16722 - An HST exclusive look at two rising stars: high-energy spectra of the two closest M dwarfs to host transiting terrestrial exoplanets

Cycle: 29, 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?*
01	(1) BD-17-588A	COS/FUV COS/NUV	3	21-Feb-2023 10:00:37.0	yes
02	(1) BD-17-588A	COS/FUV COS/NUV	3	21-Feb-2023 10:00:38.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
52	(1) BD-17-588A	COS/FUV COS/NUV	3	21-Feb-2023 10:00:39.0	yes
03	(1) BD-17-588A WAVE	STIS/CCD STIS/FUV-MAMA	1	21-Feb-2023 10:00:40.0	yes
04	(2) WOLF-437	COS/FUV COS/NUV	3	21-Feb-2023 10:00:41.0	yes
05	(2) WOLF-437	COS/FUV COS/NUV	3	21-Feb-2023 10:00:42.0	yes
06	(2) WOLF-437 WAVE	STIS/CCD STIS/FUV-MAMA	2	21-Feb-2023 10:00:43.0	yes

18 Total Orbits Used

ABSTRACT

As we build towards robustly detecting and characterizing the atmospheres of terrestrial exoplanets with JWST, we cannot forget to take a close look at the low-mass stars they orbit. Complete coverage of M dwarf ultraviolet spectra are needed to determine the photochemical production rates of molecular species in terrestrial planet atmospheres, which will alert us to when disequilibrium chemistry, a sign of surface processes or even life, is present. High-energy spectra from the UV to X-ray are also needed to calculate mass loss rates from planetary atmospheres, which can explain the lack of atmospheres around highly-irradiated terrestrial worlds. LTT 1445Ab and GJ 486b are two of the most spectroscopically accessible terrestrial exoplanets we will ever find, and their M dwarf hosts are similarly at the top of their class in terms of observability. We will use the unique ultraviolet capabilities of HST, supplemented by X-ray observations, to provide complete short-wavelength spectral coverage for the stars LTT 1445A and GJ 486. Both planets, LTT 1445Ab and GJ 486b, will be observed in JWST Cycle 1 with the aim of detecting their atmospheres. If we do not take the opportunity to make UV measurements of their host stars while HST is still operational, this crucial input to understanding the atmospheres of these planets will be lost. We request 18 orbits with HST (COS and STIS) to capture complete UV spectra of LTT 1445A and GJ 486.

OBSERVING DESCRIPTION

We will observe the complete UV spectra of the two closest M dwarfs to host transiting terrestrial worlds, LTT 1445A and GJ 486. The main goal of this program is to produce detailed, high S/N UV spectra for these two M dwarfs. This information will be key to assessing upcoming JWST Cycle 1 data that will try to establish the presence of an atmosphere on the terrestrial worlds orbiting them.

We will use HST/COS & STIS to measure the UV spectra of these stars from 1050-3200 Angstroms. For the purposes of estimating exposure times, we scale the MUSCLES HST/COS and STIS data of the M dwarf GJ 436 to the distances and stellar radii of LTT 1445A and GJ 486. Both stars are considered inactive based on weak measurements of H-alpha and Ca II H and K and long stellar rotation periods, so we expect these stars (V = 11.22 and 11.40 for LTT 1445A and GJ 486, respectively) to pass the Bright Object Protection considerations. We note that binary companion to LTT 1445A, LTT 1445BC does exhibit activity (H-alpha emission) in one or both of the blended components. LTT 1445BC orbits the primary component on a 250-year timescale, and is currently at a separation of 7 arcseconds from LTT 1445A (Winters et al., 2019). The COS aperture is 2.5 arcseconds in diameter, which we will center on LTT 1445A without worrying about contamination from the BC companion. This is not an issue for GJ 486, which is a single star. LTT 1445A and GJ 486 have nearly identical V-band magnitudes, with nearly identical scalings by distance and radius (LTT 1445A is smaller, but it is also closer). This program includes a total of 15 orbits.

UV: We will use COS to capture the FUV and NUV spectrum of both stars, but not the Ly-alpha line which is dominated by geocoronal emisison. All COS data will be taken in TIME-TAG mode to establish if flares occur during the orbits and we will use the FLASH=YES setting to maximize exposure time on target. To measure the prominent emission lines in the FUV we will use COS G130M (C III, Si III, N V, C II) for 3 orbits and COS G160M (Si IV, C IV, He II) for 2.5 orbits. These observations will provide S/N > 5, and up to 15, for prominent lines in this range. For the G130M grating we will use a central wavelength of 1222 Angstroms. This setting places the Ly-alpha line in the gap between Segments A and B, thereby protecting the instrument from excessive flux. For the G160M grating we will use a central wavelength of 1533 Angstroms. This will ensure overlap with the G130M grating such that there are no spectral gaps in the FUV. For the NUV we will use 0.5 orbits to observe with COS G230L with a central wavelength of 2950 Angstroms. COS G230L has a high sensitivity to the 1750-2100 Angstrom wavelength region, which is relevant to the photodissociation of O2 and subsequent production of O3. We will spend 6 orbits each with COS for LTT 1445A and GJ 486.

Ly-alpha: Flux in the Ly-alpha line typically makes up 85% of all flux in emitted the FUV (France et al., 2016), so measuring it is essential to a successful measurement of a high-energy stellar spectrum. The core of the Ly-alpha line is eaten up by the ISM, but the profile can be reconstructed if enough flux is measured in the line wings (Youngblood et al., 2016). For all but the brightest stars, Ly-alpha measurements and reconstructions are untenable without a heavy investment of telescope time. But for nearby bright M dwarfs like LTT 1445A and GJ 486, we can gather enough flux to perform a reconstruction of the all-important Ly-alpha line. COS is a poor observer of Ly-alpha due to its relatively large aperture which lets in

geocoronal contamination. We will instead use the 52x0.2" slit with STIS/G140M at a central wavelength of 1222 Angstroms to measure the wings of the Ly-alpha lines for LTT 1445A and GJ 486 without having to worry about geocoronal contamination. Another program (GO program 16701, PI A. Youngblood) will also make observations of LTT 1445A and GJ 486 with this same set-up. In that program 2 orbits will be spent on LTT 1445A and 1 orbit on GJ 486. In order to capture enough S/N in the wings of the Ly-alpha lines of these stars to perform a high-precision (15-20% error) reconstruction, we will add 1 orbit for LTT 1445A and 2 orbits for GJ 486, bringing the total orbit count to 3 for each star. We will limit the timing of these observations such that the barycentric velocity is within 20 km/s of the estimated ISM velocity. This ensures that in the case of a low N(H I) column density that any geocoronal airglow contamination will fall into the ISM absorption gap and not in the wings of the Ly-alpha line where airglow contamination can hinder line reconstruction.

Visit

Proposal 16722, LTT1445A_01 (01), completed Tue Feb 21 15:00:43 GMT 2023

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

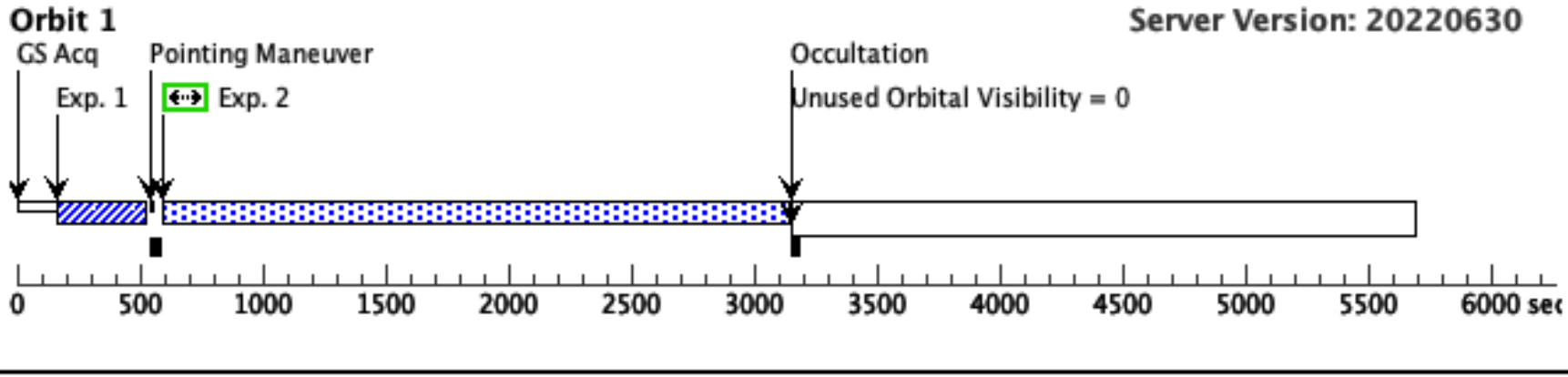
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BD-17-588A Alt Name1: LTT1445A	RA: 03 01 50.9800 (45.4624167d) Dec: -16 35 40.32 (-16.59453d) Equinox: J2000	Proper Motion RA: -369.97184335074684 mas/yr Proper Motion Dec: -267.931311928784 mas/yr Epoch of Position: 2016	V=11.22+/-0.02	Reference Frame: ICRS

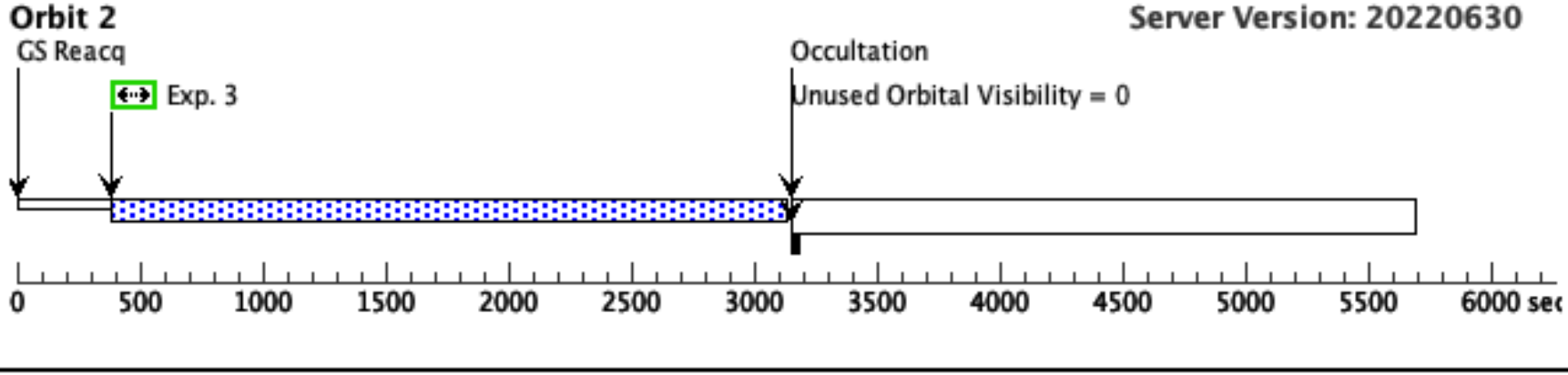
Comments: Coordinates from Gaia EDR3, epoch=2016
Category=STAR
Description=[M III-I]
Extended=NO

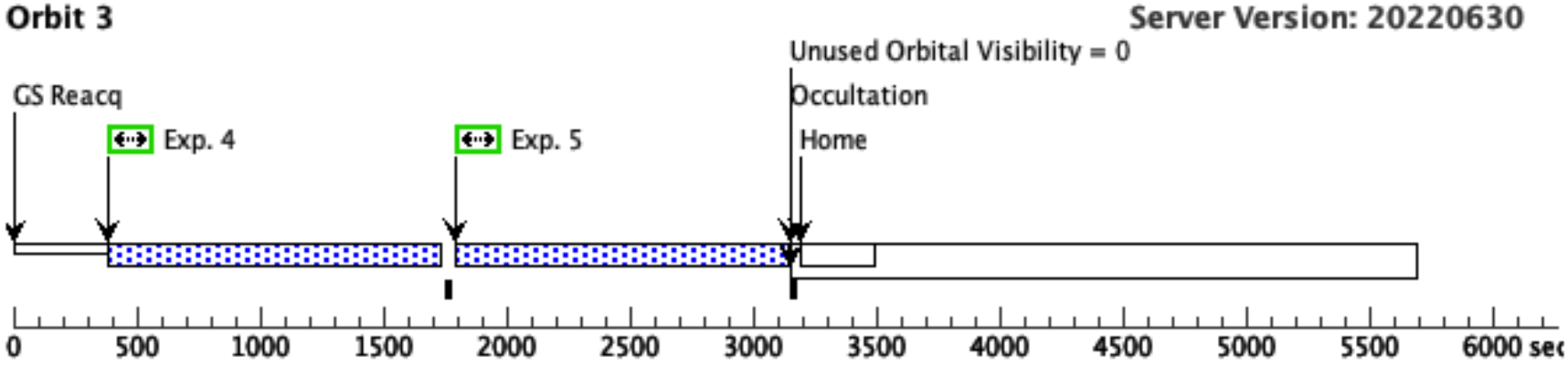
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquiring (COS.ta.1544663)	(1) BD-17-588A	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				37 Secs (37 Secs) *[==>]*	*[1]*
2	FUV_01 (COS.sp.1523847)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=1; BUFFER-TIME=19765; FLASH=YES			2362 Secs (2362 Secs) *[==>]*	*[1]*
3	FUV_02 (COS.sp.1523849)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=2; BUFFER-TIME=19765; FLASH=YES			2700 Secs (2700 Secs) *[==>]*	*[2]*
4	FUV_03 (COS.sp.1544442)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=3; BUFFER-TIME=19765; FLASH=YES			1298 Secs (1298 Secs) *[==>]*	*[3]*
5	FUV_04 (COS.sp.1544442)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=4; BUFFER-TIME=19765; FLASH=YES			1297 Secs (1297 Secs) *[==>]*	*[3]*

Orbit Structure







Visit	**Proposal 16722, LTT1445A_02 (02), failed** Tue Feb 21 15:00:44 GMT 2023 **Diagnostic Status: Error** Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none)
Diagnostics	(FUV_01 (02.004)) Error (Form): Illegal selection: G160M. (FUV_01 (02.004)) Error (Form): Illegal selection: PSA. (FUV_01 (02.004)) Error (Form): This attribute cannot have this value due to other choices: Aperture=PSA. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_01 (02.004)) Error (Form): This attribute cannot have this value due to other choices: Optional_Parameter=FLASH=YES. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_01 (02.004)) Error (Form): This attribute cannot have this value due to other choices: Spectral_Element=G160M. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_01 (02.004)) Error (Form): YES is not a valid selection (FUV_01 (02.004)) Error (Form): YES is not a valid selection (FUV_02 (02.005)) Error (Form): Illegal selection: G160M. (FUV_02 (02.005)) Error (Form): Illegal selection: PSA. (FUV_02 (02.005)) Error (Form): This attribute cannot have this value due to other choices: Aperture=PSA. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_02 (02.005)) Error (Form): This attribute cannot have this value due to other choices: Optional_Parameter=FLASH=YES. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_02 (02.005)) Error (Form): This attribute cannot have this value due to other choices: Spectral_Element=G160M. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_02 (02.005)) Error (Form): YES is not a valid selection (FUV_02 (02.005)) Error (Form): YES is not a valid selection (FUV_03 (02.006)) Error (Form): Illegal selection: G160M. (FUV_03 (02.006)) Error (Form): Illegal selection: PSA. (FUV_03 (02.006)) Error (Form): This attribute cannot have this value due to other choices: Aperture=PSA. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_03 (02.006)) Error (Form): This attribute cannot have this value due to other choices: Optional_Parameter=FLASH=YES. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_03 (02.006)) Error (Form): This attribute cannot have this value due to other choices: Spectral_Element=G160M. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_03 (02.006)) Error (Form): YES is not a valid selection (FUV_03 (02.006)) Error (Form): YES is not a valid selection (FUV_04 (02.007)) Error (Form): Illegal selection: G160M. (FUV_04 (02.007)) Error (Form): Illegal selection: PSA. (FUV_04 (02.007)) Error (Form): This attribute cannot have this value due to other choices: Aperture=PSA. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_04 (02.007)) Error (Form): This attribute cannot have this value due to other choices: Optional_Parameter=FLASH=YES. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_04 (02.007)) Error (Form): This attribute cannot have this value due to other choices: Spectral_Element=G160M. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_04 (02.007)) Error (Form): YES is not a valid selection (FUV_04 (02.007)) Error (Form): YES is not a valid selection

Fixed Targets

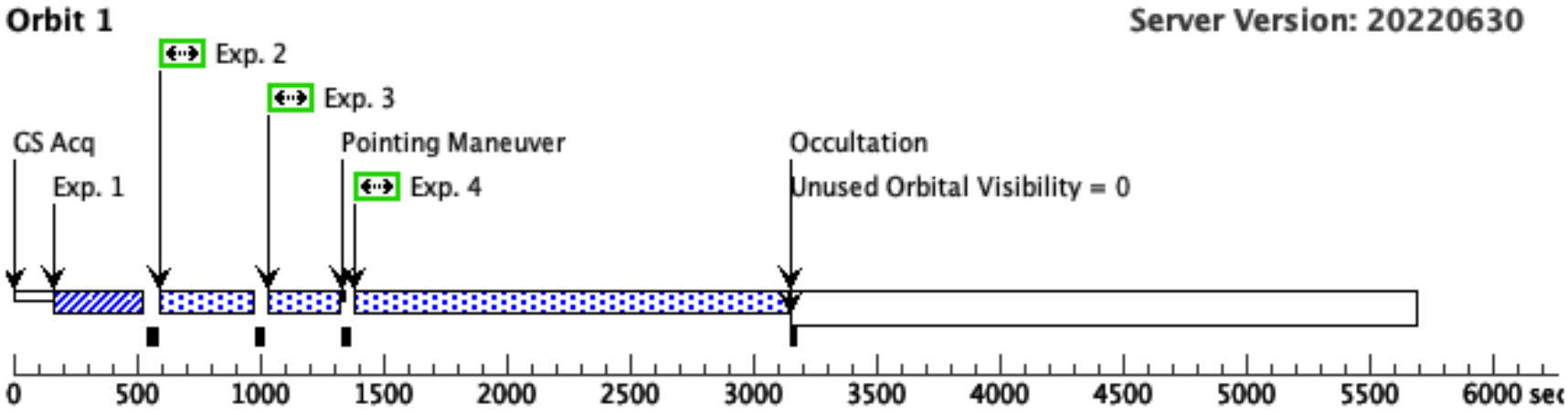
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BD-17-588A Alt Name1: LTT1445A	RA: 03 01 50.9800 (45.4624167d) Dec: -16 35 40.32 (-16.59453d) Equinox: J2000	Proper Motion RA: -369.97184335074684 mas/yr Proper Motion Dec: -267.931311928784 mas/yr Epoch of Position: 2016	V=11.22+/-0.02	Reference Frame: ICRS

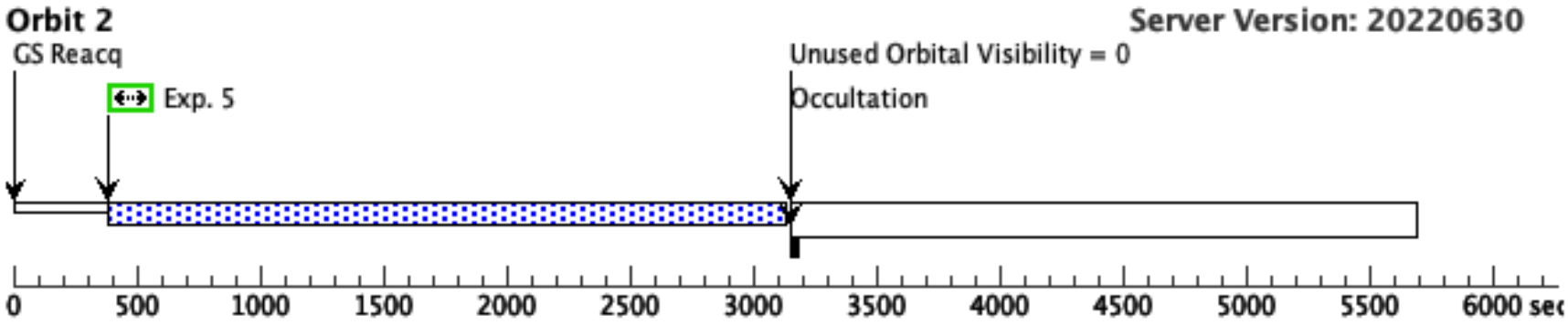
Comments: Coordinates from Gaia EDR3, epoch=2016
Category=STAR
Description=[M III-I]
Extended=NO

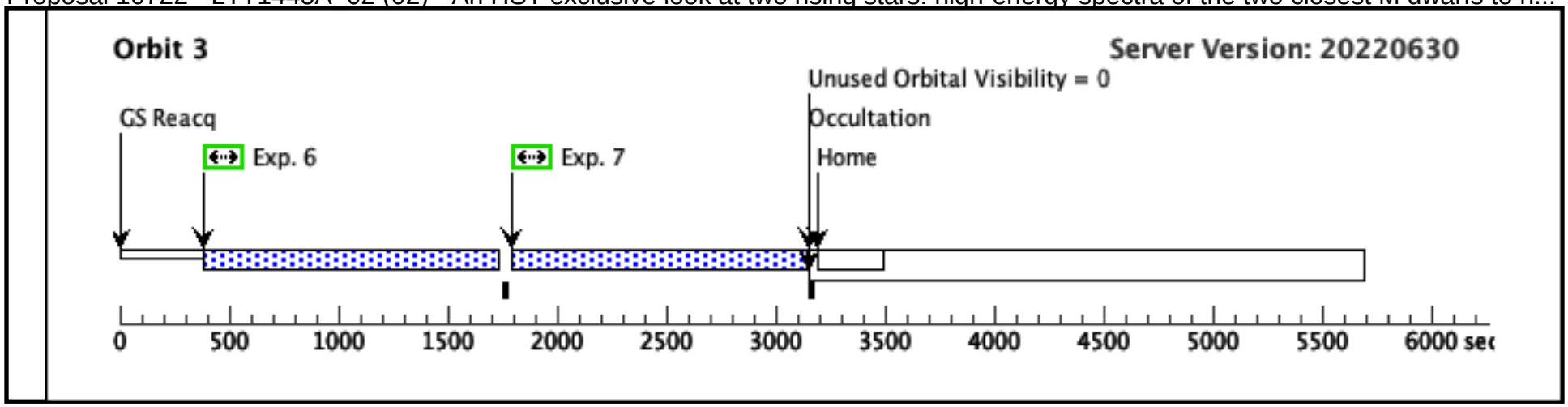
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquiring (COS.ta.1544663)	(1) BD-17-588A	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				37 Secs (37 Secs) *[==>]*	***[1]***
2	NUV_01 (COS.sp.1544458)	(1) BD-17-588A	COS/NUV, TIME-TAG, PSA	G230L 2950 A	FLASH=YES; FP-POS=2; BUFFER-TIME=1234			270 Secs (270 Secs) *[==>]*	***[1]***
3	NUV_02 (COS.sp.1544458)	(1) BD-17-588A	COS/NUV, TIME-TAG, PSA	G230L 2950 A	FLASH=YES; FP-POS=3; BUFFER-TIME=1234			270 Secs (270 Secs) *[==>]*	***[1]***
4	FUV_01 (COS.sp.1544461)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FLASH=YES; FP-POS=1; BUFFER-TIME=20000			1535 Secs (1535 Secs) *[==>]*	***[1]***
5	FUV_02 (COS.sp.1523879)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FLASH=YES; FP-POS=2; BUFFER-TIME=20000			2700 Secs (2700 Secs) *[==>]*	***[2]***
6	FUV_03 (COS.sp.1544462)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FLASH=YES; FP-POS=3; BUFFER-TIME=20000			1298 Secs (1298 Secs) *[==>]*	***[3]***
7	FUV_04 (COS.sp.1544462)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FLASH=YES; FP-POS=4; BUFFER-TIME=20000			1297 Secs (1297 Secs) *[==>]*	***[3]***

Orbit Structure



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Visit

Proposal 16722, LTT1445A_02 (52), completed Tue Feb 21 15:00:44 GMT 2023

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

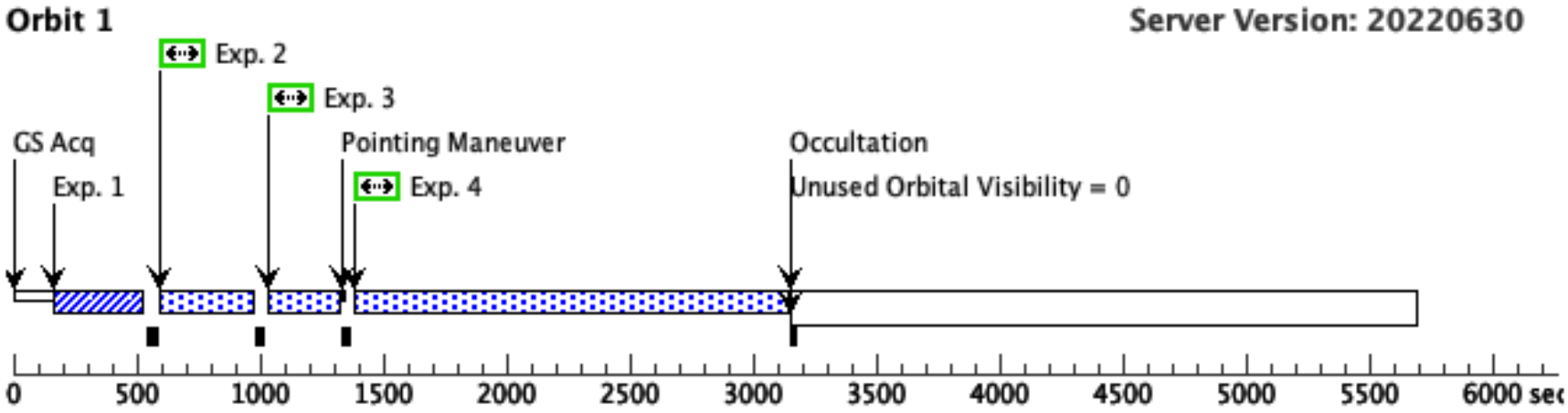
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BD-17-588A Alt Name1: LTT1445A	RA: 03 01 50.9800 (45.4624167d) Dec: -16 35 40.32 (-16.59453d) Equinox: J2000	Proper Motion RA: -369.97184335074684 mas/yr Proper Motion Dec: -267.931311928784 mas/yr Epoch of Position: 2016	V=11.22+/-0.02	Reference Frame: ICRS

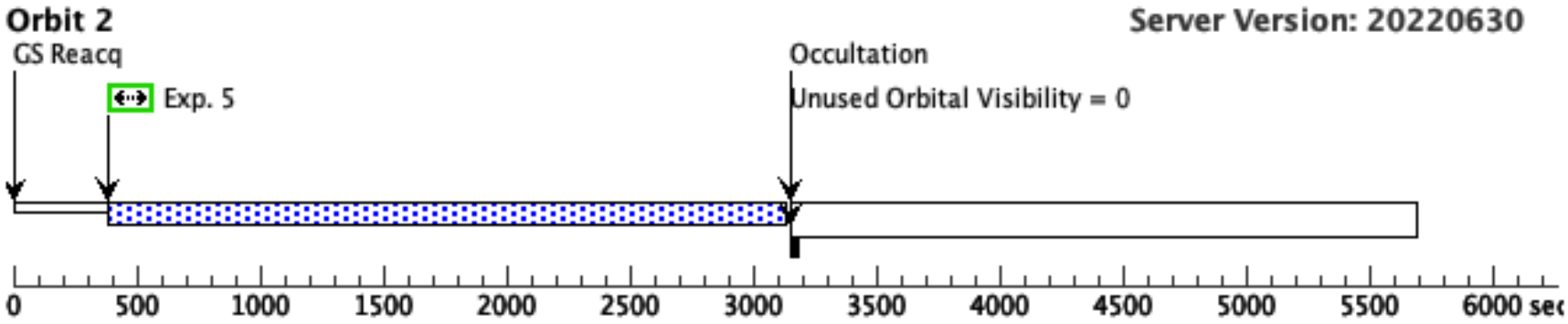
Comments: Coordinates from Gaia EDR3, epoch=2016
Category=STAR
Description=[M III-I]
Extended=NO

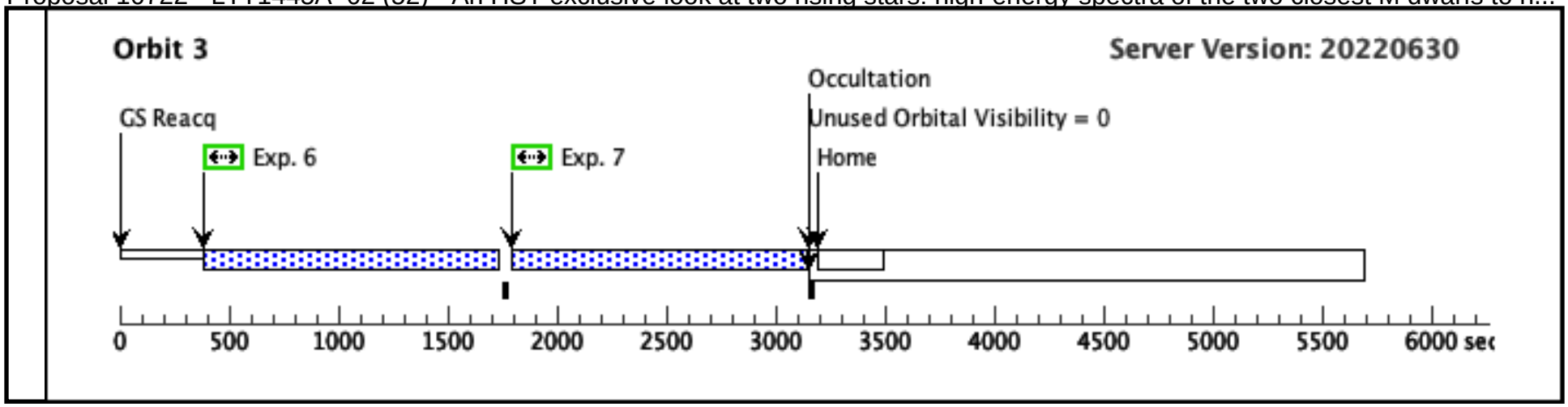
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquiring (COS.ta.1544663)	(1) BD-17-588A	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				37 Secs (37 Secs) *[==>]*	***[1]***
2	NUV_01 (COS.sp.1544458)	(1) BD-17-588A	COS/NUV, TIME-TAG, PSA	G230L 2950 A	FLASH=YES; FP-POS=2; BUFFER-TIME=1234			270 Secs (270 Secs) *[==>]*	***[1]***
3	NUV_02 (COS.sp.1544458)	(1) BD-17-588A	COS/NUV, TIME-TAG, PSA	G230L 2950 A	FLASH=YES; FP-POS=3; BUFFER-TIME=1234			270 Secs (270 Secs) *[==>]*	***[1]***
4	FUV_01 (COS.sp.1544461)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FP-POS=1; BUFFER-TIME=20000			1535 Secs (1535 Secs) *[==>]*	***[1]***
5	FUV_02 (COS.sp.1523879)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FP-POS=2; BUFFER-TIME=20000			2700 Secs (2700 Secs) *[==>]*	***[2]***
6	FUV_03 (COS.sp.1544462)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FP-POS=3; BUFFER-TIME=20000			1298 Secs (1298 Secs) *[==>]*	***[3]***
7	FUV_04 (COS.sp.1544462)	(1) BD-17-588A	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FP-POS=4; BUFFER-TIME=20000			1297 Secs (1297 Secs) *[==>]*	***[3]***

Orbit Structure



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Visit

Proposal 16722, LTT1554A_03 (03), completed Tue Feb 21 15:00:44 GMT 2023

Diagnostic Status: No Diagnostics

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

Special Requirements: ORIENT 15D TO 165 D; ORIENT 195D TO 345 D; BETWEEN 04-APR-2021:00:00:00 AND 05-DEC-2021:00:00:00; BETWEEN 04-APR-2022:00:00:00 AND 05-DEC-2022:00:00:00; BETWEEN 04-APR-2023:00:00:00 AND 05-DEC-2023:00:00:00

Fixed Targets

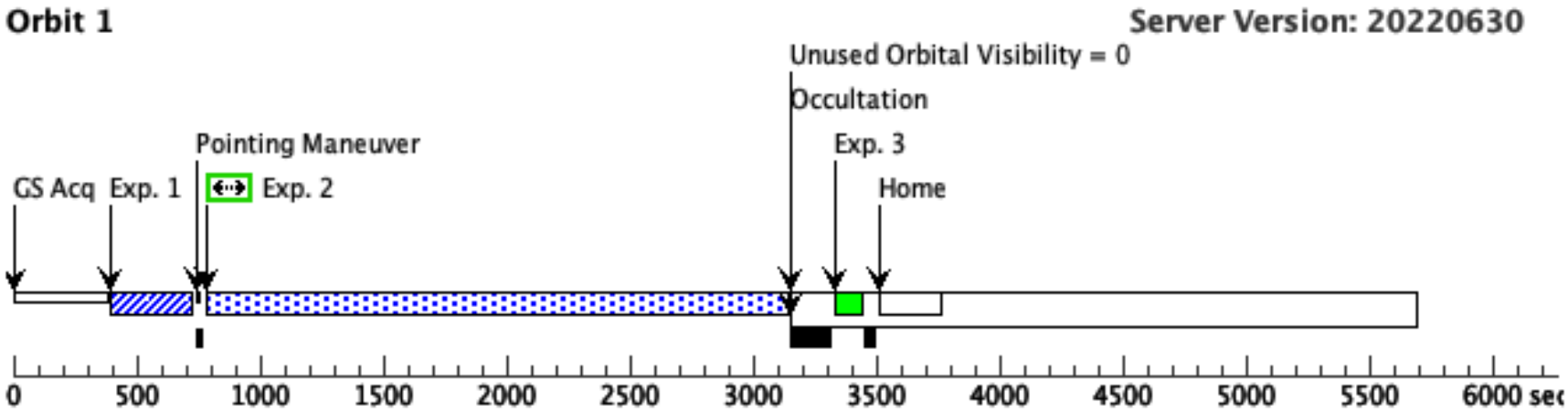
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	BD-17-588A Alt Name1: LTT1445A	RA: 03 01 50.9800 (45.4624167d) Dec: -16 35 40.32 (-16.59453d) Equinox: J2000	Proper Motion RA: -369.97184335074684 mas/yr Proper Motion Dec: -267.931311928784 mas/yr Epoch of Position: 2016	V=11.22+/-0.02	Reference Frame: ICRS

Comments: Coordinates from Gaia EDR3, epoch=2016
Category=STAR
Description=[M III-I]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquiring_01 (STIS.ta.1532945)	(1) BD-17-588A	STIS/CCD, ACQ, F28X50OII	MIRROR				19 Secs (19 Secs) *[==>]*	*[1]*
2	Ly-alpha_01 (STIS.sp.1532946)	(1) BD-17-588A	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140M 1222 A	BUFFER-TIME=6827; WAVECAL=NO			2208 Secs (2208 Secs) *[==>]*	*[1]*
3	Wavecal	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.2	G140M 1222 A				*[==>]*	*[1]*

Orbit Structure



Visit

Proposal 16722, GJ486_01 (04), completed Tue Feb 21 15:00:44 GMT 2023

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

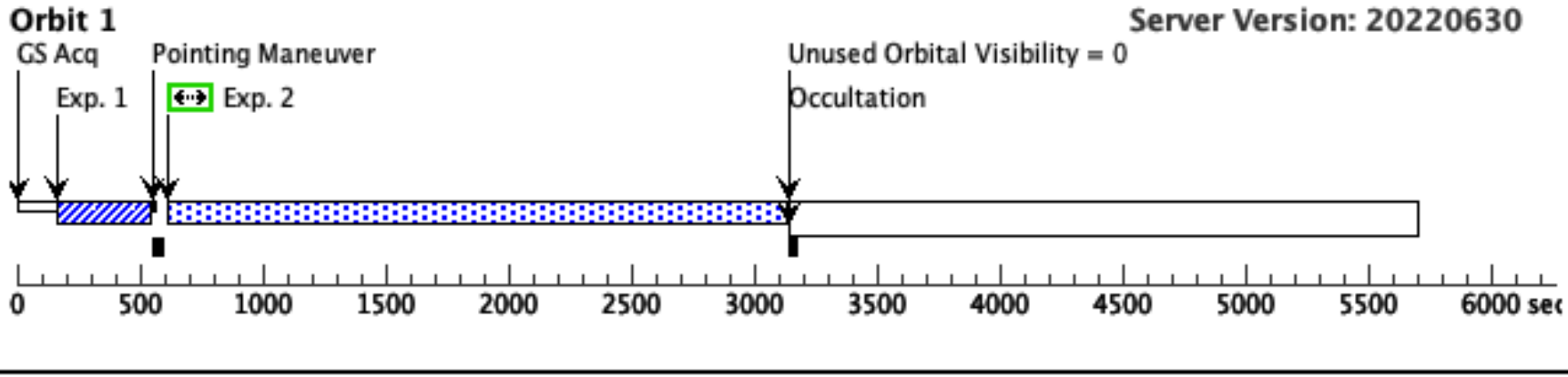
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	WOLF-437 Alt Name1: GJ486	RA: 12 47 55.5300 (191.9813750d) Dec: +09 44 57.68 (9.74936d) Equinox: J2000	Proper Motion RA: -1008.267067199613 mas/yr Proper Motion Dec: -460.0339460837744 mas/yr Epoch of Position: 2016	V=11.395	Reference Frame: ICRS

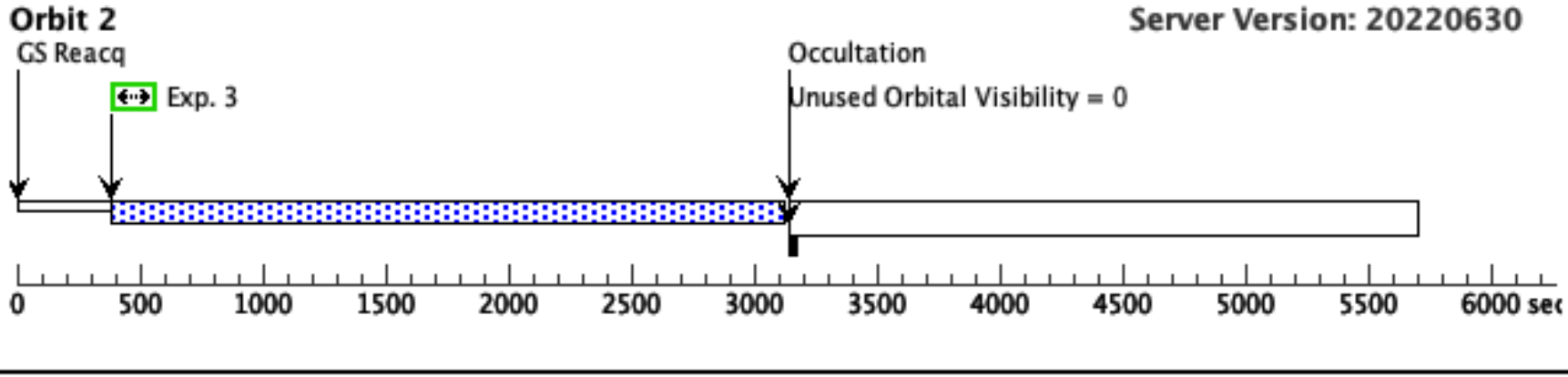
Comments: Coordinates and proper motions from Gaia EDR3.
Category=STAR
Description=[M III-I]
Extended=NO

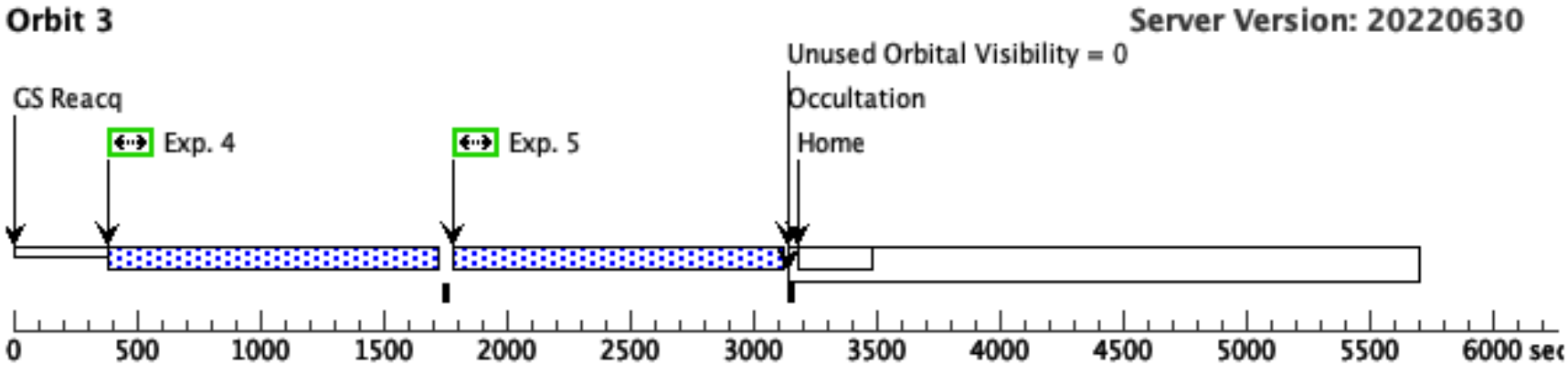
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquiring (COS.ta.1544664)	(2) WOLF-437	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				44 Secs (44 Secs) *[==>]*	***[1]***
2	FUV_01 (COS.sp.1526339)	(2) WOLF-437	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=1; BUFFER-TIME=20000; FLASH=YES			2337 Secs (2337 Secs) *[==>]*	***[1]***
3	FUV_02 (COS.sp.1526340)	(2) WOLF-437	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=2; BUFFER-TIME=20000; FLASH=YES			2689 Secs (2689 Secs) *[==>]*	***[2]***
4	FUV_03 (COS.sp.1544447)	(2) WOLF-437	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=3; BUFFER-TIME=20000; FLASH=YES			1292 Secs (1292 Secs) *[==>]*	***[3]***
5	FUV_04 (COS.sp.1544447)	(2) WOLF-437	COS/FUV, TIME-TAG, PSA	G130M 1222 A	FP-POS=4; BUFFER-TIME=20000; FLASH=YES			1292 Secs (1292 Secs) *[==>]*	***[3]***

Orbit Structure







Visit	**Proposal 16722, GJ486_02 (05), completed** Tue Feb 21 15:00:44 GMT 2023 **Diagnostic Status: Error** Scientific Instruments: COS/FUV, COS/NUV Special Requirements: (none)
Diagnostics	(FUV_01 (05.004)) Error (Form): Illegal selection: G160M. (FUV_01 (05.004)) Error (Form): Illegal selection: PSA. (FUV_01 (05.004)) Error (Form): This attribute cannot have this value due to other choices: Aperture=PSA. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_01 (05.004)) Error (Form): This attribute cannot have this value due to other choices: Optional_Parameter=FLASH=YES. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_01 (05.004)) Error (Form): This attribute cannot have this value due to other choices: Spectral_Element=G160M. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_01 (05.004)) Error (Form): YES is not a valid selection (FUV_01 (05.004)) Error (Form): YES is not a valid selection (FUV_02 (05.005)) Error (Form): Illegal selection: G160M. (FUV_02 (05.005)) Error (Form): Illegal selection: PSA. (FUV_02 (05.005)) Error (Form): This attribute cannot have this value due to other choices: Aperture=PSA. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_02 (05.005)) Error (Form): This attribute cannot have this value due to other choices: Optional_Parameter=FLASH=YES. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_02 (05.005)) Error (Form): This attribute cannot have this value due to other choices: Spectral_Element=G160M. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_02 (05.005)) Error (Form): YES is not a valid selection (FUV_02 (05.005)) Error (Form): YES is not a valid selection (FUV_03 (05.006)) Error (Form): Illegal selection: G160M. (FUV_03 (05.006)) Error (Form): Illegal selection: PSA. (FUV_03 (05.006)) Error (Form): This attribute cannot have this value due to other choices: Aperture=PSA. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_03 (05.006)) Error (Form): This attribute cannot have this value due to other choices: Optional_Parameter=FLASH=YES. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_03 (05.006)) Error (Form): This attribute cannot have this value due to other choices: Spectral_Element=G160M. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_03 (05.006)) Error (Form): YES is not a valid selection (FUV_03 (05.006)) Error (Form): YES is not a valid selection (FUV_04 (05.007)) Error (Form): Illegal selection: G160M. (FUV_04 (05.007)) Error (Form): Illegal selection: PSA. (FUV_04 (05.007)) Error (Form): This attribute cannot have this value due to other choices: Aperture=PSA. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_04 (05.007)) Error (Form): This attribute cannot have this value due to other choices: Optional_Parameter=FLASH=YES. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_04 (05.007)) Error (Form): This attribute cannot have this value due to other choices: Spectral_Element=G160M. FLASH=NO is the only permitted value for G160M PSA exposures (implied LIFETIME-POS LP6). (FUV_04 (05.007)) Error (Form): YES is not a valid selection (FUV_04 (05.007)) Error (Form): YES is not a valid selection

Fixed Targets

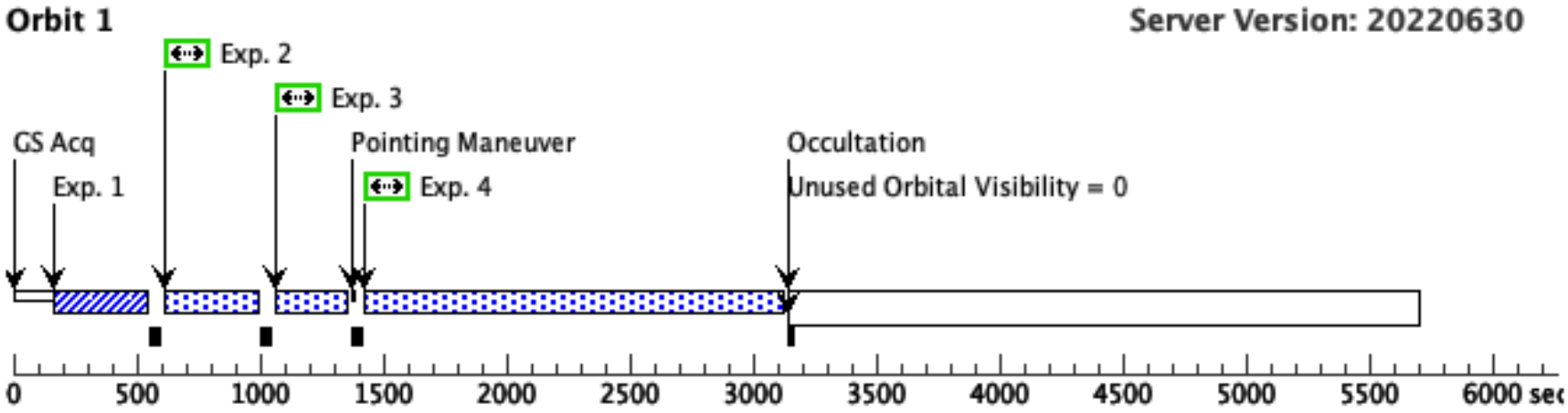
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	WOLF-437 Alt Name1: GJ486	RA: 12 47 55.5300 (191.9813750d) Dec: +09 44 57.68 (9.74936d) Equinox: J2000	Proper Motion RA: -1008.267067199613 mas/yr Proper Motion Dec: -460.0339460837744 mas/yr Epoch of Position: 2016	V=11.395	Reference Frame: ICRS

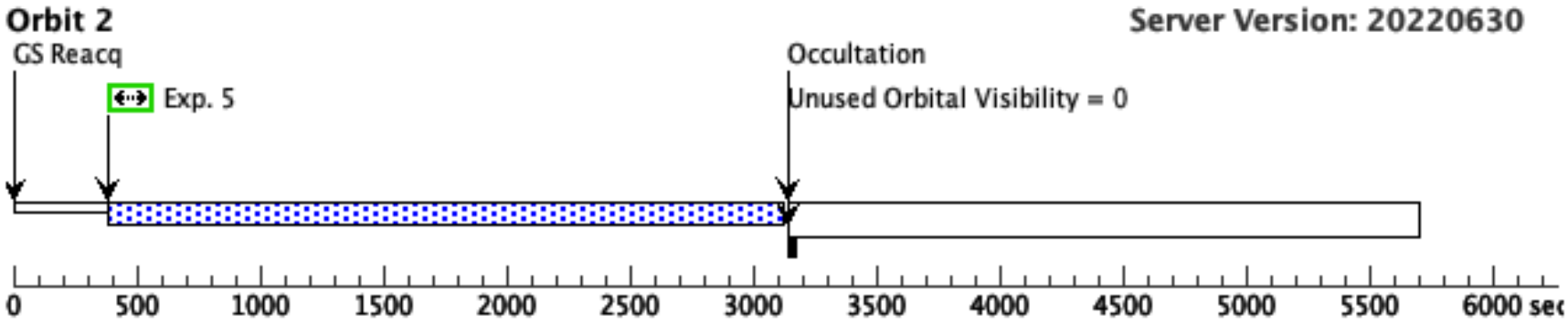
Comments: Coordinates and proper motions from Gaia EDR3.
Category=STAR
Description=[M III-I]
Extended=NO

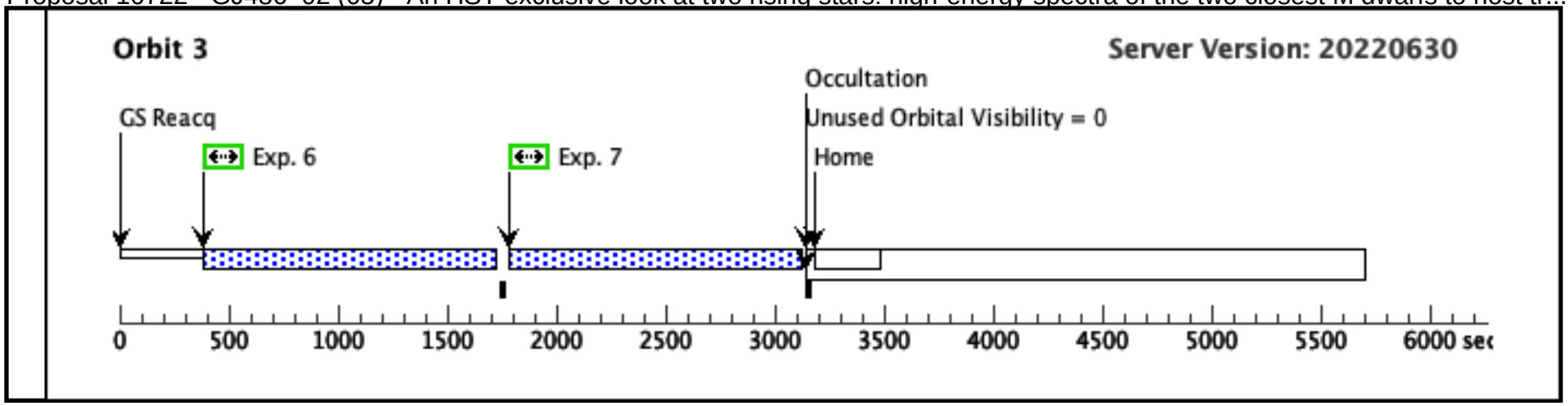
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquiring (COS.ta.1544664)	(2) WOLF-437	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				44 Secs (44 Secs) *[==>]*	***[1]***
2	NUV_01 (COS.sp.1544463)	(2) WOLF-437	COS/NUV, TIME-TAG, PSA	G230L 2950 A	FLASH=YES; FP-POS=2; BUFFER-TIME=1233			276 Secs (276 Secs) *[==>]*	***[1]***
3	NUV_01 (COS.sp.1544463)	(2) WOLF-437	COS/NUV, TIME-TAG, PSA	G230L 2950 A	FLASH=YES; FP-POS=3; BUFFER-TIME=1233			276 Secs (276 Secs) *[==>]*	***[1]***
4	FUV_01 (COS.sp.1526343)	(2) WOLF-437	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FLASH=YES; FP-POS=1; BUFFER-TIME=20000			1480 Secs (1480 Secs) *[==>]*	***[1]***
5	FUV_02 (COS.sp.1526344)	(2) WOLF-437	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FLASH=YES; FP-POS=2; BUFFER-TIME=20000			2689 Secs (2689 Secs) *[==>]*	***[2]***
6	FUV_03 (COS.sp.1544464)	(2) WOLF-437	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FLASH=YES; FP-POS=3; BUFFER-TIME=20000			1292 Secs (1292 Secs) *[==>]*	***[3]***
7	FUV_04 (COS.sp.1544464)	(2) WOLF-437	COS/FUV, TIME-TAG, PSA	G160M 1533 A	FLASH=YES; FP-POS=4; BUFFER-TIME=20000			1292 Secs (1292 Secs) *[==>]*	***[3]***

Orbit Structure



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5500
6000 sec

Visit

Proposal 16722, GJ486_03 (06), implementation Tue Feb 21 15:00:44 GMT 2023

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 28-FEB-2021:00:00:00 AND 27-OCT-2021:00:00:00; BETWEEN 28-FEB-2022:00:00:00 AND 27-OCT-2022:00:00:00; BETWEEN 28-FEB-2023:00:00:00 AND 27-OCT-2023:00:00:00

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	WOLF-437 Alt Name1: GJ486	RA: 12 47 55.5300 (191.9813750d) Dec: +09 44 57.68 (9.74936d) Equinox: J2000	Proper Motion RA: -1008.267067199613 mas/yr Proper Motion Dec: -460.0339460837744 mas/yr Epoch of Position: 2016	V=11.395	Reference Frame: ICRS

Comments: Coordinates and proper motions from Gaia EDR3.
Category=STAR
Description=[M III-I]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	Acquiring_01 (STIS.ta.1532943)	(2) WOLF-437	STIS/CCD, ACQ, F28X50OII	MIRROR				22 Secs (22 Secs) *[==>]*	***[1]***
2	Ly-alpha_01 (STIS.sp.1532949)	(2) WOLF-437	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140M 1222 A	BUFFER-TIME=6823; WAVECAL=NO			2160 Secs (2160 Secs) *[==>]*	***[1]***
3	Wavecal	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.2	G140M 1222 A				*[==>]*	***[1]***
4	Ly-alpha_02 (STIS.sp.1532949)	(2) WOLF-437	STIS/FUV-MAMA, TIME-TAG, 52X0.2	G140M 1222 A	BUFFER-TIME=6823; WAVECAL=NO			2723 Secs (2723 Secs) *[==>]*	***[2]***
5	Wavecal	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.2	G140M 1222 A				*[==>]*	***[2]***

Orbit Structure