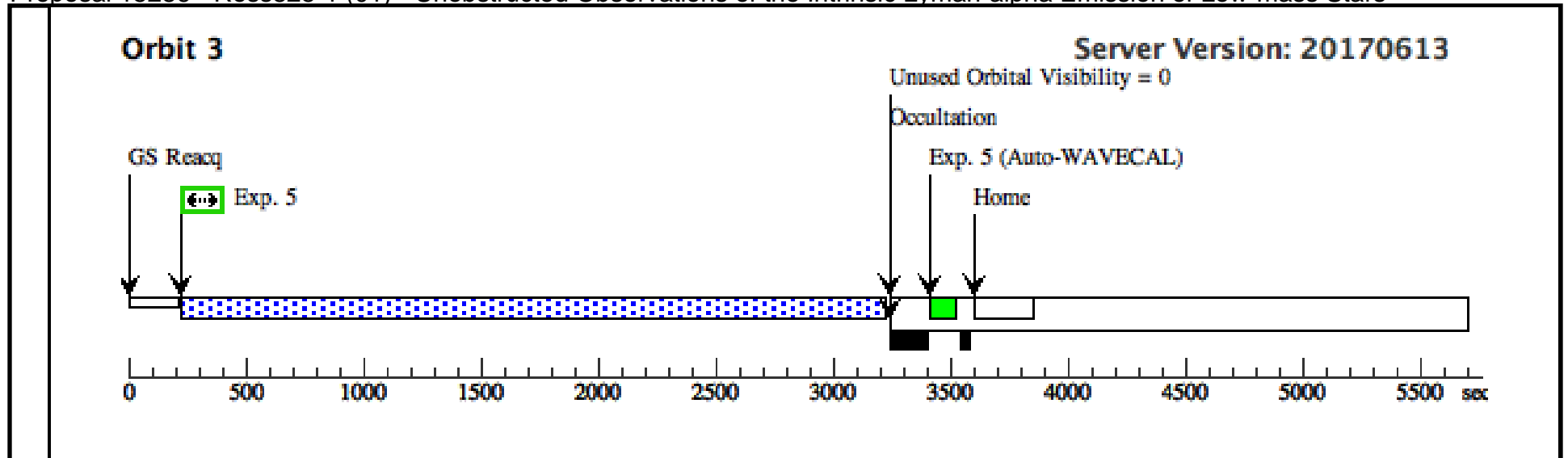
For each target, we will first perform a STIS target acquisition sequence (ACQ/SEARCH and ACQ/IMAGE), which take # seconds. We will then use the STIS/G140M grating to observe the Lyman-alpha wavelength region with the 52" x 0.1" slit centered at 1222 Angstroms, settings used successfully in the past for K and M dwarfs.

Proposal 15286 - Ross825-1 (01) - Unobstructed Observations of the Intrinsic Lyman-alpha Emission of Low-mass Stars

Tue Jul 11 01:07:51 GMT 2017

Visit	<b>Proposal 15286, Ross825-1 (01)</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	ROSS-825	RA: 21 11 17.6566 (317.8235692d) Dec: +33 31 29.69 (33.52491d) Equinox: J2000	Proper Motion RA: 502.937 mas/yr Proper Motion Dec: 159.151 mas/yr Parallax: 0.01006" Epoch of Position: 2015	V=11.92 NUV = 18.85	Reference Frame: ICRS				
	<i>Comments: 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	ACQ (STIS.ta.100 6121)	(1) ROSS-825	STIS/CCD, ACQ, F25ND3	MIRROR				1.3 Secs (1.3 Secs)	
									[==>]	[1]
	2	ACQ/PEAK (STIS.ta.100 6124)	(1) ROSS-825	STIS/CCD, ACQ/PEAK, 0.2X0.05ND	MIRROR				2.0 Secs (2 Secs)	
									[==>]	[1]
	3	Spec1 (STIS.sp.10 06111)	(1) ROSS-825	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		1709 Secs (1709 Secs)	
								[==>]	[1]	
4	Spec2 (STIS.sp.10 06111)	(1) ROSS-825	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		2988 Secs (2988 Secs)		
								[==>]	[2]	
5	Spec3 (STIS.sp.10 06111)	(1) ROSS-825	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		2988 Secs (2988 Secs)		
								[==>]	[3]	

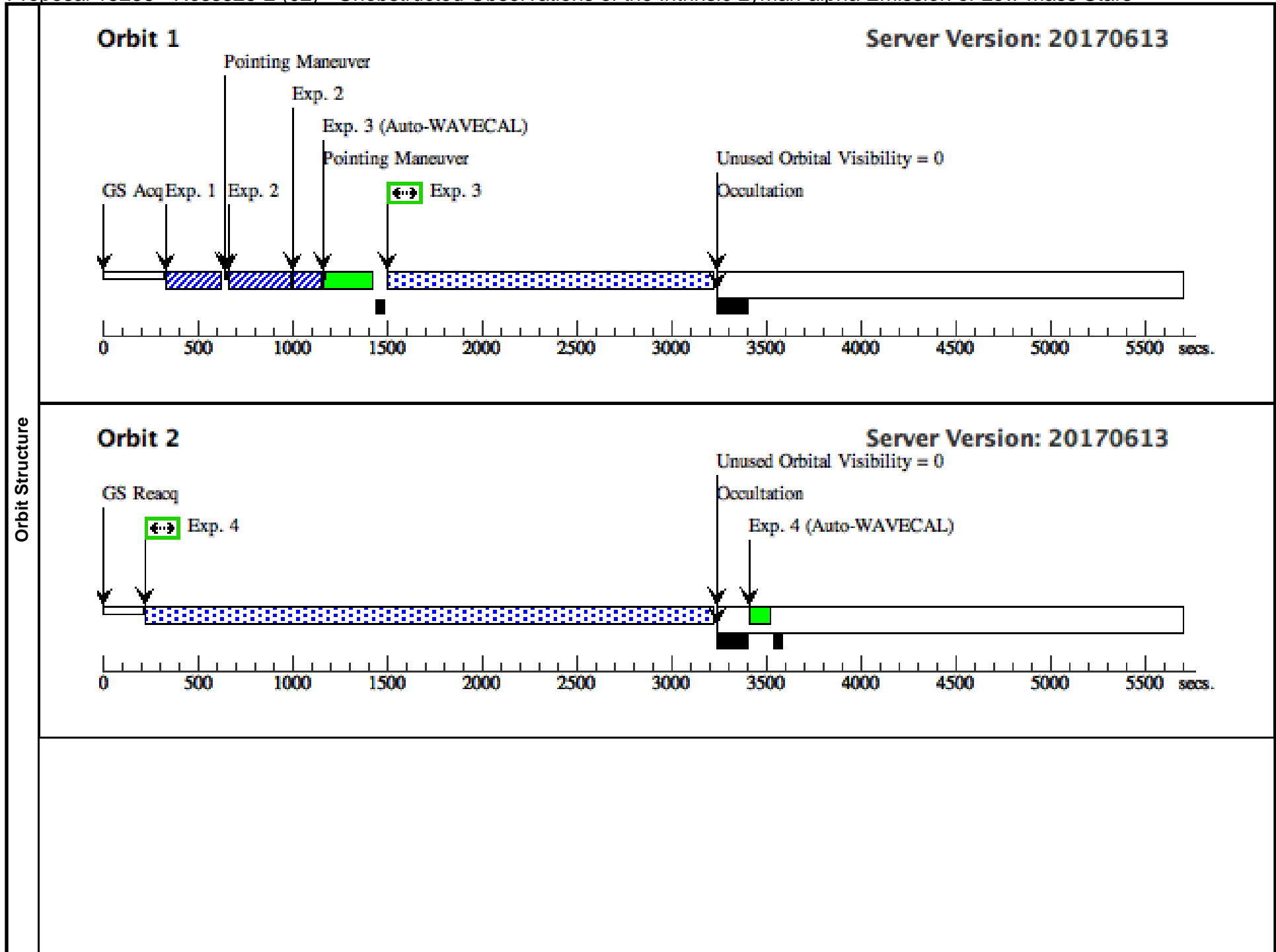


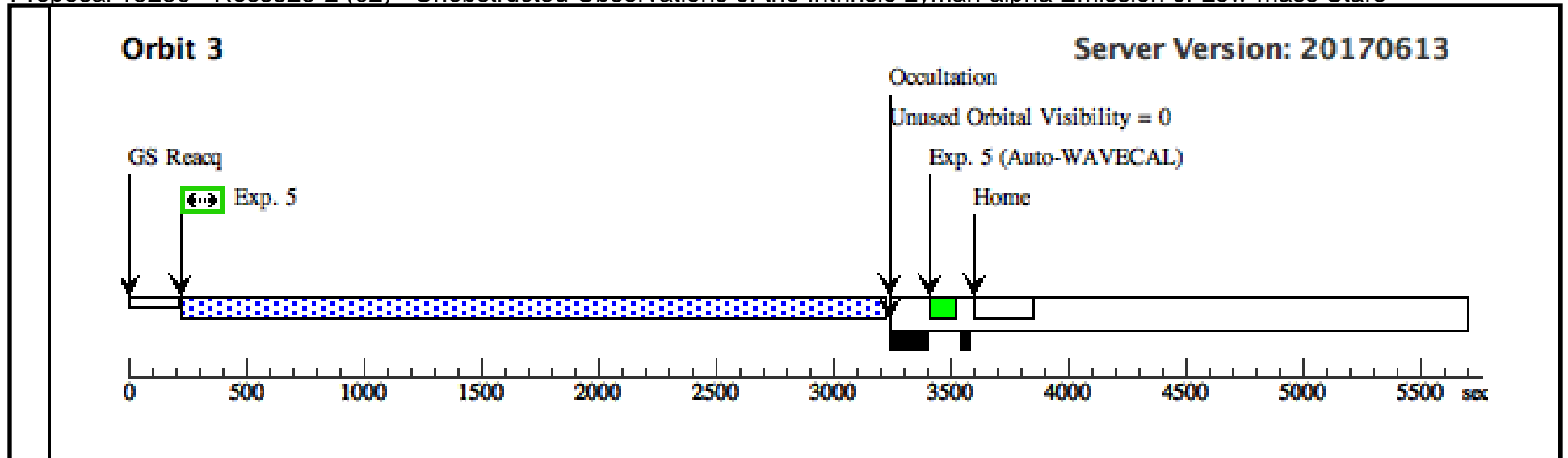


Proposal 15286 - Ross825-2 (02) - Unobstructed Observations of the Intrinsic Lyman-alpha Emission of Low-mass Stars

Tue Jul 11 01:07:52 GMT 2017

Visit	<b>Proposal 15286, Ross825-2 (02)</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	ROSS-825	RA: 21 11 17.6566 (317.8235692d) Dec: +33 31 29.69 (33.52491d) Equinox: J2000	Proper Motion RA: 502.937 mas/yr Proper Motion Dec: 159.151 mas/yr Parallax: 0.01006" Epoch of Position: 2015	V=11.92 NUV = 18.85	Reference Frame: ICRS				
	<i>Comments: 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	ACQ (STIS.ta.100 6121)	(1) ROSS-825	STIS/CCD, ACQ, F25ND3	MIRROR				1.3 Secs (1.3 Secs)	
									[==>]	[1]
	2	ACQ/PEAK (STIS.ta.100 6124)	(1) ROSS-825	STIS/CCD, ACQ/PEAK, 0.2X0.05ND	MIRROR				2.0 Secs (2 Secs)	
									[==>]	[1]
	3	Spec1 (STIS.sp.10 06111)	(1) ROSS-825	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		1709 Secs (1709 Secs)	
								[==>]	[1]	
4	Spec2 (STIS.sp.10 06111)	(1) ROSS-825	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		2988 Secs (2988 Secs)		
								[==>]	[2]	
5	Spec3 (STIS.sp.10 06111)	(1) ROSS-825	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		2988 Secs (2988 Secs)		
								[==>]	[3]	

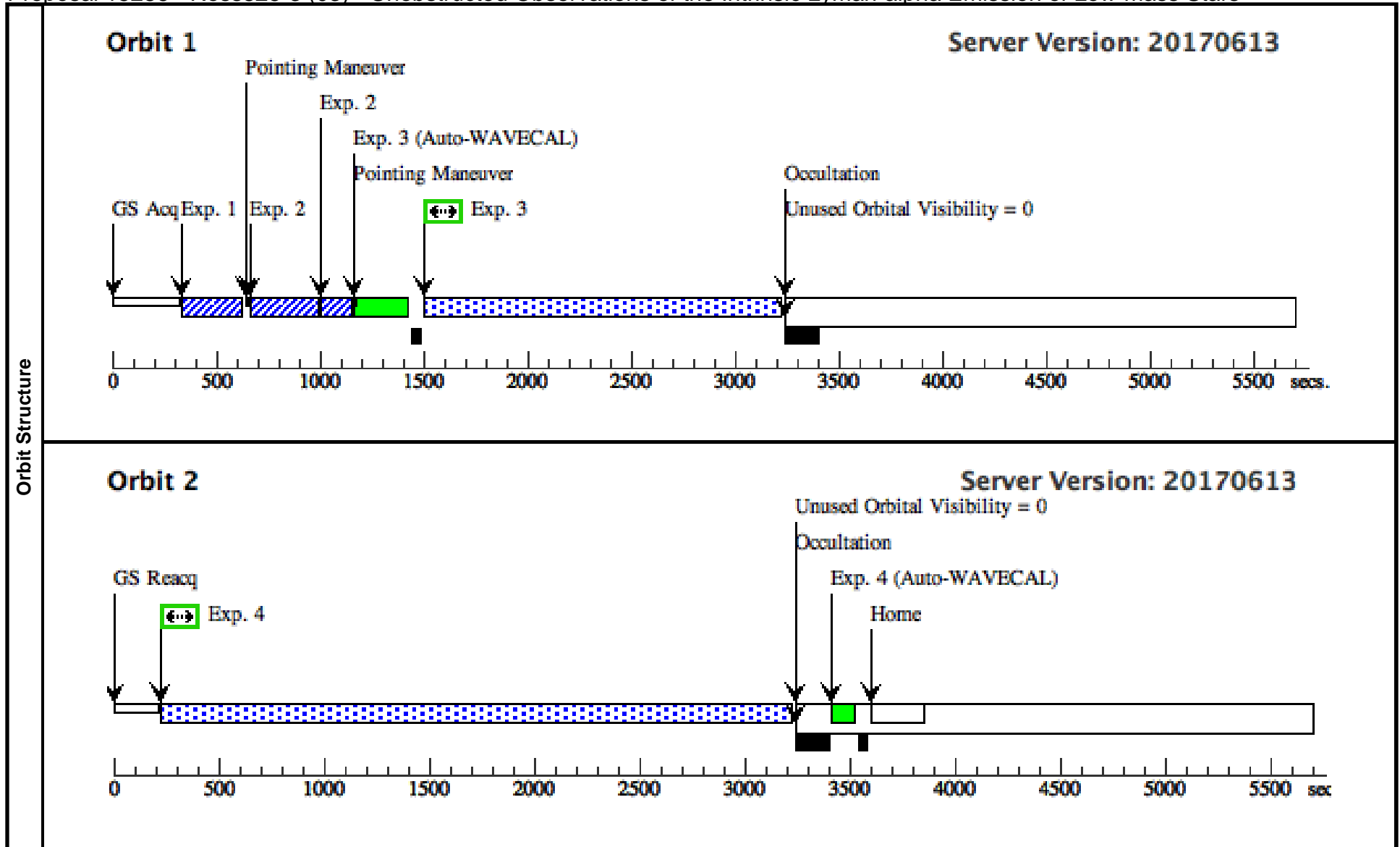




Proposal 15286 - Ross825-3 (03) - Unobstructed Observations of the Intrinsic Lyman-alpha Emission of Low-mass Stars

Tue Jul 11 01:07:52 GMT 2017

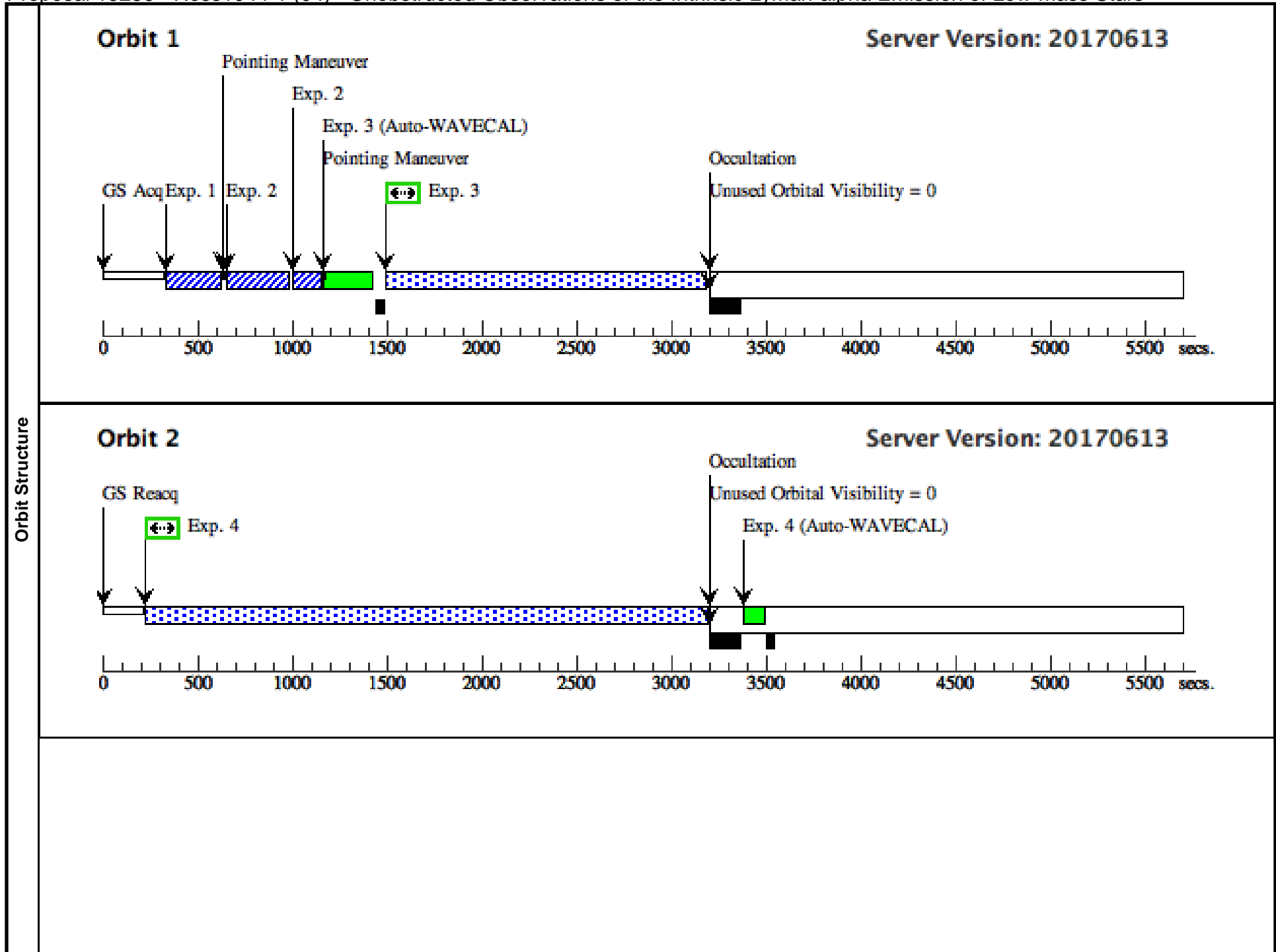
Visit	<b>Proposal 15286, Ross825-3 (03)</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(1)	ROSS-825	RA: 21 11 17.6566 (317.8235692d) Dec: +33 31 29.69 (33.52491d) Equinox: J2000	Proper Motion RA: 502.937 mas/yr Proper Motion Dec: 159.151 mas/yr Parallax: 0.01006" Epoch of Position: 2015	V=11.92 NUV = 18.85	Reference Frame: ICRS				
	<i>Comments: 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	ACQ (STIS.ta.100 6121)	(1) ROSS-825	STIS/CCD, ACQ, F25ND3	MIRROR				1.3 Secs (1.3 Secs)	
									[==>]	[1]
	2	ACQ/PEAK (STIS.ta.100 6124)	(1) ROSS-825	STIS/CCD, ACQ/PEAK, 0.2X0.05ND	MIRROR				2.0 Secs (2 Secs)	
									[==>]	[1]
3	Spec1 (STIS.sp.10 06111)	(1) ROSS-825	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00			1709 Secs (1709 Secs)	
									[==>]	[1]
4	Spec2 (STIS.sp.10 06111)	(1) ROSS-825	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00			2988 Secs (2988 Secs)	
									[==>]	[2]

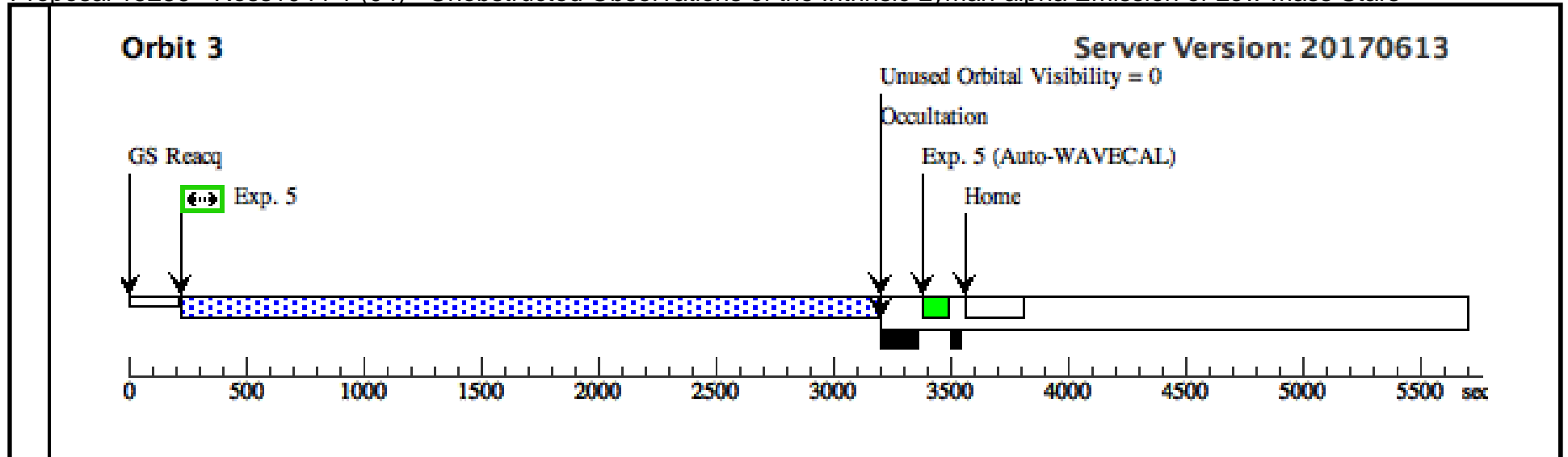


Proposal 15286 - Ross1044-1 (04) - Unobstructed Observations of the Intrinsic Lyman-alpha Emission of Low-mass Stars

Tue Jul 11 01:07:52 GMT 2017

Visit	<b>Proposal 15286, Ross1044-1 (04)</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(2)	ROSS-1044	RA: 15 03 23.6699 (225.8486246d) Dec: +03 47 7.74 (3.78548d) Equinox: J2000	Proper Motion RA: -895.0 mas/yr Proper Motion Dec: 717.0 mas/yr Epoch of Position: 2015	V=12.063 NUV = 21.59	Reference Frame: ICRS				
	<i>Comments: 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	ACQ (STIS.ta.100 6132)	(2) ROSS-1044	STIS/CCD, ACQ, F25ND3	MIRROR				0.8 Secs (0.8 Secs) [==>]	[1]
	2	ACQ/PEAK (STIS.ta.100 6125)	(2) ROSS-1044	STIS/CCD, ACQ/PEAK, 0.2X0.05ND	MIRROR				2.0 Secs (2 Secs) [==>]	[1]
	3	Spec1 (STIS.sp.10 06110)	(2) ROSS-1044	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		1673 Secs (1673 Secs) [==>]	[1]
	4	Spec2 (STIS.sp.10 06110)	(2) ROSS-1044	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		2950 Secs (2950 Secs) [==>]	[2]
	5	Spec3 (STIS.sp.10 06110)	(2) ROSS-1044	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A		BUFFER-TIME=20 00		2950 Secs (2950 Secs) [==>]	[3]





Proposal 15286 - Ross1044-2 (05) - Unobstructed Observations of the Intrinsic Lyman-alpha Emission of Low-mass Stars

Tue Jul 11 01:07:52 GMT 2017

Visit	<b>Proposal 15286, Ross1044-2 (05)</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: STIS/CCD, STIS/FUV-MAMA Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	ROSS-1044	RA: 15 03 23.6699 (225.8486246d) Dec: +03 47 7.74 (3.78548d) Equinox: J2000	Proper Motion RA: -895.0 mas/yr Proper Motion Dec: 717.0 mas/yr Epoch of Position: 2015	V=12.063 NUV = 21.59	Reference Frame: ICRS				
	<i>Comments: 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	ACQ (STIS.ta.100 6132)	(2) ROSS-1044	STIS/CCD, ACQ, F25ND3	MIRROR				0.8 Secs (0.8 Secs) [==>]	[1]
	2	ACQ/PEAK (STIS.ta.100 6125)	(2) ROSS-1044	STIS/CCD, ACQ/PEAK, 0.2X0.05ND	MIRROR				2.0 Secs (2 Secs) [==>]	[1]
	3	Spec1 (STIS.sp.10 06110)	(2) ROSS-1044	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=20 00			1673 Secs (1673 Secs) [==>]	[1]
	4	Spec2 (STIS.sp.10 06110)	(2) ROSS-1044	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=20 00			2950 Secs (2950 Secs) [==>]	[2]
	5	Spec3 (STIS.sp.10 06110)	(2) ROSS-1044	STIS/FUV-MAMA, TIME-TAG, 52X0.1	G140M 1222 A	BUFFER-TIME=20 00			2950 Secs (2950 Secs) [==>]	[3]

