15828 - Essential observations of the stellar and nebular He II emission in two extreme metal-poor starbursts.

Cycle: 27, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
02	(2) NGC-3125	COS/FUV COS/NUV	4	29-Dec-2020 14:00:34.0	yes
H2	(2) NGC-3125	COS/FUV COS/NUV	4	29-Dec-2020 14:00:35.0	yes
P2	(2) NGC-3125	COS/FUV COS/NUV	4	29-Dec-2020 14:00:36.0	yes
03	(3) SBS0335-052E-OFFSET (4) SBS0335-052E-5	STIS/CCD STIS/FUV-MAMA	2	29-Dec-2020 14:00:38.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
H3	(5) SBS0335-052E-5-COPY (6) SBS0335-052E-OFFSET-COPY	STIS/CCD STIS/FUV-MAMA	1	29-Dec-2020 14:00:39.0	yes

15 Total Orbits Used

ABSTRACT

We propose COS G160M observations of cluster NGC 3125-A1, which based on STIS G140L data has the strongest (EW=7 Ang) broad (FWHM~1200 km/s) stellar He II 1640 emission among nearby metal-poor starburst galaxies. This will enable to: i) separate stellar, nebular, and/or neutral-ISM contributions to the high-ionization UV lines C IV 1548, 1551 and He II 1640; ii) better constrain the number of very massive stars via modeling of the stellar He II and C IV lines; and iii) better study the feedback from the extreme starburst via nebular-emission and ISM-absorption lines. The galaxy has complementary COS G130M spectroscopy available. In addition, we request co-spatial STIS 52"x0.2" G140L + G230L + G430L observations of super star clusters 4 and 5 in SBS 0335-052E, which is one of the nearest, most-metal poor starburst galaxies known. The available COS G160M spectrum of SBS 0335-052E integrates the light of four super star clusters (3, 4, 5, 6) making the interpretation of the purely-nebular (FWHM~160 km/s) He II line in the galaxy difficult and uncertain. High-ionization UV emission lines of C IV, He II, O III] and C III] are detected in the COS data of SBS 0335-052E and with STIS we will be able to spatially resolve the contributions from clusters 4 and 5 to these lines and determine the size of the He II Stromgren sphere. We will use the co-spatial UV+optical data to test for the *first time* simple stellar population models near the low-metallicity limit of the nearby universe, simultaneously in the UV and optical, which is not possible using ground-based optical, and is necessary in preparation to observations of distant galaxies with future large telescopes, like JWST.

OBSERVING DESCRIPTION

We will use COS G160M for target NGC 3125-A1, at the same coordinates as the archival COS G130M observation.

Target acquisition. We will use the same strategy as for the G130M observation, which was successful.

Spectroscopy. We will use two central wavelengths, 1600 and 1623 (in order to fill the FUV detector gap), the time-tag mode, and all FP-POS settings.

Orbits. We used the archival STIS G140L 25"x2" observation of the target to compute the number of orbits required to get He II 1640 at the desired SNR.

We will use the STIS 52"x0.2" long slit to simultaneously observe super star clusters 4 and 5 in SBS 0335-052E.

Orient. The two clusters are along the line North-South in the WCS, so the PA angle is zero.

Target acquisition. We will use the CCD F28x50LP configuration in ACQ mode and the exposure time necessary to reach a SNR of 100.

Spectroscopy. We will use the three gratings G140L and G430L in ACCUM mode.

Orbits. We used archival COS and MUSE spectroscopy to compute the number of orbits required to reach the desired SNR at He II 4686 and He II 1640 with G430L and G140L, respectively.

Visit

Proposal 15828, Visit 02, failed Tue Dec 29 19:00:39 GMT 2020

Diagnostic Status: Warning

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Diagnostics

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Fixed Targets

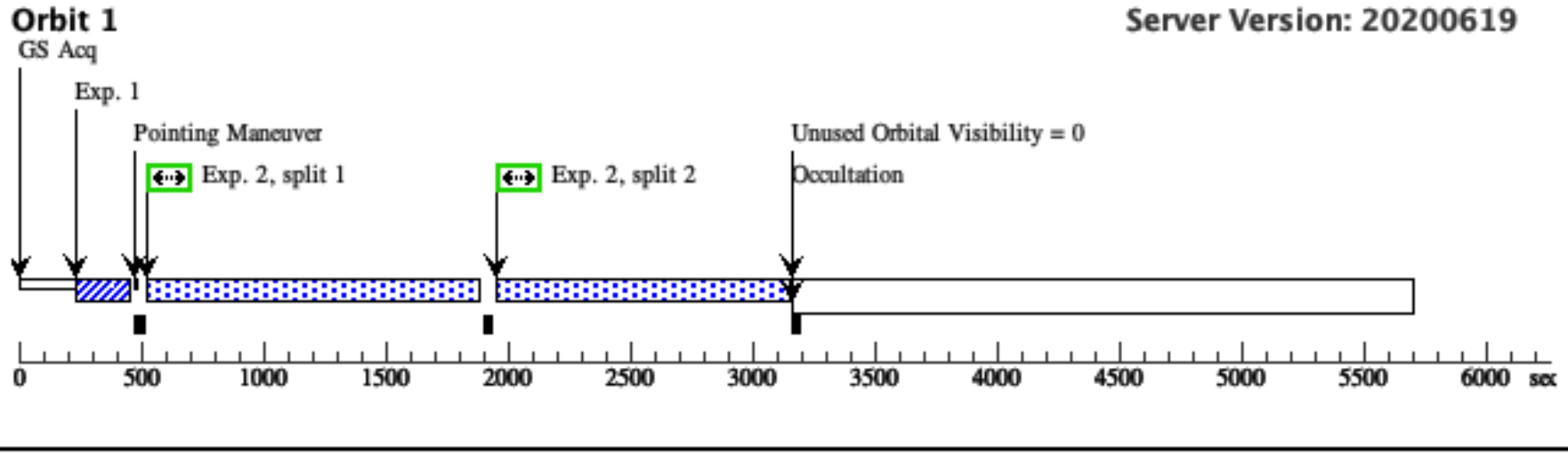
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-3125	RA: 10 06 33.2800 (151.6386667d) Dec: -29 56 6.80 (-29.93522d) Equinox: J2000		V=13.0+/-0.5 F(1300) = 2e-15	Reference Frame: ICRS

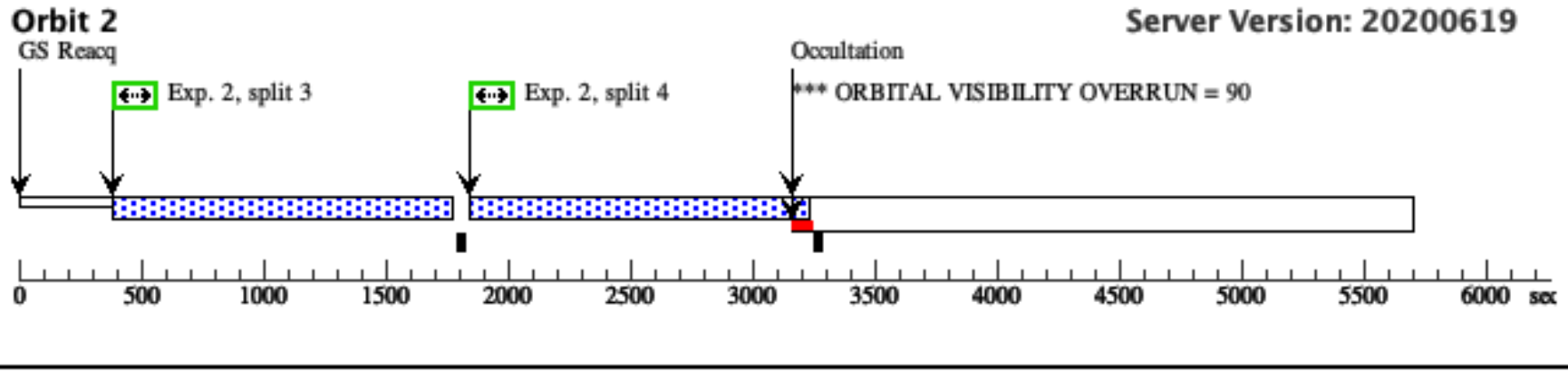
Comments: The coordinates match those of the previous observation with COS G130M (proposal 12172) as provided by the MAST archive. The uncertainties were obtained by calculating the offset between the above coordinates and those of the centroid, which were measured using the COS NUV MIRRORA image of proposal 12172 with ds9.
Category=EXT-CLUSTER
Description=[EMISSION LINE NEBULA, STAR FORMING REGION]
Extended=NO

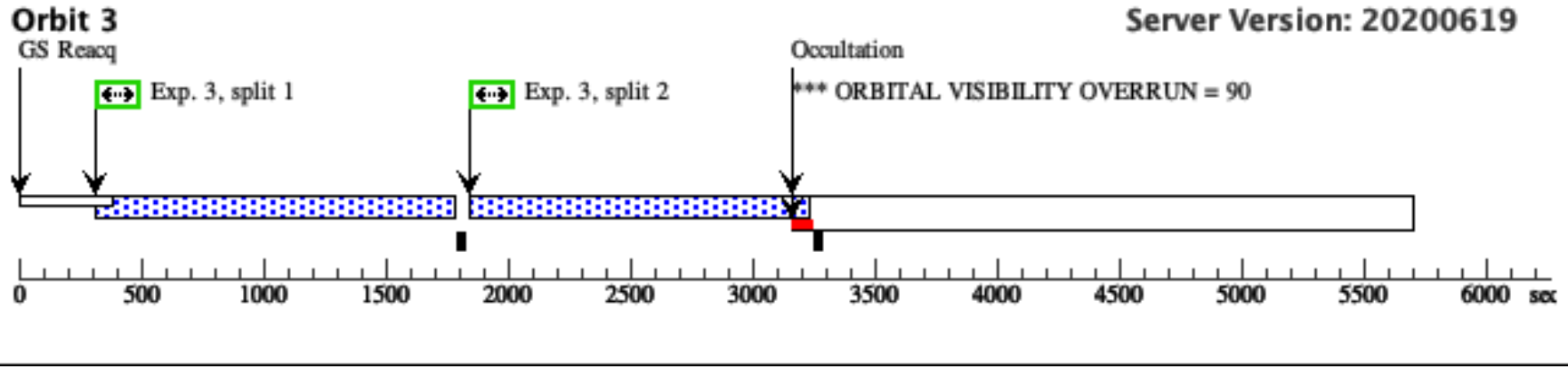
Exposures

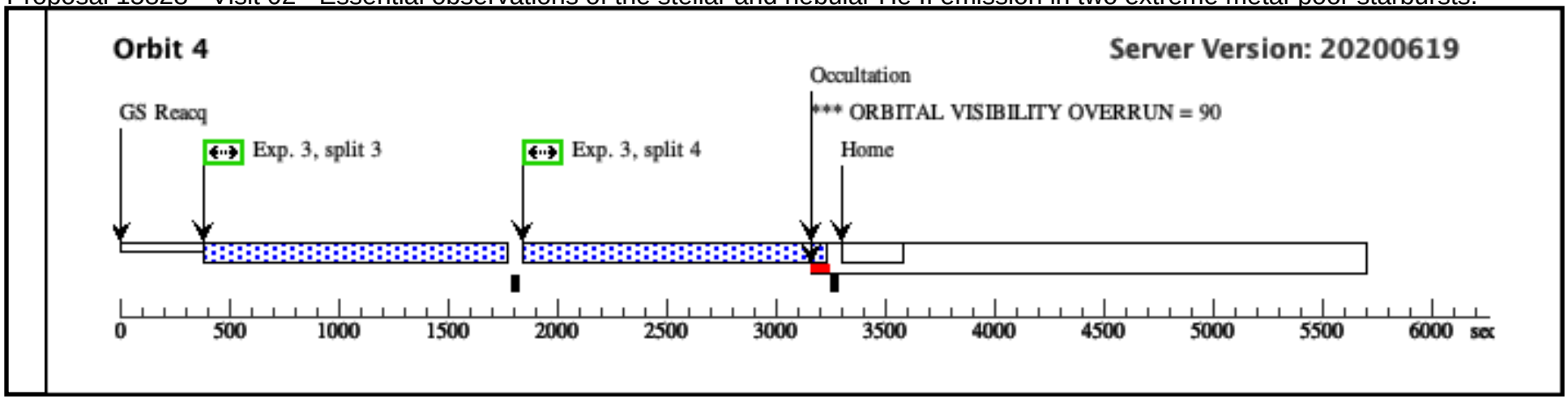
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.1371482)	(2) NGC-3125	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				2 Secs (2 Secs)	
								[==>]	***[1]***
2	(COS.sp.1371512)	(2) NGC-3125	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=9926; FP-POS=ALL			1300 Secs (4978 Secs)	
								[==>1147 Secs (Split 1)] *[==>1147 Secs (Split 2)]*	***[1]***
								[==>1342.0 Secs (Split 3)] *[==>1342.0 Secs (Split 4)]*	***[2]***
3	(COS.sp.1371513)	(2) NGC-3125	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10574; FP-POS=ALL			1300 Secs (5368 Secs)	
								[==>1342.0 Secs (Split 1)] *[==>1342.0 Secs (Split 2)]*	***[3]***
								[==>1342.0 Secs (Split 3)] *[==>1342.0 Secs (Split 4)]*	***[4]***

Orbit Structure








Orbit 4
Server Version: 20200619
Occultation
GS Reacq
*** ORBITAL VISIBILITY OVERRUN = 90
Exp. 3, split 3
Exp. 3, split 4
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

Visit

Proposal 15828, HOPR FOR FAILED 02 (H2), failed Tue Dec 29 19:00:39 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

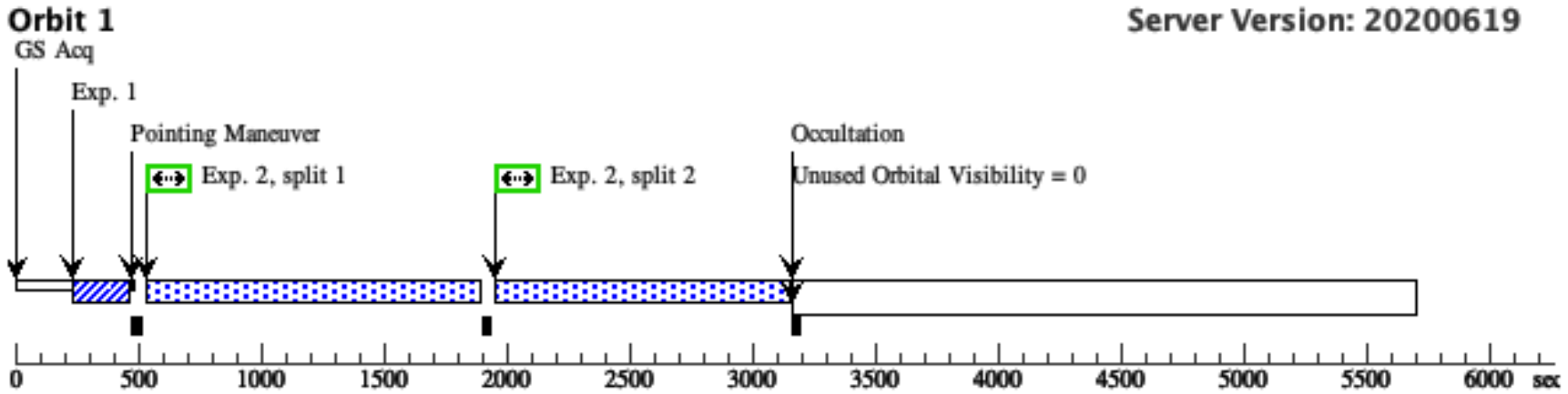
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-3125	RA: 10 06 33.2800 (151.6386667d) Dec: -29 56 6.80 (-29.93522d) Equinox: J2000		V=13.0+/-0.5 F(1300) = 2e-15	Reference Frame: ICRS

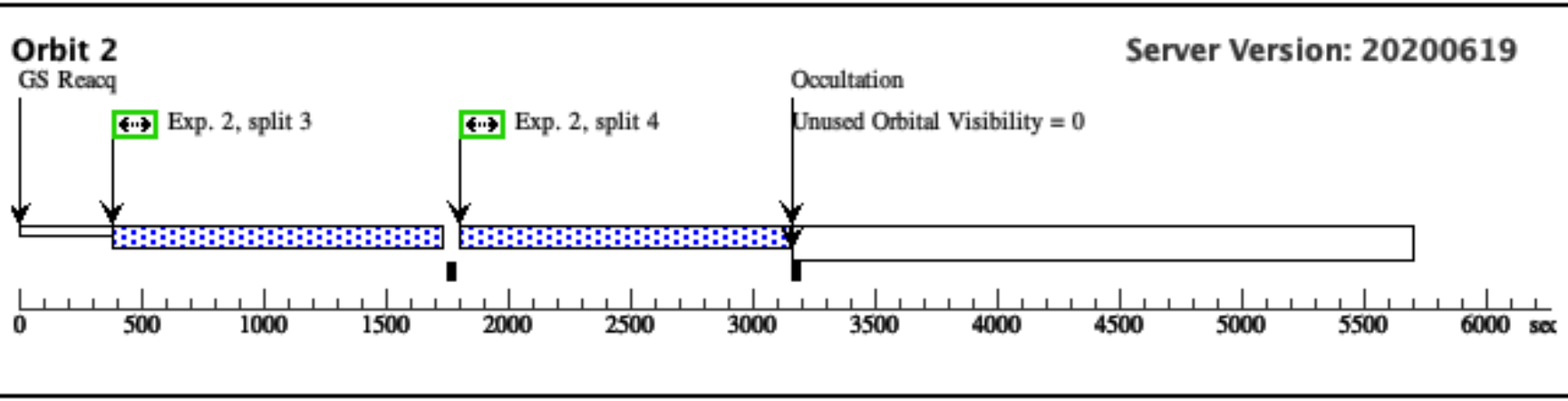
Comments: The coordinates match those of the previous observation with COS G130M (proposal 12172) as provided by the MAST archive. The uncertainties were obtained by calculating the offset between the above coordinates and those of the centroid, which were measured using the COS NUV MIRRORA image of proposal 12172 with ds9.
Category=EXT-CLUSTER
Description=[EMISSION LINE NEBULA, STAR FORMING REGION]
Extended=NO

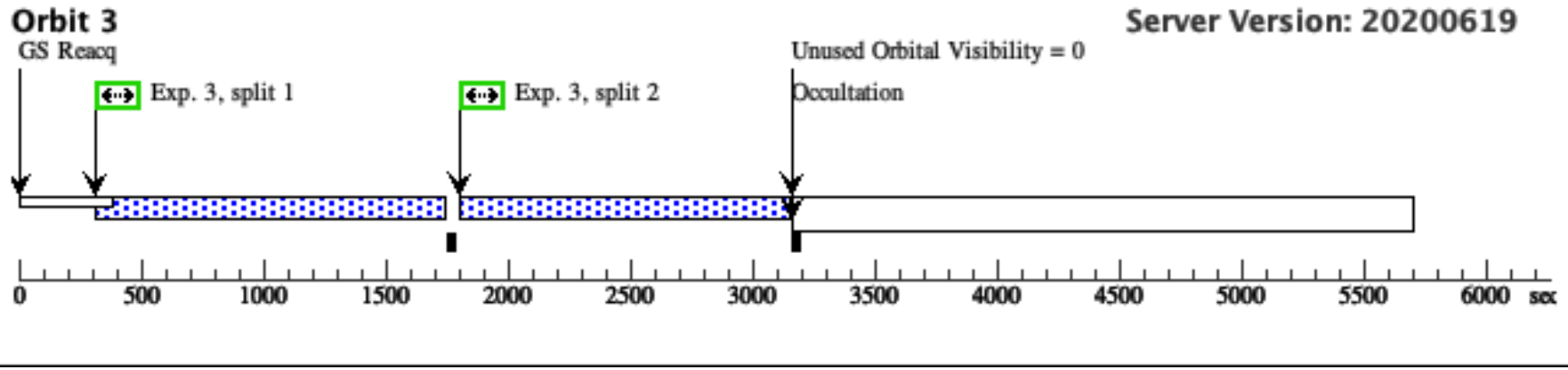
Exposures

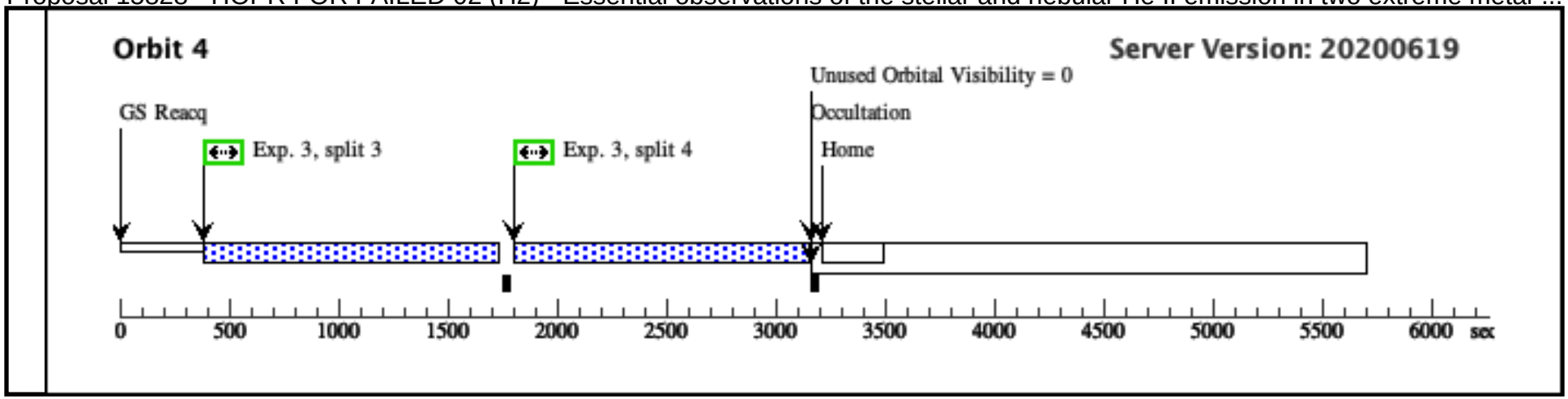
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.1371482)	(2) NGC-3125	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				6 Secs (6 Secs)	
								[==>]	***[1]***
2	(COS.sp.1371512)	(2) NGC-3125	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=9926; FP-POS=ALL			1300 Secs (4880 Secs)	
								[==>1143.0 Secs (Split 1)] *[==>1143.0 Secs (Split 2)]*	***[1]***
								[==>1297.0 Secs (Split 3)] *[==>1297.0 Secs (Split 4)]*	***[2]***
3	(COS.sp.1371513)	(2) NGC-3125	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10574; FP-POS=ALL			1300 Secs (5188 Secs)	
								[==>1297.0 Secs (Split 1)] *[==>1297.0 Secs (Split 2)]*	***[3]***
								[==>1297.0 Secs (Split 3)] *[==>1297.0 Secs (Split 4)]*	***[4]***

Orbit Structure








Orbit 4
Server Version: 20200619
Unused Orbital Visibility = 0
GS Reacq
Occultation
Exp. 3, split 3
Exp. 3, split 4
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

Visit

Proposal 15828, HOPR FOR FAILED H2 (P2), completed Tue Dec 29 19:00:39 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

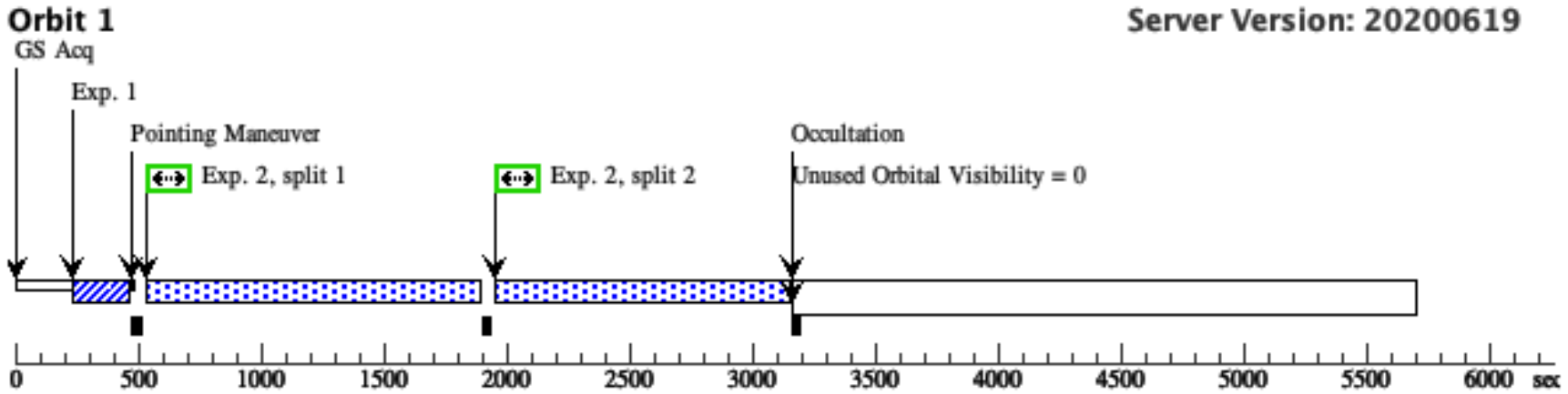
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-3125	RA: 10 06 33.2800 (151.6386667d) Dec: -29 56 6.80 (-29.93522d) Equinox: J2000		V=13.0+/-0.5 F(1300) = 2e-15	Reference Frame: ICRS

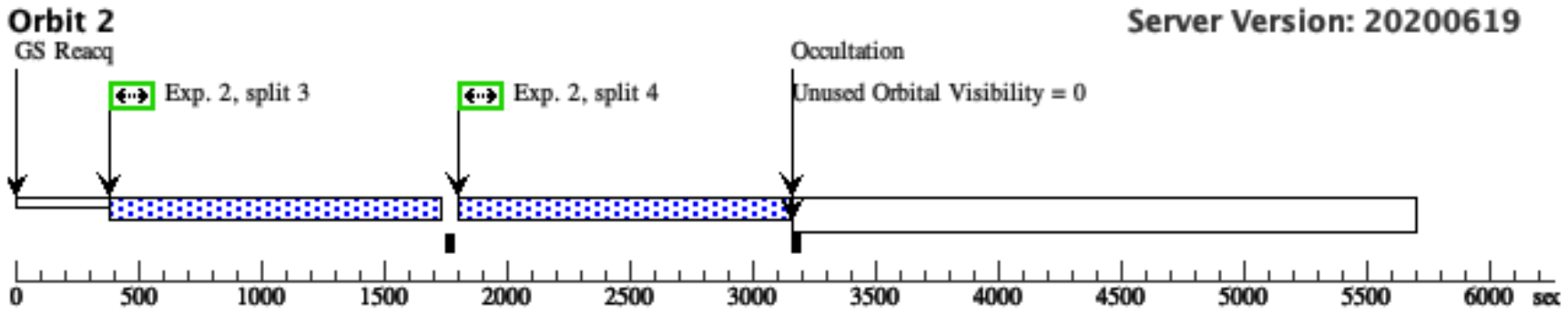
Comments: The coordinates match those of the previous observation with COS G130M (proposal 12172) as provided by the MAST archive. The uncertainties were obtained by calculating the offset between the above coordinates and those of the centroid, which were measured using the COS NUV MIRRORA image of proposal 12172 with ds9.
Category=EXT-CLUSTER
Description=[EMISSION LINE NEBULA, STAR FORMING REGION]
Extended=NO

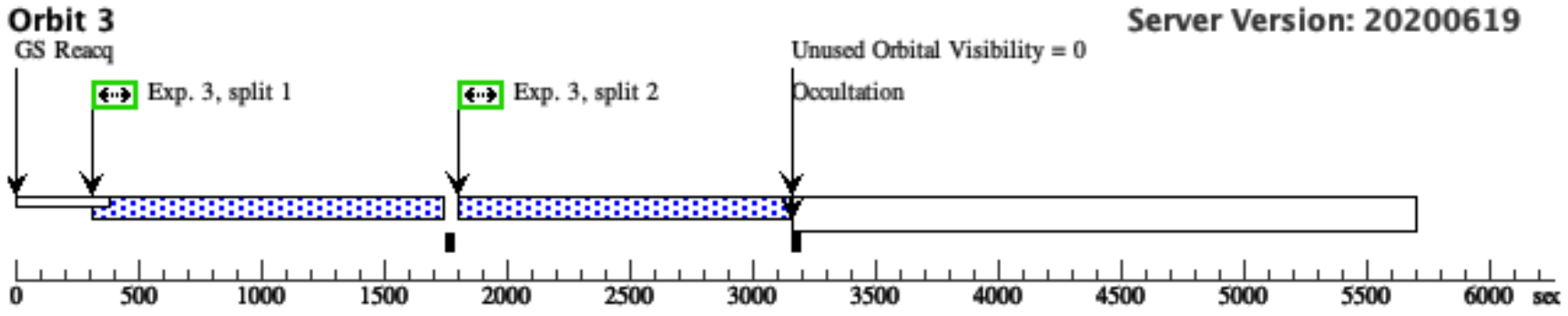
Exposures

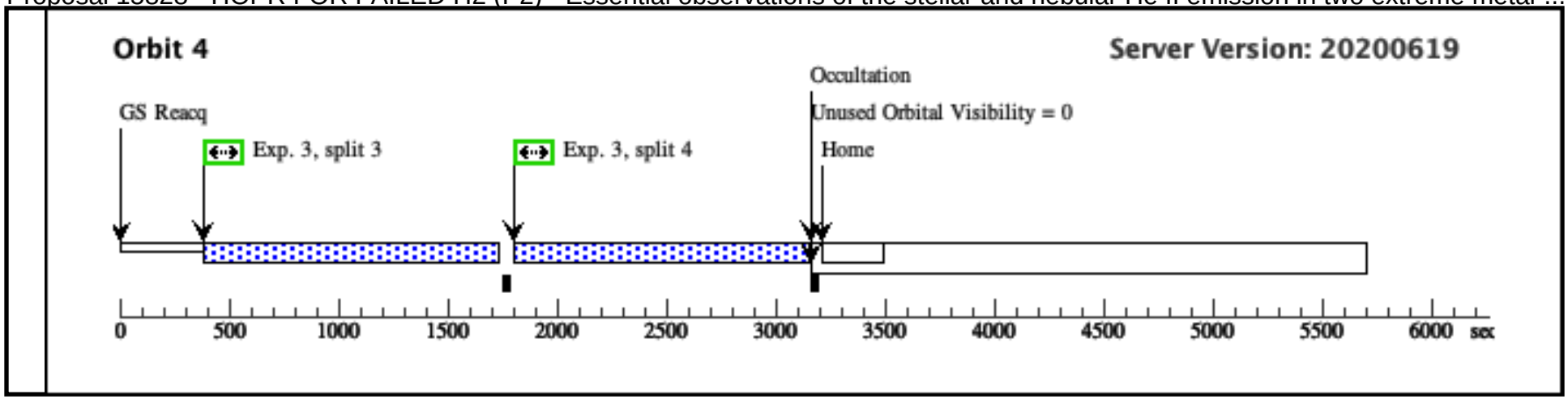
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(COS.ta.1371482)	(2) NGC-3125	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				6 Secs (6 Secs)	
								[==>]	***[1]***
2	(COS.sp.1371512)	(2) NGC-3125	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=9926; FP-POS=ALL			1300 Secs (4880 Secs)	
								[==>1143.0 Secs (Split 1)] *[==>1143.0 Secs (Split 2)]*	***[1]***
								[==>1297.0 Secs (Split 3)] *[==>1297.0 Secs (Split 4)]*	***[2]***
3	(COS.sp.1371513)	(2) NGC-3125	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=10574; FP-POS=ALL			1300 Secs (5188 Secs)	
								[==>1297.0 Secs (Split 1)] *[==>1297.0 Secs (Split 2)]*	***[3]***
								[==>1297.0 Secs (Split 3)] *[==>1297.0 Secs (Split 4)]*	***[4]***

Orbit Structure








Orbit 4
Server Version: 20200619
Occultation
GS Reacq
Unused Orbital Visibility = 0
Exp. 3, split 3
Exp. 3, split 4
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

Visit

Proposal 15828, SBS0335-052E (03), failed Tue Dec 29 19:00:40 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: ORIENT 345D TO 345 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=STIS-ALONG-SLIT	Coordinate Frame=POS-TARG		(2), (3)
	Purpose=DITHER	Pattern Orientation=90.0		
	Number Of Points=2	Angle Between Sides=		
	Point Spacing=0.5	Center Pattern=false		
	Line Spacing=			

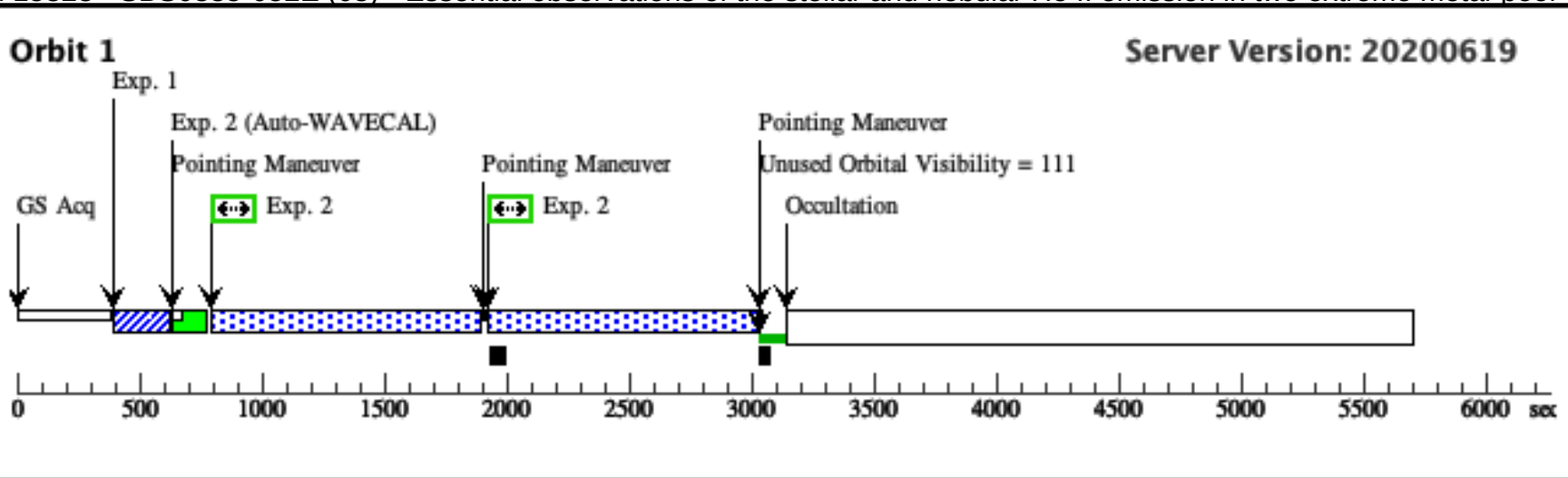
Fixed Targets

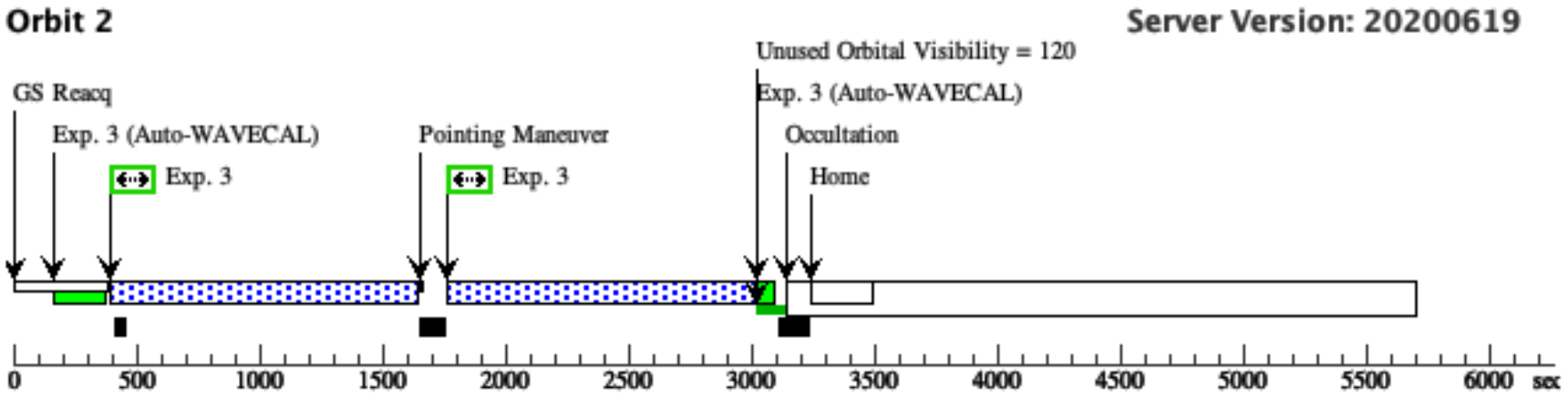
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SBS0335-052E-OFFSET	RA: 03 37 48.0762 (54.4503175d) Dec: -05 02 9.94 (-5.03609d) Equinox: J2000		V=15.4	Reference Frame: ICRS
Comments: *Category=STAR* *Description=[F0-F2]*					
(4)	SBS0335-052E-5	Offset from SBS0335-052E-OFFSET RA Offset: -4.075 Secs Dec Offset: -29.124 Arcsec		V=19.0	Offset Position (SBS0335-052E-5)
Comments: *Category=GALAXY* *Description=[DWARF COMPACT, STARBURST]* *Extended=YES*					

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquisition using offset star (STIS.ta.1356855)	(3) SBS0335-052E-OFFSET	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARIO BASE1BE		1 Secs (1 Secs) *[==>]*	 ***[1]***
2		(4) SBS0335-052E-5	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=NO		Pattern 1, Exps 2-2 in SBS0335-052E (03) (1)	600 Secs (2120 Secs) *[==>1060.0 Secs (Pattern 1)]* *[==>1060.0 Secs (Pattern 2)]*	 ***[1]***
3	(STI.sp.1338378)	(4) SBS0335-052E-5	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A			Pattern 1, Exps 3-3 in SBS0335-052E (03) (1)	1200 Secs (2464 Secs) *[==>1232.0 Secs (Pattern 1)]* *[==>1232.0 Secs (Pattern 2)]*	 ***[2]***

Orbit Structure





Visit

Proposal 15828, HOPR FOR FAILED 03 (H3), implementation Tue Dec 29 19:00:40 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: (none)

Comments: This is a HOPR repeat (1 orbit) for failed visit 03 (2 orbits).

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=STIS-ALONG-SLIT	Coordinate Frame=POS-TARG		(3)
	Purpose=DITHER	Pattern Orientation=90.0		
	Number Of Points=2	Angle Between Sides=		
	Point Spacing=0.5	Center Pattern=false		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	SBS0335-052E-5-COPY	Offset from SBS0335-052E-OFFSET-COPY RA Offset: -4.073 Secs Dec Offset: -29.18 Arcsec		V=19.0	Offset Position (SBS0335-052E-5-COPY)
Comments: *Category=GALAXY* *Description=[DWARF COMPACT, STARBURST]* *Extended=YES*					
(6)	SBS0335-052E-OFFSET-COPY	RA: 03 37 48.0200 (54.4500833d) Dec: -05 02 8.95 (-5.03582d) Equinox: J2000		V=15.4	Reference Frame: ICRS
Comments: *Category=STAR* *Description=[F0-F2]*					

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquisition using offset star (STIS.ta.1356855)	(6) SBS0335-052E-OFFSET-COPY	STIS/CCD, ACQ, F28X50LP	MIRROR		GS ACQ SCENARIO BASE1BE		1 Secs (1 Secs) *[==>]*	 ***[1]***
2	AQC/PEAK (STIS.ta.1472544)	(5) SBS0335-052E-5-COPY	STIS/CCD, ACQ/PEAK, 52X0.1	MIRROR				50 Secs (50 Secs) *[==>]*	 ***[1]***
3	(STI.sp.133830)	(5) SBS0335-052E-5-COPY	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A			Pattern 1, Exps 3-3 in HOPR FOR FAILED 03 (H3) (1)	1200 Secs (1258 Secs) *[==>629.0 Secs (Pattern 1)]* *[==>629.0 Secs (Pattern 2)]*	 ***[1]***

Orbit Structure