



18393 - Dissecting a newly unveiled He II nebula at the edge of the Local Group with STIS

Cycle: 34, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
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Dr. Ylva Gotberg (CoI) (ESA Member)	Institute of Science and Technology Austria
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Dr. Margaret Lazzarini (CoI)	California State University - Los Angeles
Prof. Paul A. Crowther (CoI) (ESA Member)	University of Sheffield

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) WLM-HEII (2) WLM-HEII-OFFSET	STIS/CCD STIS/FUV-MAMA	3	19-Aug-2026 11:04:45.0	yes
02	(1) WLM-HEII (2) WLM-HEII-OFFSET	STIS/CCD STIS/FUV-MAMA	3	19-Aug-2026 11:04:46.0	yes
03	(1) WLM-HEII (2) WLM-HEII-OFFSET	STIS/CCD STIS/FUV-MAMA	2	19-Aug-2026 11:04:47.0	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>
04	(1) WLM-HEII (2) WLM-HEII-OFFSET	STIS/CCD STIS/FUV-MAMA	3	19-Aug-2026 11:04:47.0	yes
05	(1) WLM-HEII (2) WLM-HEII-OFFSET	STIS/CCD STIS/FUV-MAMA	3	19-Aug-2026 11:04:48.0	yes
06	(1) WLM-HEII (2) WLM-HEII-OFFSET	STIS/CCD STIS/FUV-MAMA	2	19-Aug-2026 11:04:49.0	yes

16 Total Orbits Used

ABSTRACT

For decades, the routine detection of nebular He II emission in unresolved metal-poor star forming galaxies has evaded explanation. The failure of population synthesis models to explain this emission suggests that these models are missing or mismodeling sources of hard ionizing radiation that are relatively commonplace at low metallicities; and spells trouble for our ability to confidently interpret the spectra of the growing population of distant galaxies with high-ionization line detections. Recently, a rare spatially resolved He II nebula has been identified within a bright HII region in the dwarf irregular galaxy WLM. Follow-up optical spectroscopy confirms this narrow high-ionization nebular emission, but reveals no signatures of any source hot enough to provide the requisite >54 eV photons. This is consistent with a picture in which a very hot atmosphere is present, but outshined by its companion or other neighbors in the optical. Such an object can only be identified unambiguously in the far ultraviolet. Here we propose STIS FUV spectroscopy designed to dissect the cluster underlying this emission. These observations will detect or place stringent limits on any hot atmospheres present which would be effectively invisible at other wavelengths beyond the EUV and UV; provide access to key diagnostics of these and all UV bright sources within the region; and map high-ionization UV nebular lines at pc-scales. This object represents a unique opportunity that only HST can take advantage of to directly tie hard ionizing radiation in a metal-poor dwarf galaxy to its source, providing crucial input to models of massive stars and their ionizing feedback in the early Universe.

OBSERVING DESCRIPTION

This program will obtain a set of deep FUV / G140L spectroscopic observations of the gas and UV-bright stars underlying a resolved He II emitting region in the galaxy WLM. In order to capture the brightest stars which are resolved and separated at few-arcsecond scales, we have carefully chosen 2 position angles that when employed with the 52x0.5 slit will cover the bulk of these while also dissecting the nebular emission covering this region. Because of the complex nature of this central knot and the requirements on slit centering to capture these stars, a direct acquisition is infeasible. Instead, we have identified a nearby ($\sim 30''$) isolated and reasonably bright star (~ 19 AB) with negligible proper motion. We will perform a simple

Proposal 18393 (STScI Edit Number: 0, Created: Wednesday, August 19, 2026, 10:04:49AM Eastern Standard Time) - Overview

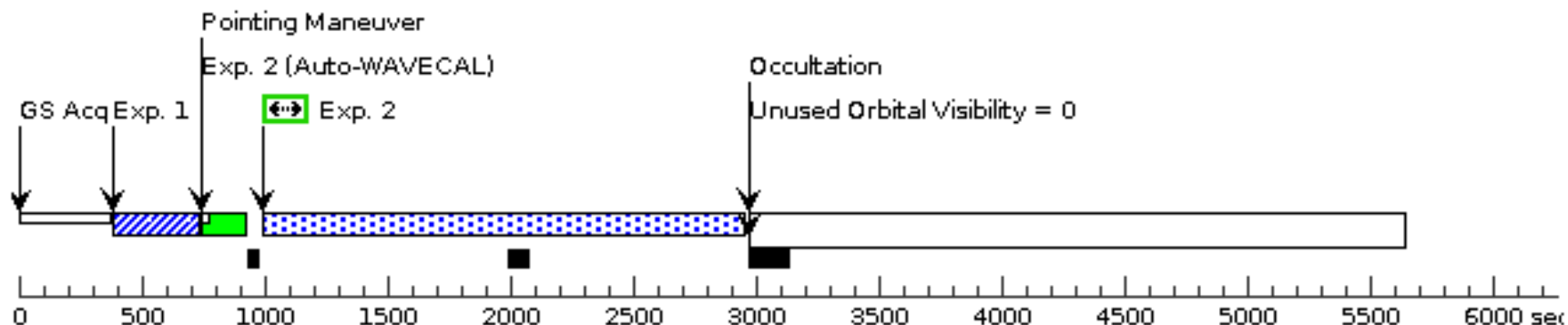
ACQ on this star for each visit, and offset to our primary target positions. Both the offset and primary target coordinates are GAIA-derived and checked against aligned HST imaging, and the point source acquisition is simulated with existing F814W and F625W imaging. The remainder of each visit is devoted to spectroscopic integrations in TIME-TAG mode. Even in an extremely optimistic ETC estimate for a combined AB=27 F275W O3V source, we do not expect to encounter high count rates that would approach the readout limits; but to guard against slightly brighter sources than expected, we conservatively set the buffer time to just less than half each integration length. Each PA is assigned 3 visits (3+3+2 orbits) for a total of 18 orbits across both pointings.

Proposal 18393 - PA 130 (01) - Dissecting a newly unveiled He II nebula at the edge of the Local Group with STIS

Visit	Proposal 18393, PA_130 (01)										Wed Aug 19 15:04:49 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: STIS/CCD, STIS/FUV-MAMA											
	Special Requirements: ORIENT 355D TO 355 D											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	WLM-HEII	RA: 00 01 56.4583 (.4852429d) Dec: -15 26 54.05 (-15.44835d) Equinox: J2000					V=20+/-1.0		Reference Frame: ICRS		
	Comments: Category=EXT-CLUSTER Description=[EMISSION LINE NEBULA, KNOT, OB ASSOCIATION, STAR FORMING REGION]											
	(2)	WLM-HEII-OFFSET	RA: 00 01 57.2078 (.4883658d) Dec: -15 27 18.50 (-15.45514d) Equinox: J2000					V=18.9+/-0.2		Reference Frame: ICRS		
Comments: Category=UNIDENTIFIED Description=[UNDESIGNATED] Extended=NO												
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.236 6971)	(2) WLM-HEII-OFF SET	STIS/CCD, ACQ, F28X50LP		MIRROR	ACQTYPE=POINT			30 Secs (30 Secs)		
										[==>]		[1]
	2	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=95 4			1800 Secs (1909 Secs)		
										[==>1909.0 Secs]		[1]
	3	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=12 83			2200 Secs (2568 Secs)		
									[==>2568.0 Secs]		[2]	
4	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=12 62			2200 Secs (2526 Secs)			
									[==>2526.0 Secs]		[3]	

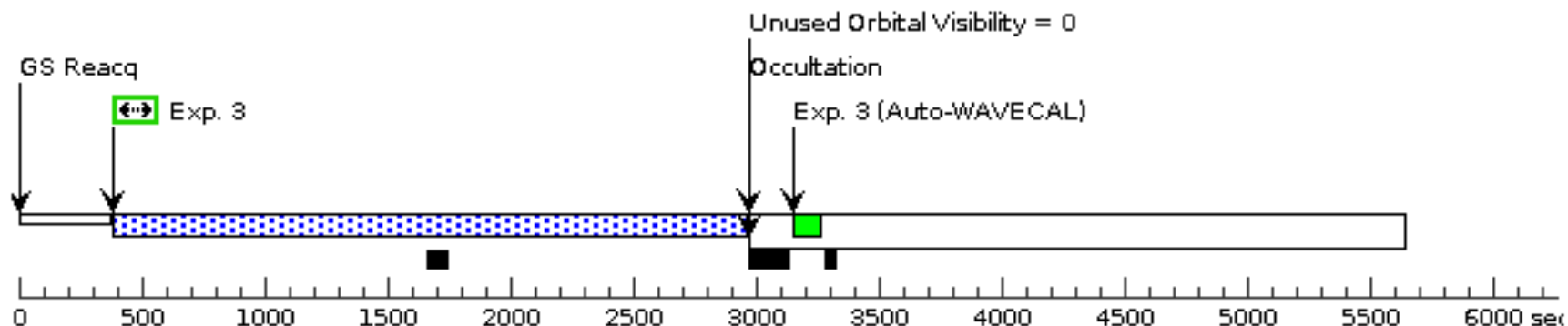
Orbit 1

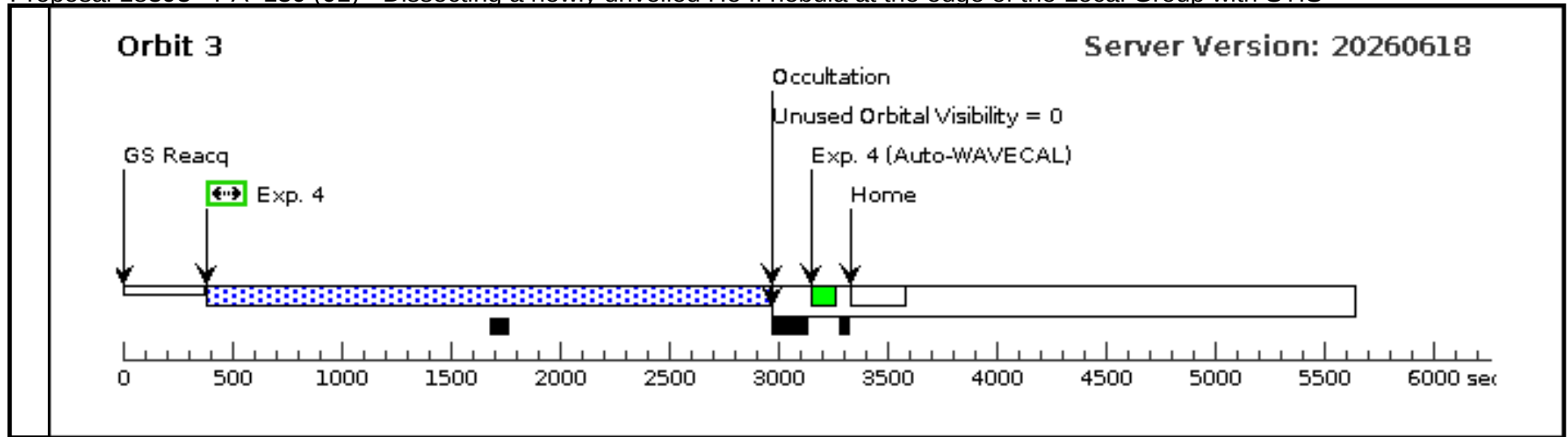
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Orbit 2

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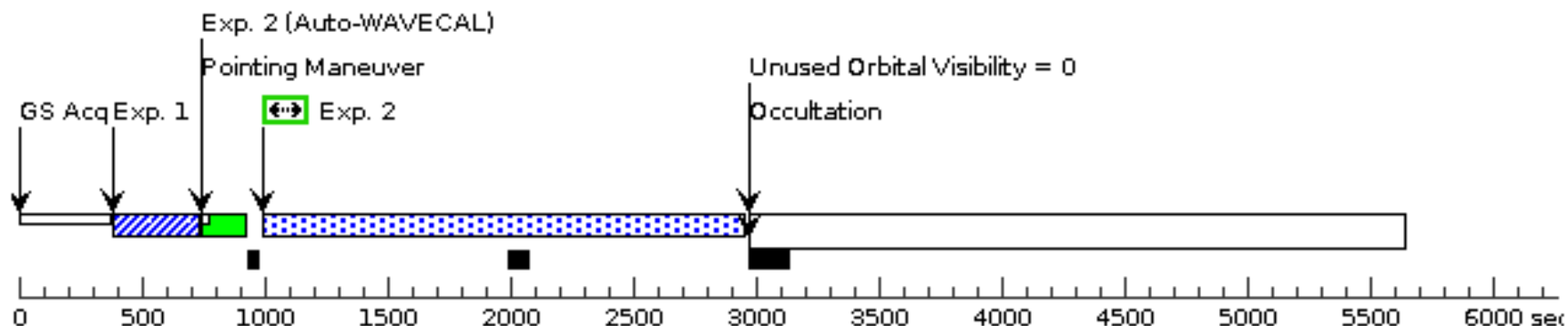


Proposal 18393 - PA 130 (02) - Dissecting a newly unveiled He II nebula at the edge of the Local Group with STIS

Visit	Proposal 18393, PA_130 (02)										Wed Aug 19 15:04:49 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: STIS/CCD, STIS/FUV-MAMA											
	Special Requirements: ORIENT 355D TO 355 D											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	WLM-HEII	RA: 00 01 56.4583 (.4852429d) Dec: -15 26 54.05 (-15.44835d) Equinox: J2000					V=20+/-1.0		Reference Frame: ICRS		
	Comments: Category=EXT-CLUSTER Description=[EMISSION LINE NEBULA, KNOT, OB ASSOCIATION, STAR FORMING REGION]											
	(2)	WLM-HEII-OFFSET	RA: 00 01 57.2078 (.4883658d) Dec: -15 27 18.50 (-15.45514d) Equinox: J2000					V=18.9+/-0.2		Reference Frame: ICRS		
Comments: Category=UNIDENTIFIED Description=[UNDESIGNATED] Extended=NO												
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.236 6971)	(2) WLM-HEII-OFF SET	STIS/CCD, ACQ, F28X50LP		MIRROR	ACQTYPE=POINT			30 Secs (30 Secs)		
										[==>]		[1]
	2	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=95 4			1800 Secs (1909 Secs)		
										[==>1909.0 Secs]		[1]
	3	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=12 83			2200 Secs (2568 Secs)		
									[==>2568.0 Secs]		[2]	
4	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=12 62			2200 Secs (2526 Secs)			
									[==>2526.0 Secs]		[3]	

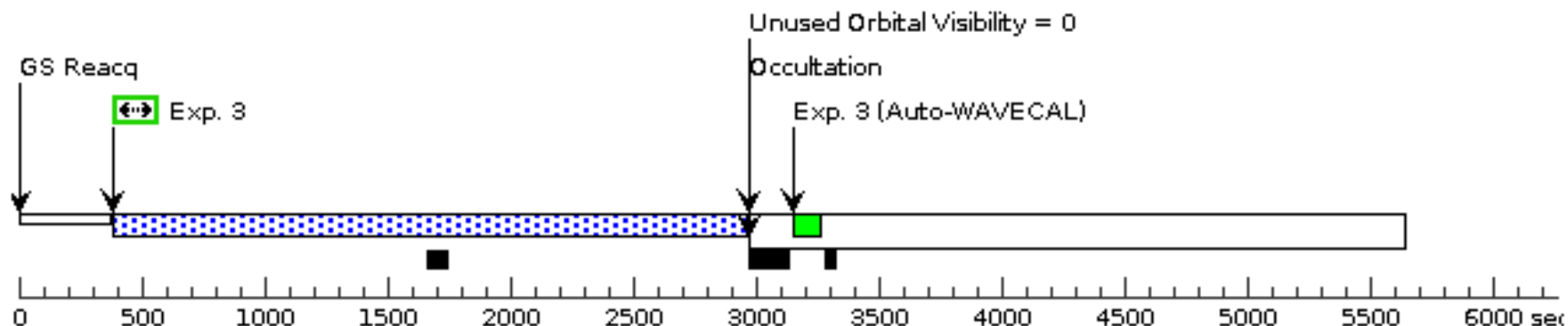
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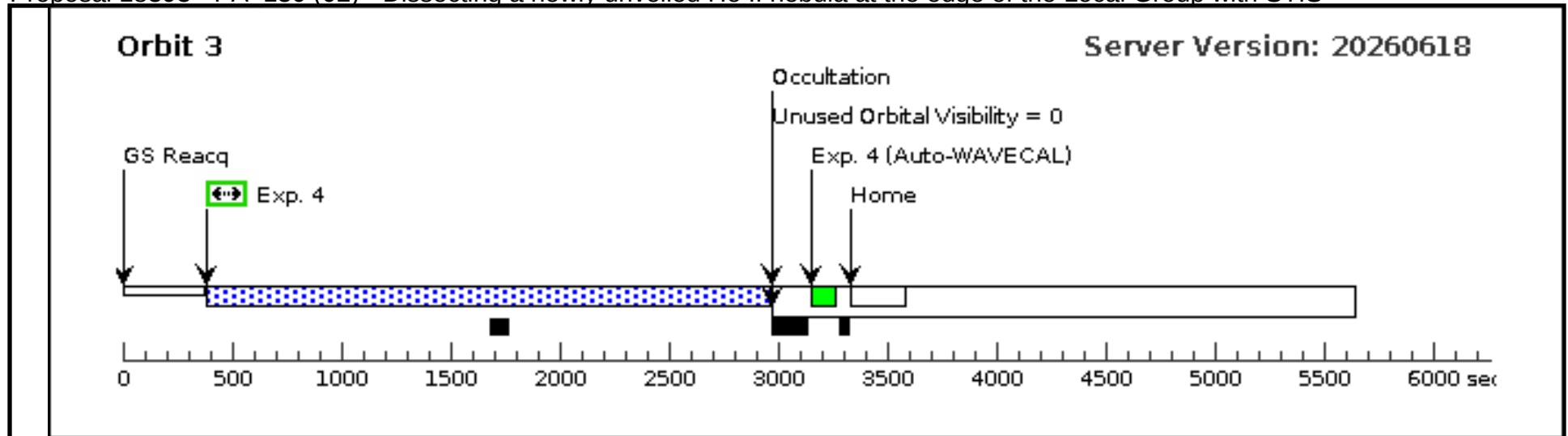
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Orbit 2

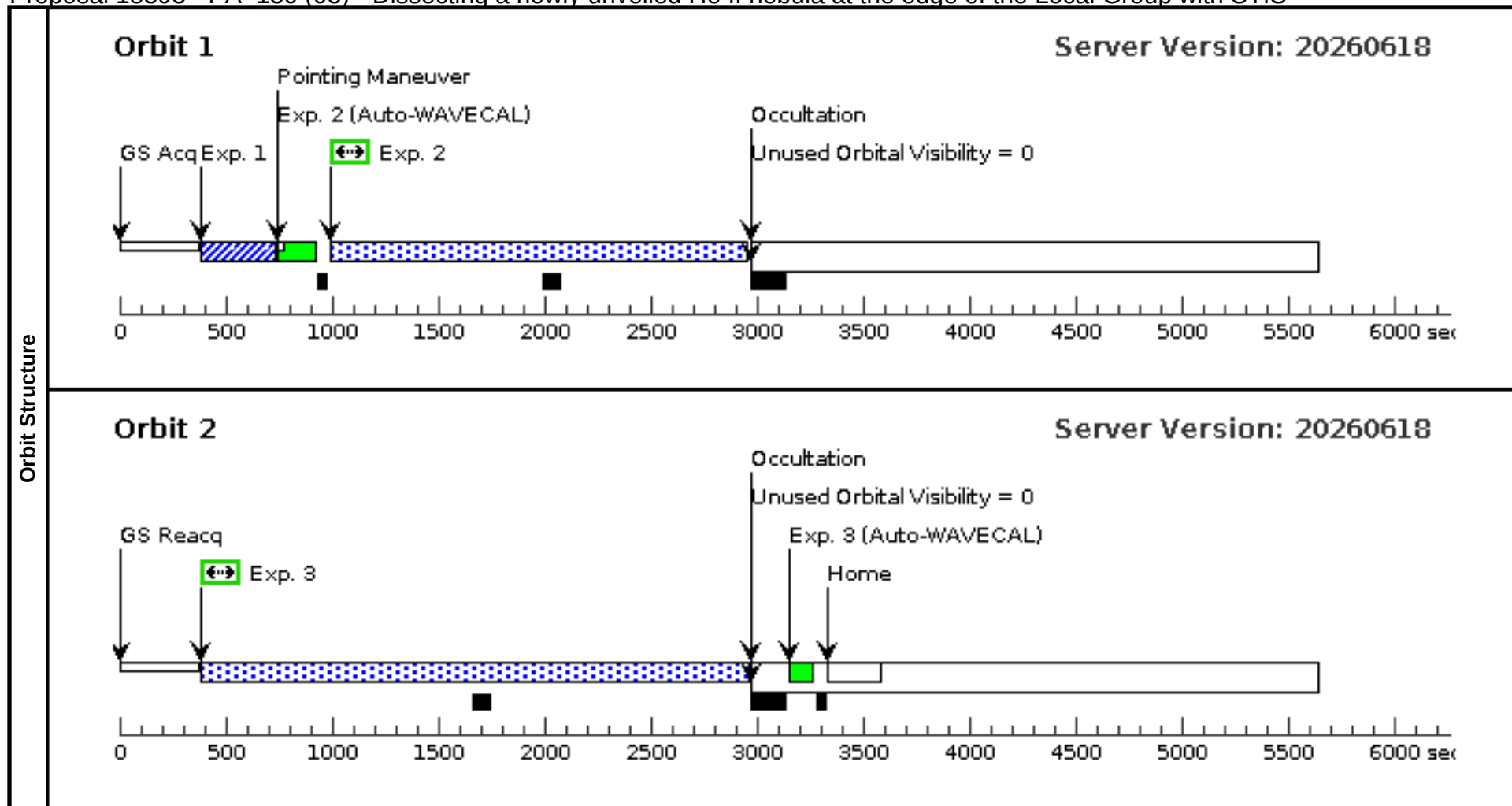
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Proposal 18393 - PA 130 (03) - Dissecting a newly unveiled He II nebula at the edge of the Local Group with STIS

Visit	Proposal 18393, PA_130 (03)										Wed Aug 19 15:04:49 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: STIS/CCD, STIS/FUV-MAMA											
	Special Requirements: ORIENT 355D TO 355 D											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	WLM-HEII	RA: 00 01 56.4583 (.4852429d) Dec: -15 26 54.05 (-15.44835d) Equinox: J2000					V=20+/-1.0		Reference Frame: ICRS		
	Comments: Category=EXT-CLUSTER Description=[EMISSION LINE NEBULA, KNOT, OB ASSOCIATION, STAR FORMING REGION]											
	(2)	WLM-HEII-OFFSET	RA: 00 01 57.2078 (.4883658d) Dec: -15 27 18.50 (-15.45514d) Equinox: J2000					V=18.9+/-0.2		Reference Frame: ICRS		
Comments: Category=UNIDENTIFIED Description=[UNDESIGNATED] Extended=NO												
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.236 6971)	(2) WLM-HEII-OFF SET	STIS/CCD, ACQ, F28X50LP		MIRROR	ACQTYPE=POINT			30 Secs (30 Secs)		
										[==>]		[1]
	2	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=95 4			1800 Secs (1909 Secs)		
										[==>1909.0 Secs]		[1]
3	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=12 83			2200 Secs (2568 Secs)			
									[==>2568.0 Secs]		[2]	

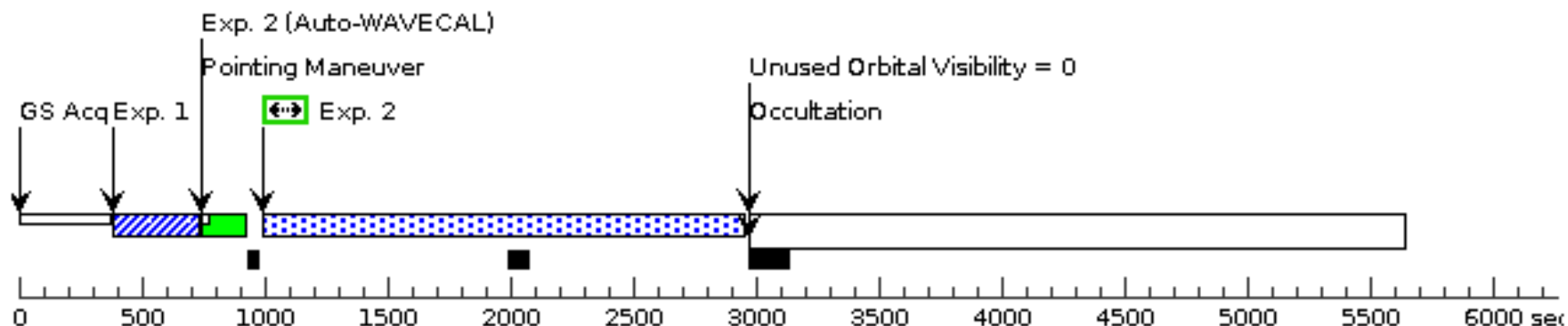


Proposal 18393 - PA 25 (04) - Dissecting a newly unveiled He II nebula at the edge of the Local Group with STIS

Visit	Proposal 18393, PA_25 (04)										Wed Aug 19 15:04:49 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: STIS/CCD, STIS/FUV-MAMA											
	Special Requirements: ORIENT 250D TO 250 D											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	WLM-HEII	RA: 00 01 56.4583 (.4852429d) Dec: -15 26 54.05 (-15.44835d) Equinox: J2000					V=20+/-1.0		Reference Frame: ICRS		
	Comments: Category=EXT-CLUSTER Description=[EMISSION LINE NEBULA, KNOT, OB ASSOCIATION, STAR FORMING REGION]											
	(2)	WLM-HEII-OFFSET	RA: 00 01 57.2078 (.4883658d) Dec: -15 27 18.50 (-15.45514d) Equinox: J2000					V=18.9+/-0.2		Reference Frame: ICRS		
Comments: Category=UNIDENTIFIED Description=[UNDESIGNATED] Extended=NO												
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.236 6971)	(2) WLM-HEII-OFF SET	STIS/CCD, ACQ, F28X50LP		MIRROR	ACQTYPE=POINT			30 Secs (30 Secs)		
										[==>]		[1]
	2	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=95 4			1800 Secs (1909 Secs)		
										[==>1909.0 Secs]		[1]
	3	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=12 83			2200 Secs (2568 Secs)		
									[==>2568.0 Secs]		[2]	
4	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=12 62			2200 Secs (2526 Secs)			
									[==>2526.0 Secs]		[3]	

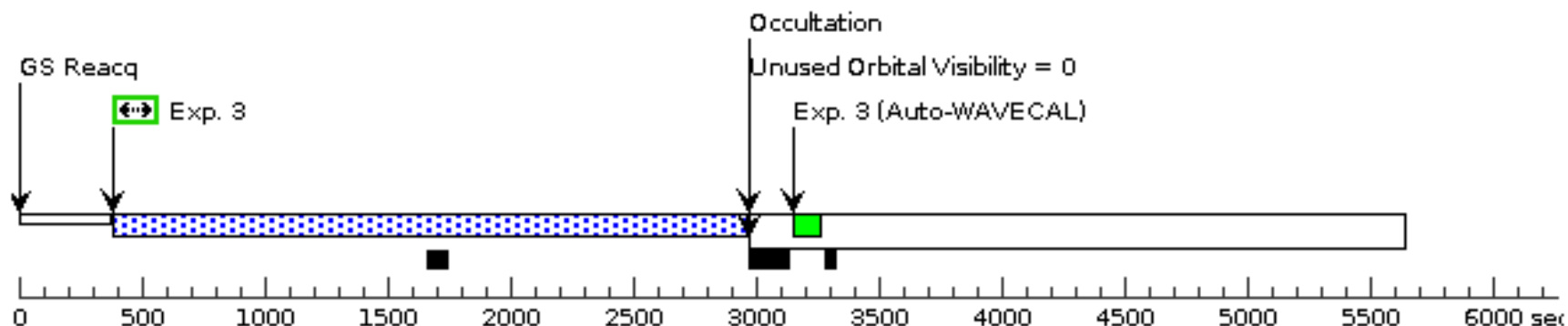
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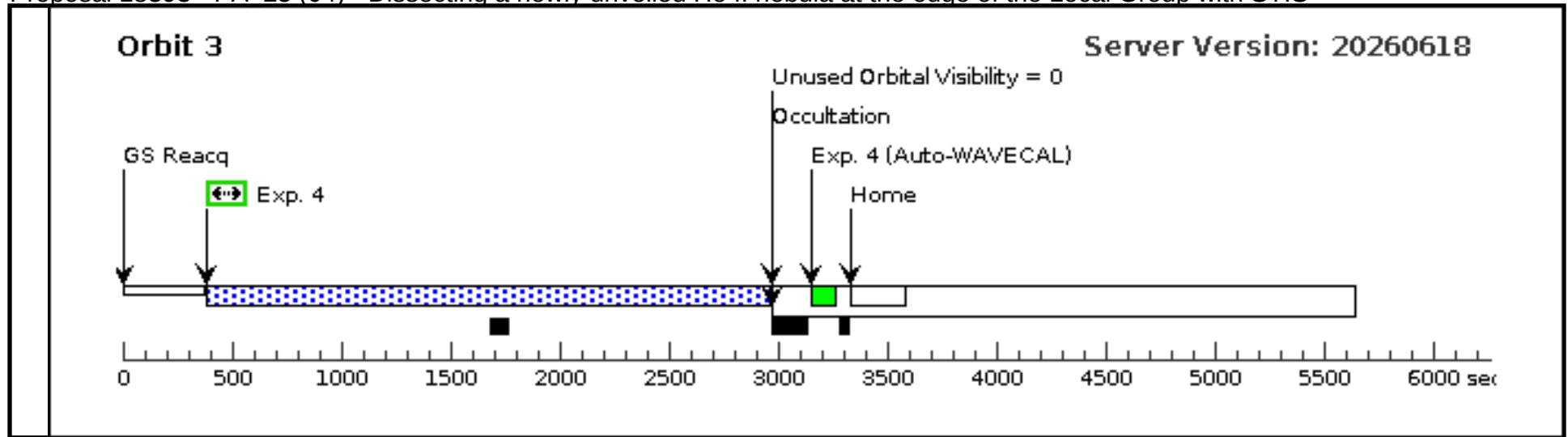
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Orbit 2

Server Version: 20260618



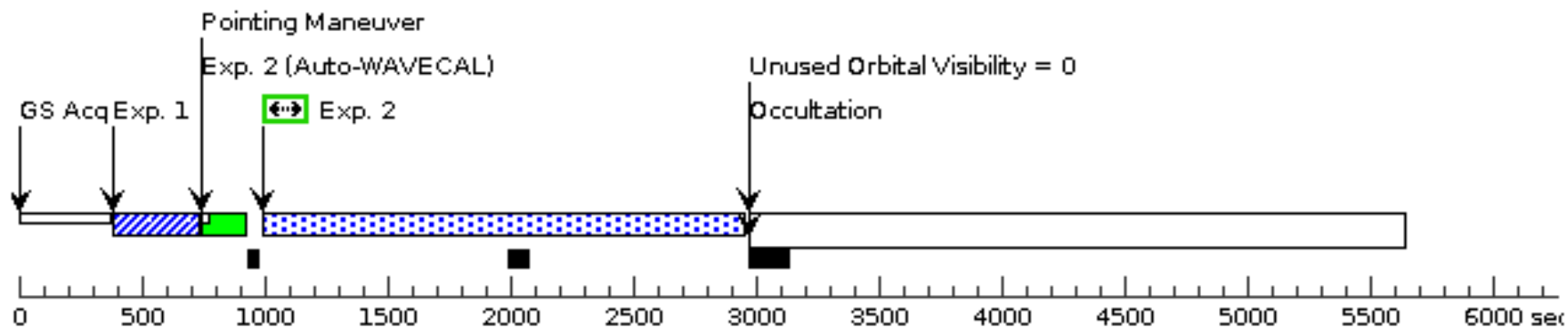


Proposal 18393 - PA 25 (05) - Dissecting a newly unveiled He II nebula at the edge of the Local Group with STIS

Visit	Proposal 18393, PA_25 (05)								Wed Aug 19 15:04:49 GMT 2026	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/CCD, STIS/FUV-MAMA									
	Special Requirements: ORIENT 250D TO 250 D									
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous	
	(1)	WLM-HEII	RA: 00 01 56.4583 (.4852429d) Dec: -15 26 54.05 (-15.44835d) Equinox: J2000				V=20+/-1.0		Reference Frame: ICRS	
	Comments: Category=EXT-CLUSTER Description=[EMISSION LINE NEBULA, KNOT, OB ASSOCIATION, STAR FORMING REGION]									
	(2)	WLM-HEII-OFFSET	RA: 00 01 57.2078 (.4883658d) Dec: -15 27 18.50 (-15.45514d) Equinox: J2000				V=18.9+/-0.2		Reference Frame: ICRS	
Comments: Category=UNIDENTIFIED Description=[UNDESIGNATED] Extended=NO										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.236 6971)	(2) WLM-HEII-OFF SET	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=POINT			30 Secs (30 Secs)	
									[==>]	[1]
	2	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=95 4			1800 Secs (1909 Secs)	
									[==>1909.0 Secs]	[1]
	3	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=12 83			2200 Secs (2568 Secs)	
								[==>2568.0 Secs]	[2]	
4	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1	G140L 1425 A	BUFFER-TIME=12 62			2200 Secs (2526 Secs)		
								[==>2526.0 Secs]	[3]	

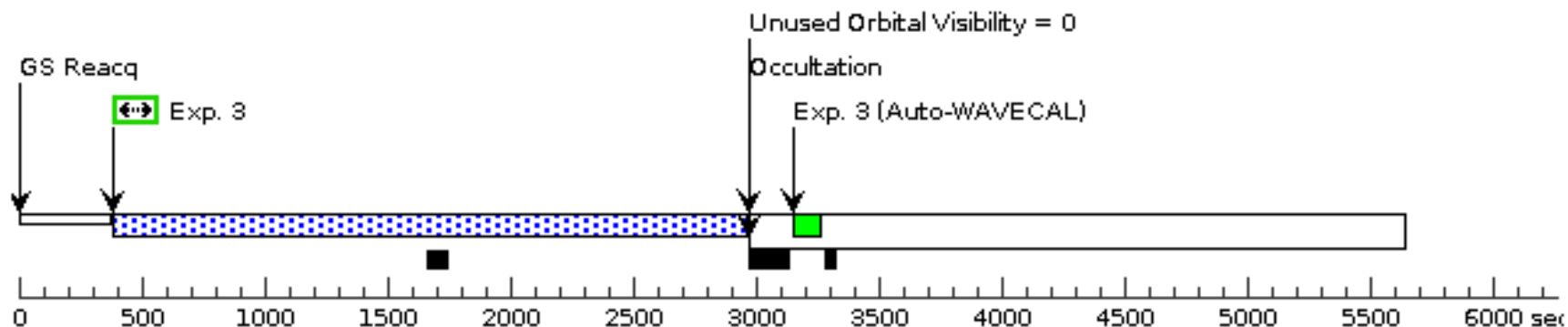
Orbit 1

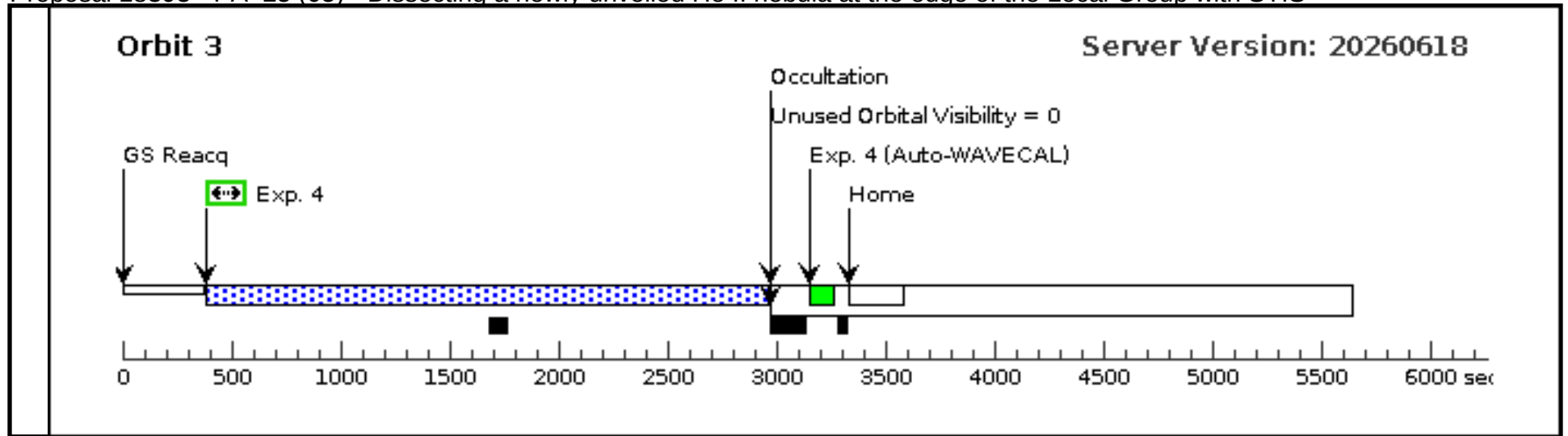
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Orbit 2

Server Version: 20260618





Proposal 18393 - PA 25 (06) - Dissecting a newly unveiled He II nebula at the edge of the Local Group with STIS

Visit	Proposal 18393, PA_25 (06)										Wed Aug 19 15:04:49 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: STIS/CCD, STIS/FUV-MAMA											
	Special Requirements: ORIENT 250D TO 250 D											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	WLM-HEII	RA: 00 01 56.4583 (.4852429d) Dec: -15 26 54.05 (-15.44835d) Equinox: J2000					V=20+/-1.0		Reference Frame: ICRS		
	Comments: Category=EXT-CLUSTER Description=[EMISSION LINE NEBULA, KNOT, OB ASSOCIATION, STAR FORMING REGION]											
	(2)	WLM-HEII-OFFSET	RA: 00 01 57.2078 (.4883658d) Dec: -15 27 18.50 (-15.45514d) Equinox: J2000					V=18.9+/-0.2		Reference Frame: ICRS		
Comments: Category=UNIDENTIFIED Description=[UNDESIGNATED] Extended=NO												
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.236 6971)	(2) WLM-HEII-OFF SET	STIS/CCD, ACQ, F28X50LP		MIRROR	ACQTYPE=POINT			30 Secs (30 Secs)		
										[==>]		[1]
	2	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=95 4			1800 Secs (1909 Secs)		
										[==>1909.0 Secs]		[1]
3	(STIS.sp.23 66995)	(1) WLM-HEII	STIS/FUV-MAMA, TIME-TAG, 52X0.5D1		G140L 1425 A	BUFFER-TIME=12 83			2200 Secs (2568 Secs)			
									[==>2568.0 Secs]		[2]	

