



18391 - The First Direct Measurement of the Extreme-UV Spectra of Very Massive Stars

Cycle: 34, Proposal Category: GO
(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>
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Prof. Matthew James Hayes (CoI) (ESA Member)	Stockholm University
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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	(3) J0817+3241	ACS/SBC	3	10-Aug-2026 15:00:14.0	yes
02	(1) J1220+0842	ACS/SBC	3	10-Aug-2026 15:00:15.0	yes
03	(2) J1316+2614	ACS/SBC	3	10-Aug-2026 15:00:15.0	yes

9 Total Orbits Used

ABSTRACT

Very Massive Stars (VMS ; $M^*>\sim 100M_{\text{sol}}$) are increasingly invoked to explain the hard ionizing spectra, strong HeII emission, and elevated ionizing photon production efficiencies observed in early galaxies, yet their extreme-ultraviolet (EUV) spectra remain essentially unconstrained. We propose ACS/SBC imaging of nine UV-luminous star-forming galaxies at $z=2.3-3.6$ with spectroscopic signatures consistent with VMS populations, and high escape fraction of ionizing radiation ($\sim 40-90\%$). At these redshifts, rest-frame 300-500 Å emission is shifted into the HST far-UV window, enabling the first direct constraints on escaping stellar radiation between the H I and He II ionization edges. Combining new SBC photometry with

existing rest-UV and optical spectroscopy and HST measurements near rest-frame 800 Å, we will infer the hardness and shape of the ionizing continuum using forward modeling of stellar populations and IGM transmission. These observations will test whether VMS dominate the EUV output of extreme starbursts and provide an empirical calibration of ionizing spectra crucial for interpreting JWST galaxies and cosmic reionization.

OBSERVING DESCRIPTION

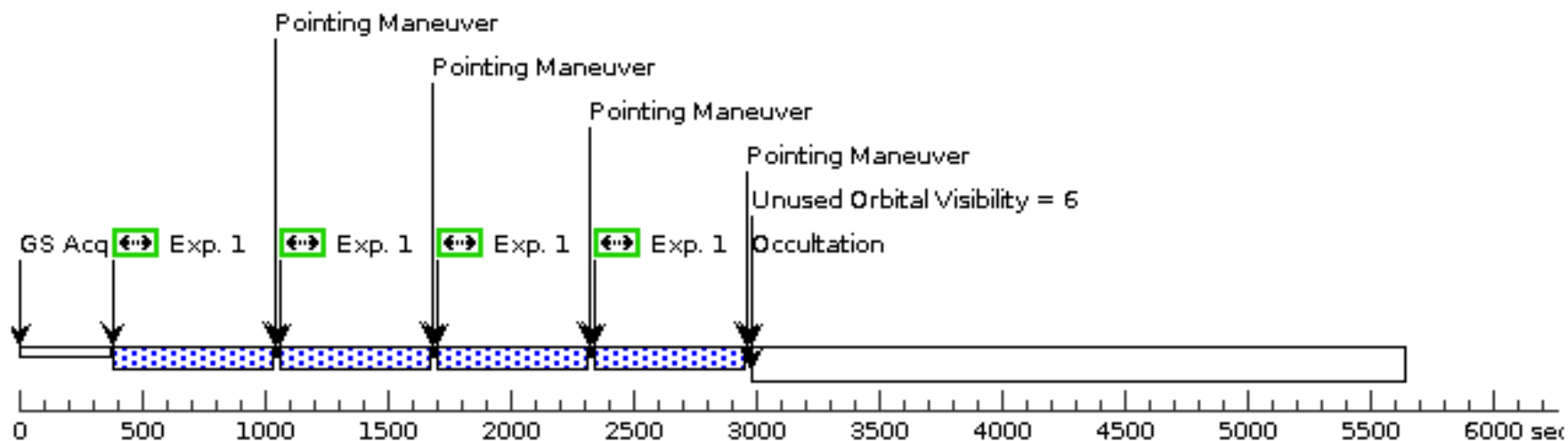
Imaging in F140L

Proposal 18391 - Visit 01 - The First Direct Measurement of the Extreme-UV Spectra of Very Massive Stars

Visit	Proposal 18391, Visit 01										Mon Aug 10 19:00:16 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: ACS/SBC											
	Special Requirements: (none)											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116		Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false						(1), (2), (3)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(3)	J0817+3241	RA: 08 17 38.7700 (124.4115417d) Dec: +32 41 8.10 (32.68558d) Equinox: J2000				V=20		Reference Frame: ICRS			
	Comments: Category=GALAXY Description=[STARBURST]											
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(1811053)	(3) J0817+3241	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 1-1 in Visit 01 (1)	580 Secs (2320 Secs)		
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										[==>(Pattern 3)]		
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	2	(1811053)	(3) J0817+3241	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 2-2 in Visit 01 (1)	587 Secs (2348 Secs)		
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3	(1811053)	(3) J0817+3241	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 3-3 in Visit 01 (1)	587 Secs (2348 Secs)			
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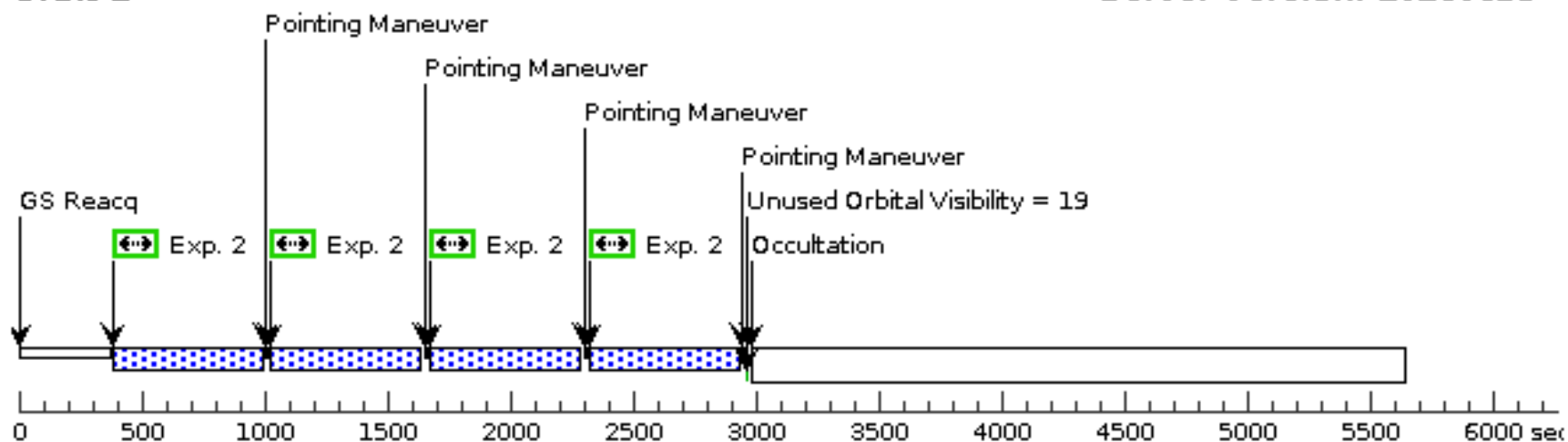
Orbit 1

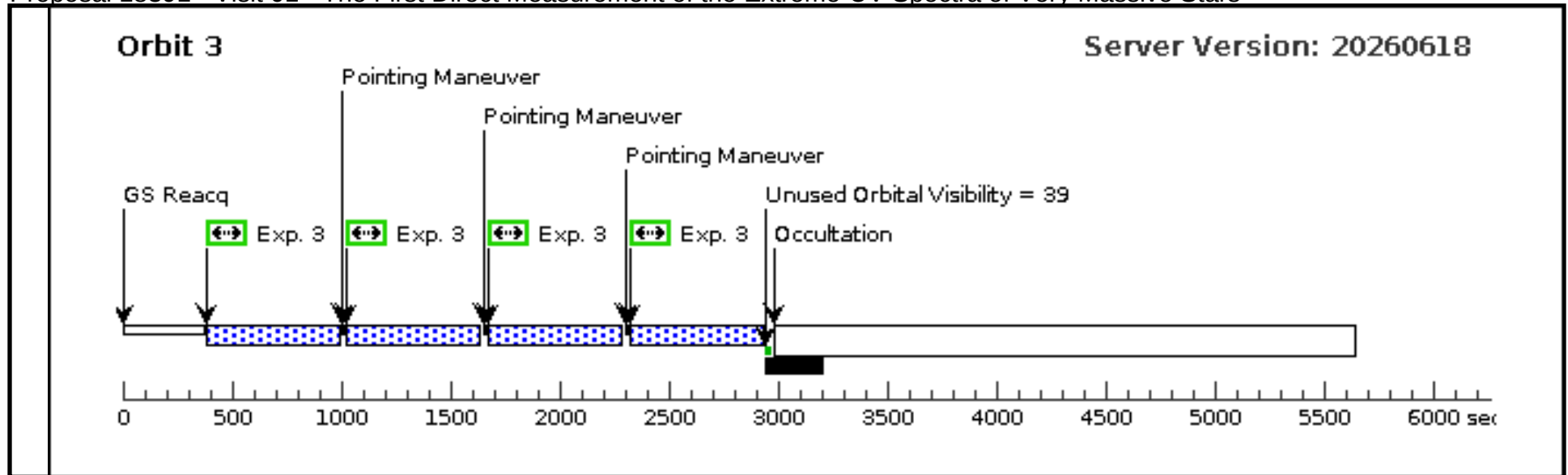
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Orbit 2

Server Version: 20260618



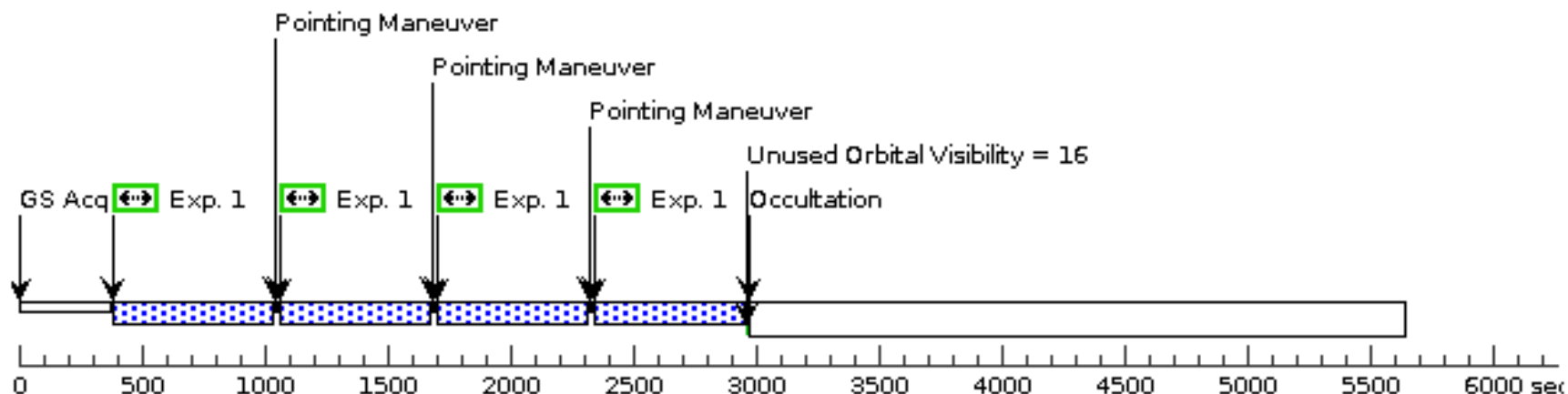


Proposal 18391 - Visit 02 - The First Direct Measurement of the Extreme-UV Spectra of Very Massive Stars

Visit	Proposal 18391, Visit 02										Mon Aug 10 19:00:16 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: ACS/SBC											
	Special Requirements: (none)											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116		Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false						(1), (2), (3)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(1)	J1220+0842	RA: 12 20 40.7200 (185.1696667d) Dec: +08 42 38.14 (8.71059d) Equinox: J2000				V=20		Reference Frame: ICRS			
	Comments: Category=GALAXY Description=[STARBURST]											
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(1811053)	(1) J1220+0842	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 1-1 i n Visit 02 (1)	580 Secs (2320 Secs)		
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	2	(1811053)	(1) J1220+0842	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 2-2 i n Visit 02 (1)	587 Secs (2348 Secs)		
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	3	(1811053)	(1) J1220+0842	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 3-3 i n Visit 02 (1)	587 Secs (2348 Secs)		
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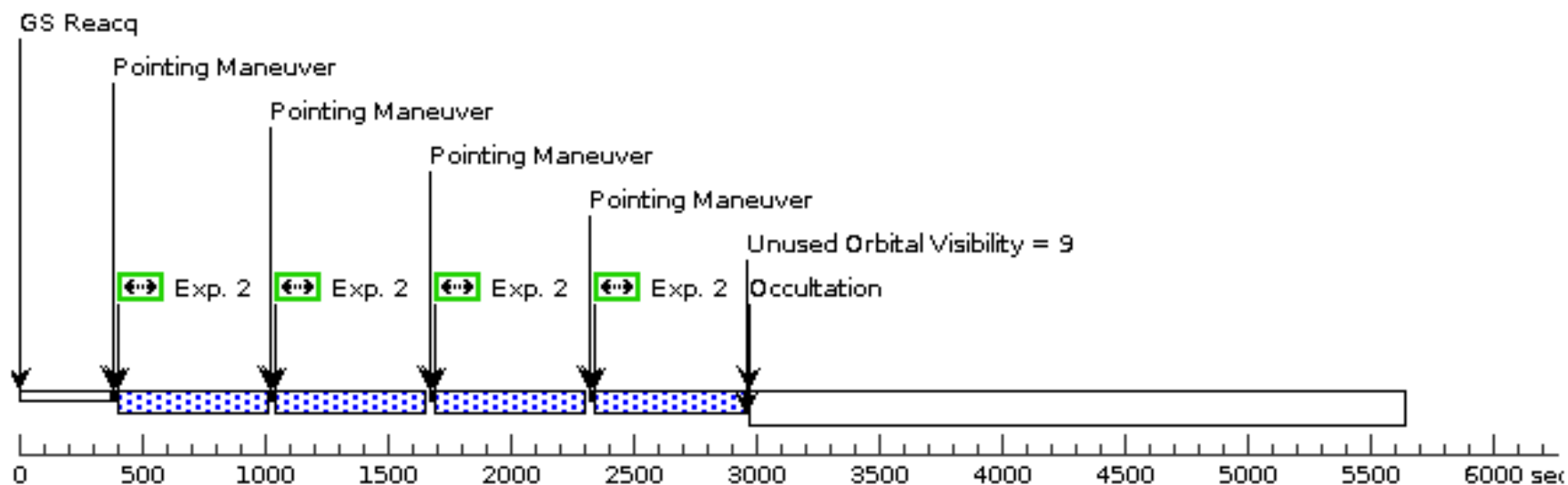
Orbit 1

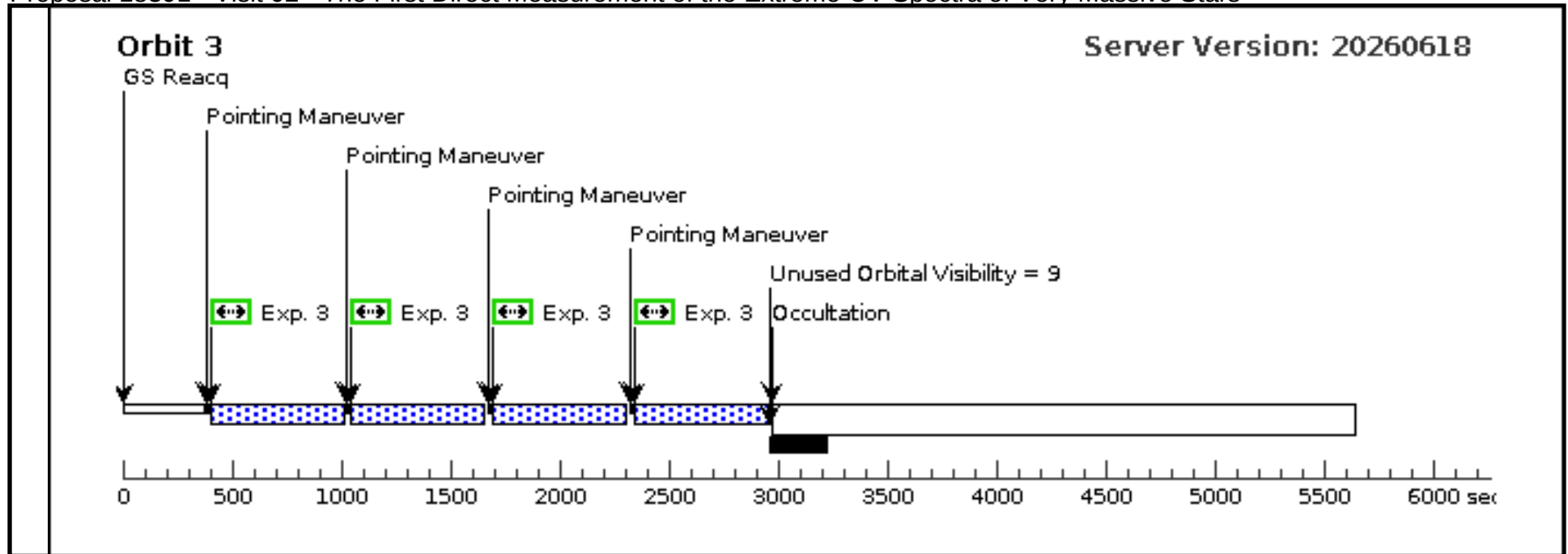
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Orbit 2

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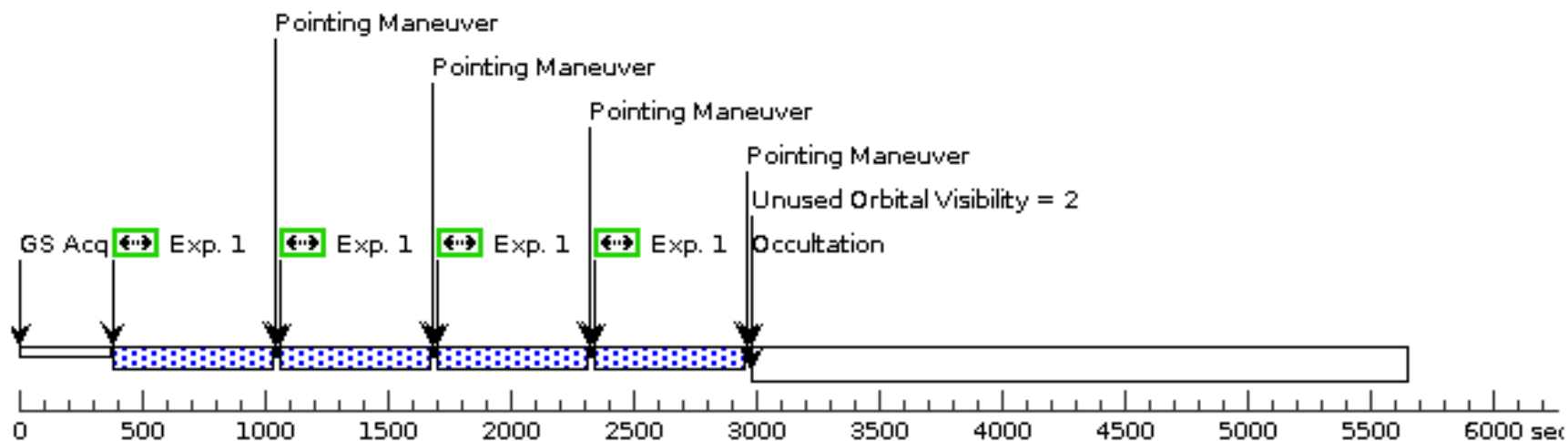


Proposal 18391 - Visit 03 - The First Direct Measurement of the Extreme-UV Spectra of Very Massive Stars

Visit	Proposal 18391, Visit 03										Mon Aug 10 19:00:16 GMT 2026	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: ACS/SBC											
	Special Requirements: (none)											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(1)	Pattern Type=ACS-SBC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.179 Line Spacing=0.116		Coordinate Frame=POS-TARG Pattern Orientation=20.02 Angle Between Sides=63.65 Center Pattern=false						(1), (2), (3)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(2)	J1316+2614	RA: 13 16 29.6100 (199.1233750d) Dec: +26 14 7.05 (26.23529d) Equinox: J2000				V=20		Reference Frame: ICRS			
	Comments: Category=GALAXY Description=[STARBURST]											
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(1811053)	(2) J1316+2614	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 1-1 i n Visit 03 (1)	580 Secs (2320 Secs)		
										[==>(Pattern 1)]		[1]
										[==>(Pattern 2)]		
										[==>(Pattern 3)]		
										[==>(Pattern 4)]		
	2	(1811053)	(2) J1316+2614	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 2-2 i n Visit 03 (1)	587 Secs (2348 Secs)		
										[==>(Pattern 1)]		[2]
										[==>(Pattern 2)]		
										[==>(Pattern 3)]		
										[==>(Pattern 4)]		
	3	(1811053)	(2) J1316+2614	ACS/SBC, ACCUM, SBC-LODARK		F140LP		POS TARG -1.5000, 0	Pattern 1, Exps 3-3 i n Visit 03 (1)	595 Secs (2380 Secs)		
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Orbit 1

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Orbit 2

Server Version: 20260618

