16204 - A New Method to Measure the Chemical Compositions of Extrasolar Planetesimals

Cycle: 28, 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) GAIAJ0006+2858	COS/NUV	2	25-Jun-2020 11:01:09.0	yes
02	(2) WD0145+234	COS/NUV	1	25-Jun-2020 11:01:10.0	yes
03	(3) GAIAJ0347+1624	COS/NUV	2	25-Jun-2020 11:01:11.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
04	(4) GAIAJ0510+2315	COS/NUV	2	25-Jun-2020 11:01:11.0	yes
05	(5) GAIAJ0611-6931	COS/NUV	2	25-Jun-2020 11:01:12.0	yes
06	(6) WD0842+572	COS/NUV	2	25-Jun-2020 11:01:13.0	yes
07	(7) WD1622+587	COS/NUV	3	25-Jun-2020 11:01:14.0	yes
08	(8) GAIAJ2100+2122	COS/NUV	2	25-Jun-2020 11:01:15.0	yes

16 Total Orbits Used

ABSTRACT

The chemical composition of an extrasolar planet is a fundamental property with little observational signature. Spectroscopic observations of polluted white dwarfs have proven to be a successful pathway to constrain the compositions of disrupted planetesimals but this approach has its own limitations. Here, we propose a new method to measure the compositions of extrasolar planetesimals by observing the gas debris around polluted white dwarfs. These disks are fresh extrasolar planetary material in a transient stage, right after tidal disruption and before being completely accreted onto the white dwarf. Recent increases in the sample size of white dwarf gas disks combined with timely advancements in disk modeling efforts have made this new exploration feasible. This proposal will open a noval method to measure chemical compositions of extrasolar planetesimals.

OBSERVING DESCRIPTION

The goal of this proposal is to determine the magnesium abundances in gas disks around white dwarfs -- a novel way to measure the compositions of extrasolar planetesimals. The strongest magnesium transitions are those around Mg II 2800 A. We propose to use G230L grating (spectral resolution 2000) with a central wavelength of 2950 A, which covers 1651 - 2049 A and 2751 - 3150 A. Such a wide wavelength coverage will allow us to search for other unknown gas emission lines as well.

For the four systems with strong calcium triplet emissions, a SNR of at least 30 is needed to distinguish different Mg abundances, while for four systems with weaker calcium triplet emission, a SNR of at least 50 is needed. The requested time is computed with the exposure time calculator v28.1. Including overhead for target acquisition, a total of 16 orbits is needed for this program. Our targets are sufficiently faint that the safety of COS is not a concern.

The reduced gyro operations have little impact on the execution of this program.

Visit

Proposal 16204, GaiaJ0006+2858 - Visit (01) Thu Jun 25 15:01:15 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

Fixed Targets

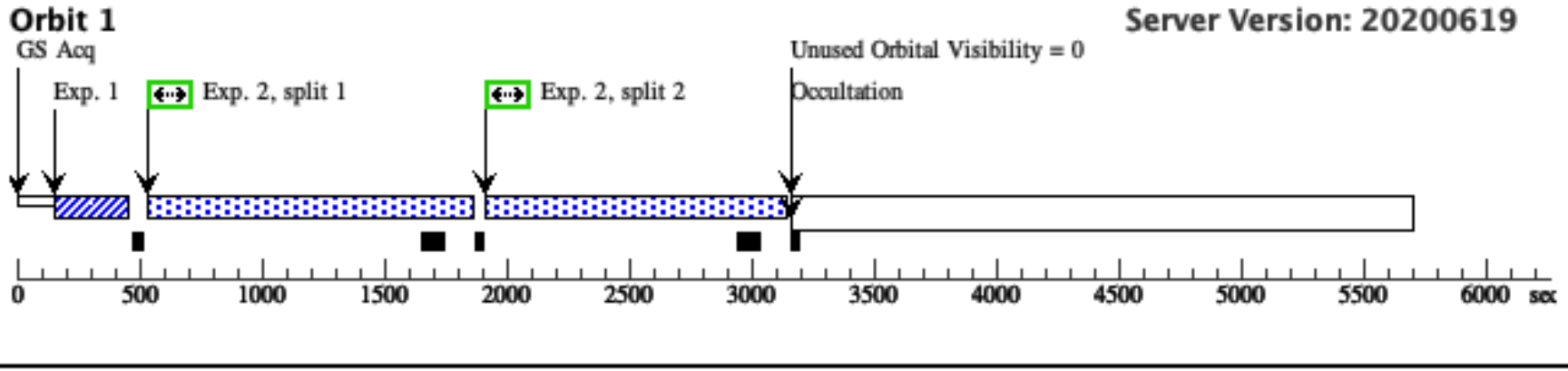
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GAIAJ0006+2858	RA: 00 06 34.7400 (1.6447500d) Dec: +28 58 46.75 (28.97965d) Equinox: J2000	Proper Motion RA: 23.194 mas/yr Proper Motion Dec: 13.295 mas/yr Epoch of Position: 2015.5	V=16.4	Reference Frame: ICRS

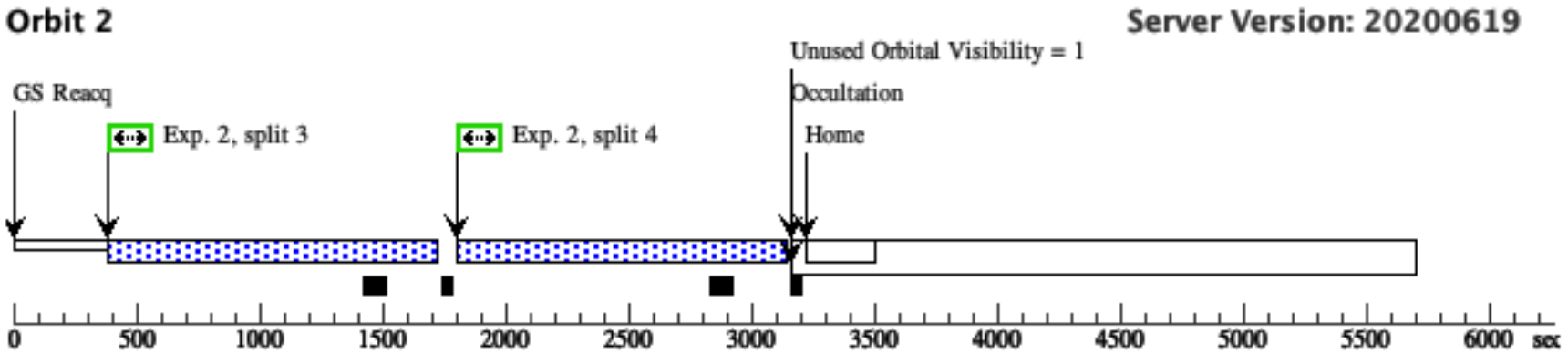
Comments:
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	GAIAJ0006+2858_ACQ/IMAGE (COS.ta.1449538)	(1) GAIAJ0006+2858	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				3.7 Secs (3.7 Secs) *[==>]*	 ***[1]***
2	GAIAJ0006+2858_COS_NUV_G230L (COS.sp.1450366)	(1) GAIAJ0006+2858	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=1028; FP-POS=ALL			1130 Secs (5092 Secs) *[==>1217.0 Secs (Split 1)]* *[==>1217.0 Secs (Split 2)]* *[==>1329.0 Secs (Split 3)]* *[==>1329.0 Secs (Split 4)]*	 ***[1]*** ***[2]***

Orbit Structure





Visit

Proposal 16204, WD0145+234 - Visit (02)

Thu Jun 25 15:01:15 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

Fixed Targets

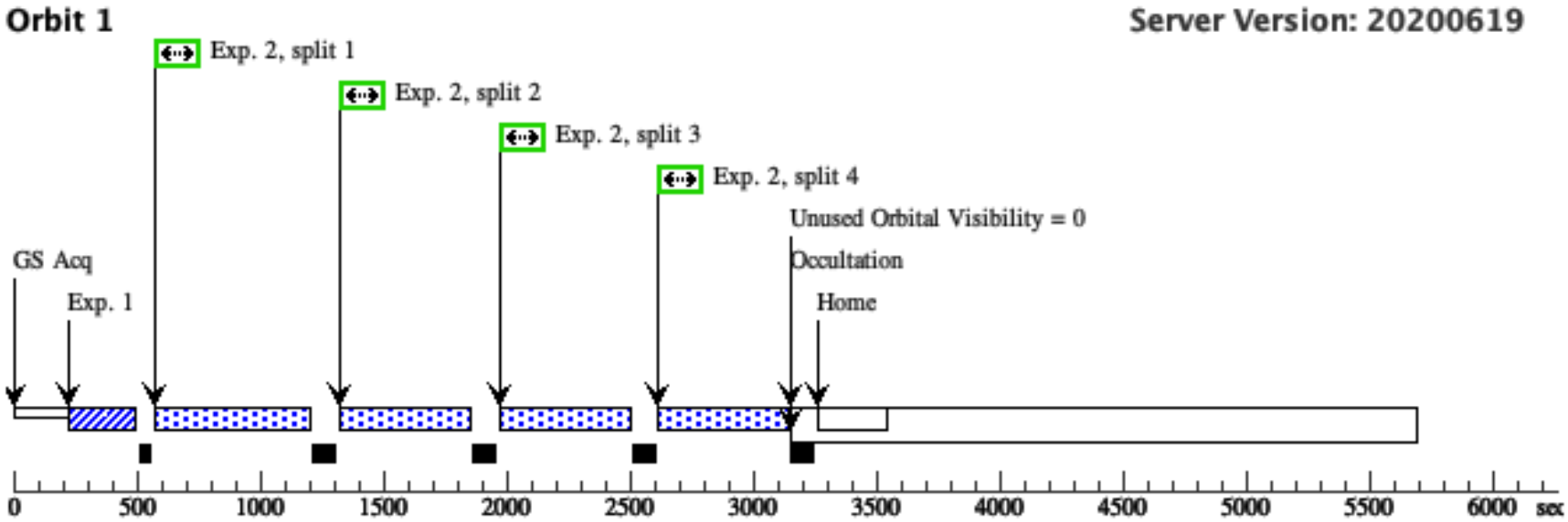
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	WD0145+234	RA: 01 47 54.8118 (26.9783825d) Dec: +23 39 42.09 (23.66169d) Equinox: J2000	Proper Motion RA: -5.209 mas/yr Proper Motion Dec: -97.589 mas/yr Epoch of Position: 2015.5	V=14.0	Reference Frame: ICRS

Comments:
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	WD0145+234_ACQ/IMAGE (COS.ta.1449542)	(2) WD0145+234	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				23.2 Secs (23.2 Secs) *[==>]*	*[1]*
2	WD0145+234_COS_NUV_G230L (COS.sp.1450371)	(2) WD0145+234	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=650; FP-POS=ALL			540 Secs (2044 Secs) *[==>511.0 Secs (Split 1)]* *[==>511.0 Secs (Split 2)]* *[==>511.0 Secs (Split 3)]* *[==>511.0 Secs (Split 4)]*	*[1]*

Orbit Structure



Visit

Proposal 16204, GAIAJ0347+1624 - Visit (03) Thu Jun 25 15:01:16 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

Fixed Targets

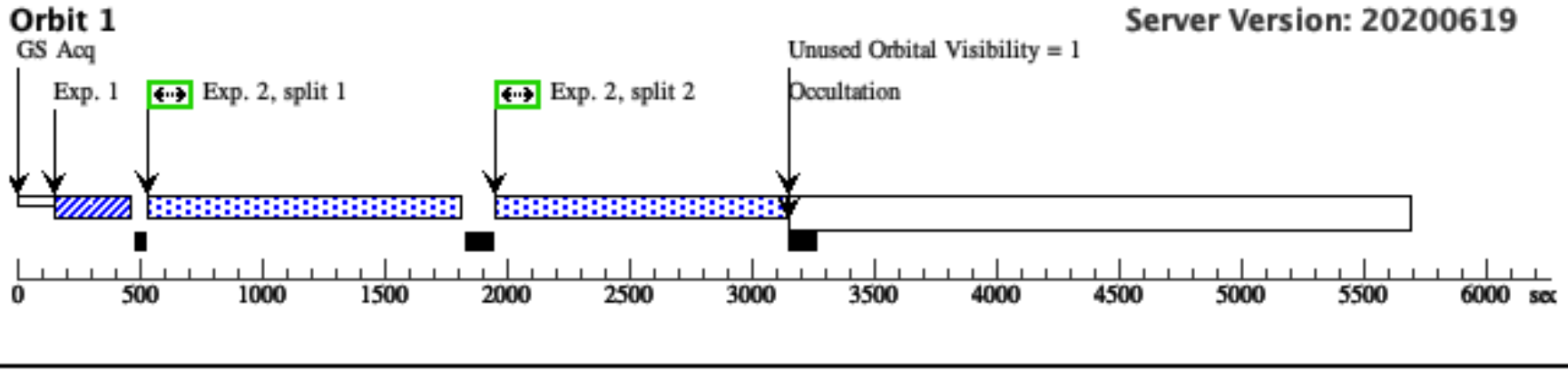
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	GAIAJ0347+1624	RA: 03 47 36.6980 (56.9029083d) Dec: +16 24 8.76 (16.40243d) Equinox: J2000	Proper Motion RA: 5.68 mas/yr Proper Motion Dec: -62.903 mas/yr Epoch of Position: 2015.5	V=16.7	Reference Frame: ICRS

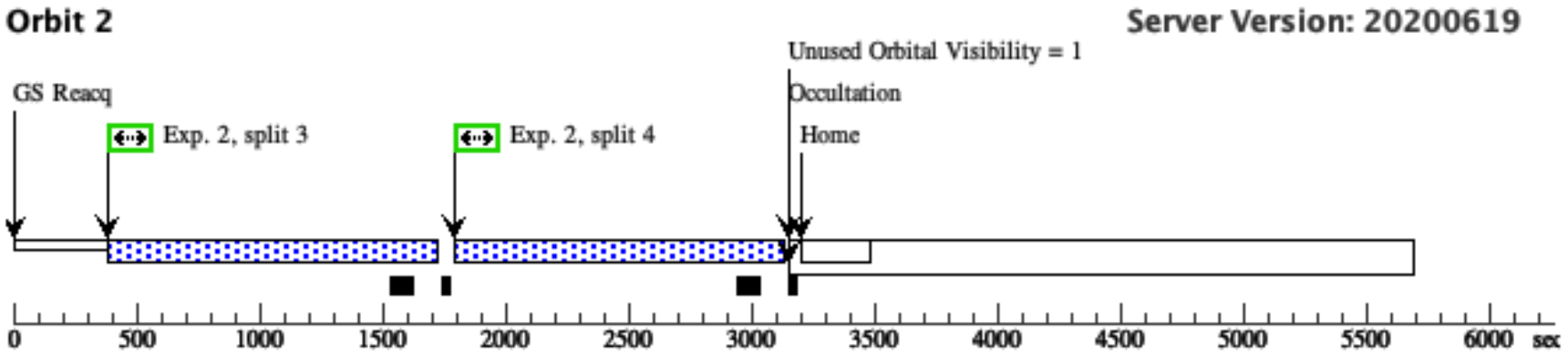
Comments:
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	GAIAJ0347+1624_ACQ/IMAGE (COS.ta.1449543)	(3) GAIAJ0347+1624	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				6.5 Secs (6.5 Secs)	
								[==>]	***[1]***
2	GAIAJ0347+1624_COS_NUV_G230L (COS.sp.1450374)	(3) GAIAJ0347+1624	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=1145; FP-POS=ALL			1130 Secs (5000 Secs)	
								[==>1171.0 Secs (Split 1)] *[==>1171.0 Secs (Split 2)]*	***[1]***
								[==>1329.0 Secs (Split 3)] *[==>1329.0 Secs (Split 4)]*	***[2]***

Orbit Structure





Visit

Proposal 16204, GAIAJ0510+2315 - Visit (04) Thu Jun 25 15:01:16 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

Fixed Targets

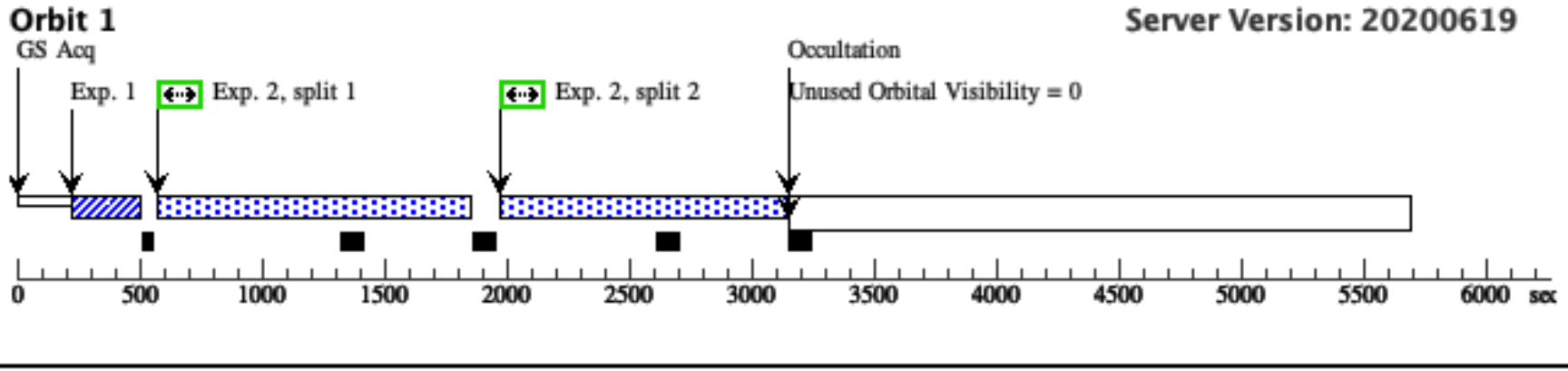
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	GAIAJ0510+2315	RA: 05 10 2.0970 (77.5087375d) Dec: +23 15 40.82 (23.26134d) Equinox: J2000	Proper Motion RA: -44.374 mas/yr Proper Motion Dec: -38.229 mas/yr Epoch of Position: 2015.5	V=15.1	Reference Frame: ICRS

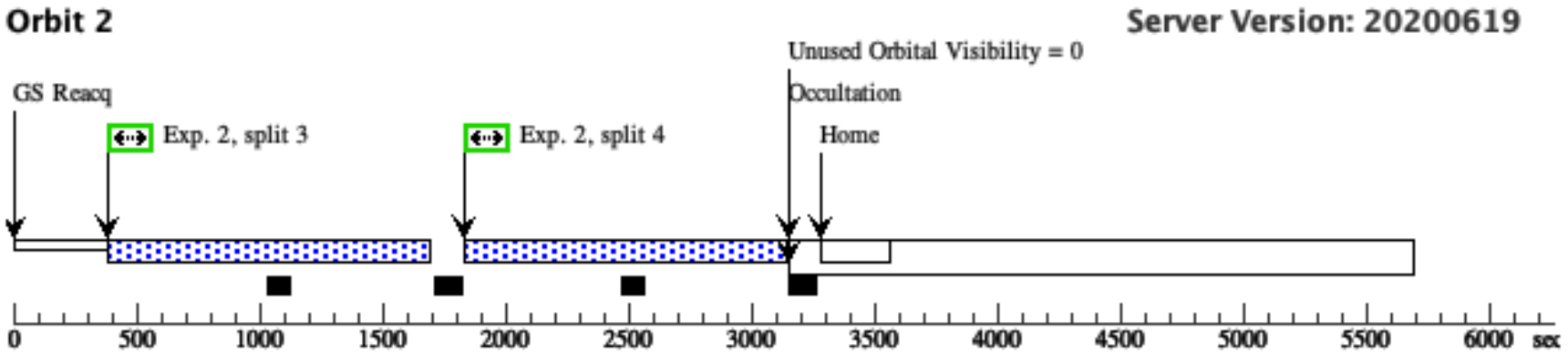
Comments:
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	GaiaJ0510+2315_ACQ/IMAGE (COS.ta.1450376)	(4) GAIAJ0510+2315	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				25.2 Secs (25.2 Secs) *[==>]*	 ***[1]***
2	GAIAJ0510+2315_COS_NUV_G230L (COS.sp.1450377)	(4) GAIAJ0510+2315	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=639; FP-POS=ALL			1130 Secs (4894 Secs) *[==>1155.0 Secs (Split 1)]* *[==>1155.0 Secs (Split 2)]* *[==>1292.0 Secs (Split 3)]* *[==>1292.0 Secs (Split 4)]*	 ***[1]*** ***[2]***

Orbit Structure





Visit

Proposal 16204, GAIAJ0611-6931 - Visit (05) Thu Jun 25 15:01:16 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

Fixed Targets

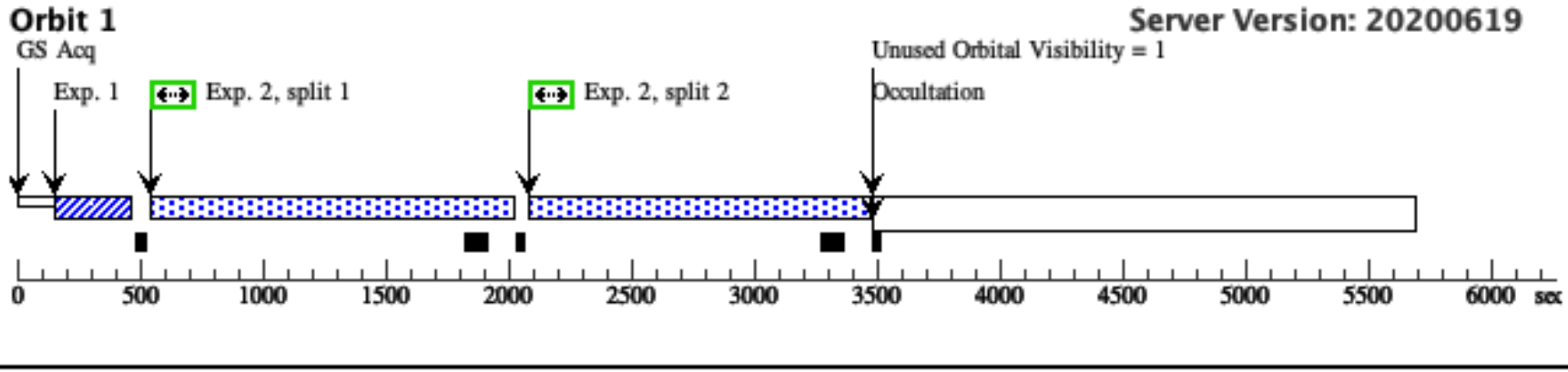
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(5)	GAIAJ0611-6931	RA: 06 11 31.7660 (92.8823583d) Dec: -69 31 0.59 (-69.51683d) Equinox: J2000	Proper Motion RA: 22.662 mas/yr Proper Motion Dec: 100.373 mas/yr Epoch of Position: 2015.5	V=16.8	Reference Frame: ICRS

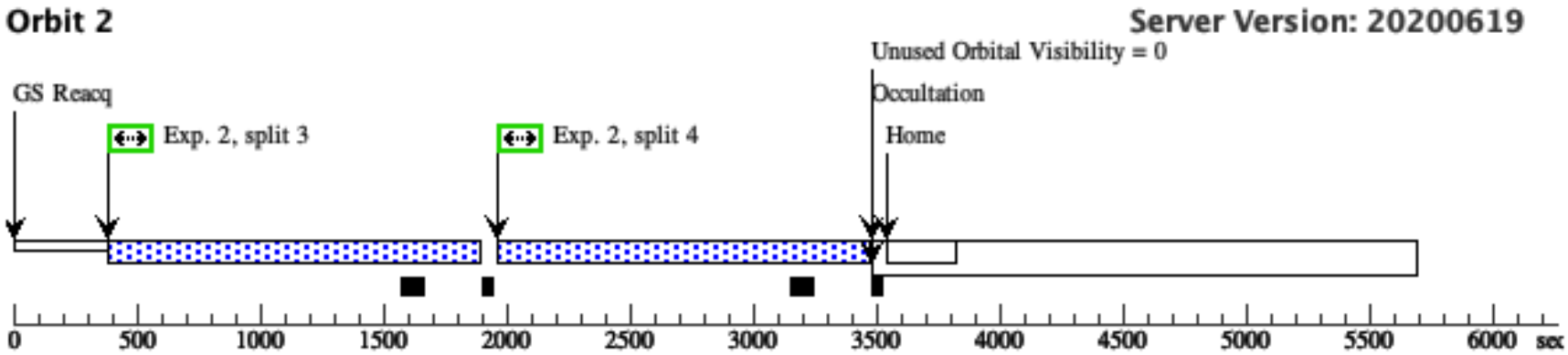
Comments:
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	GAIAJ0611-6931_ACQ/IMAGE (COS.ta.1449547)	(5) GAIAJ0611-6931	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				8.4 Secs (8.4 Secs) *[==>]*	 ***[1]***
2	GAIAJ0611-6931_COS_NUV_G230L (OS.sp.1450380)	(5) GAIAJ0611-6931	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=1184; FP-POS=ALL			1130 Secs (5724 Secs) *[==>1372.0 Secs (Split 1)]* *[==>1372.0 Secs (Split 2)]* *[==>1490.0 Secs (Split 3)]* *[==>1490.0 Secs (Split 4)]*	 ***[1]*** ***[2]***

Orbit Structure





Visit

Proposal 16204, WD0842+572 - Visit (06)

Thu Jun 25 15:01:16 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

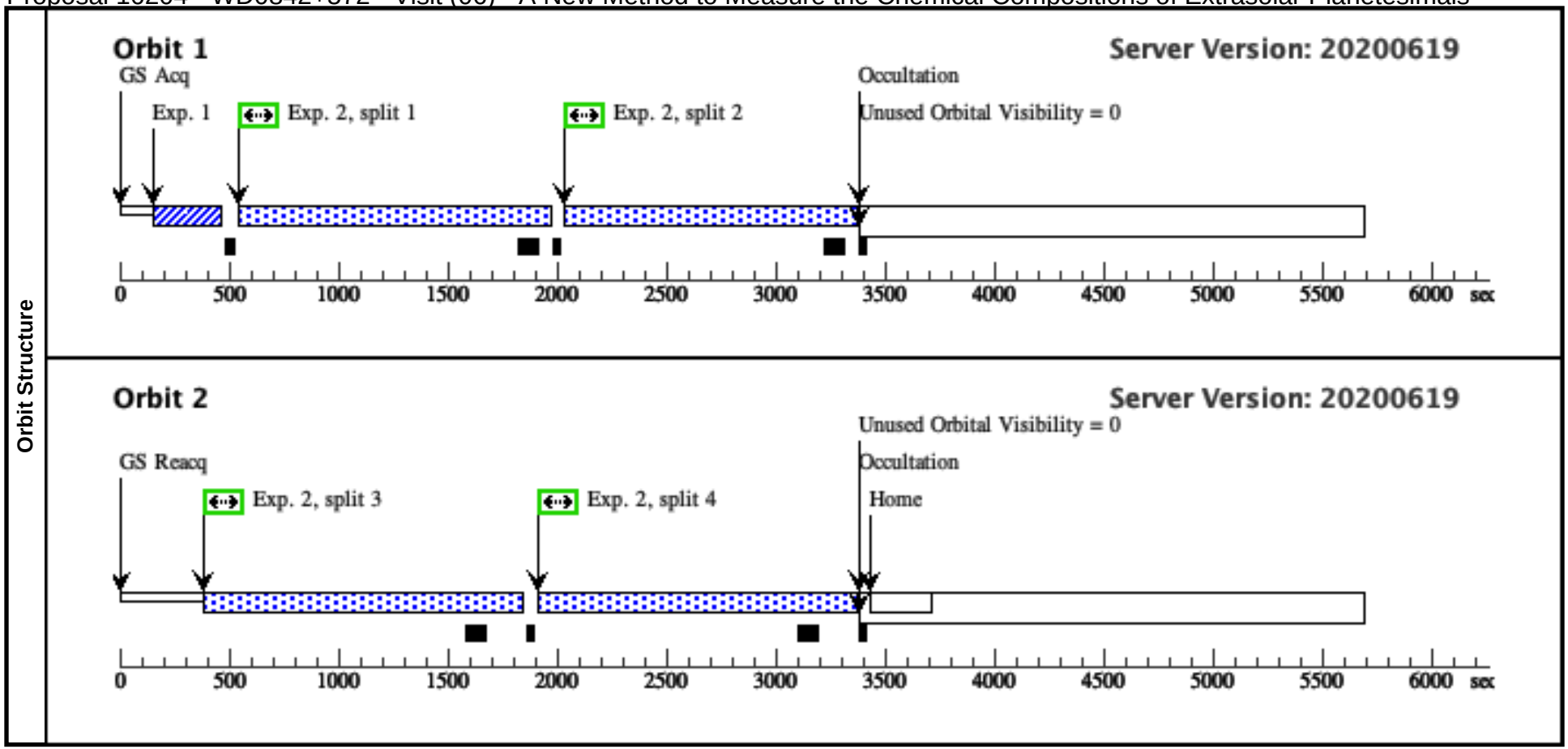
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	WD0842+572	RA: 08 46 2.4320 (131.5101333d) Dec: +57 03 28.26 (57.05785d) Equinox: J2000	Proper Motion RA: -21.895 mas/yr Proper Motion Dec: -24.160 mas/yr Epoch of Position: 2015.5	V=16.8	Reference Frame: ICRS

Comments:
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	WD0842+572_ACQ/IMAGE (COS.ta.1450383)	(6) WD0842+572	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				8.9 Secs (8.9 Secs) *[==>]*	 ***[1]***
2	WD0842+572_COS_NUV_G230L (COS.sp.1450384)	(6) WD0842+572	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=1191; FP-POS=ALL			1300 Secs (5540 Secs) *[==>1324.0 Secs (Split 1)]* *[==>1324.0 Secs (Split 2)]* *[==>1446.0 Secs (Split 3)]* *[==>1446.0 Secs (Split 4)]*	 ***[1]*** ***[2]***


Orbit Structure
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Exp. 1
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1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec
Orbit 2
Server Version: 20200619
Unused Orbital Visibility = 0
GS Reacq
Exp. 2, split 3
Exp. 2, split 4
Occultation
Home
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500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
sec

Visit

Proposal 16204, WD1622+587 - Visit (07) Thu Jun 25 15:01:16 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

Fixed Targets

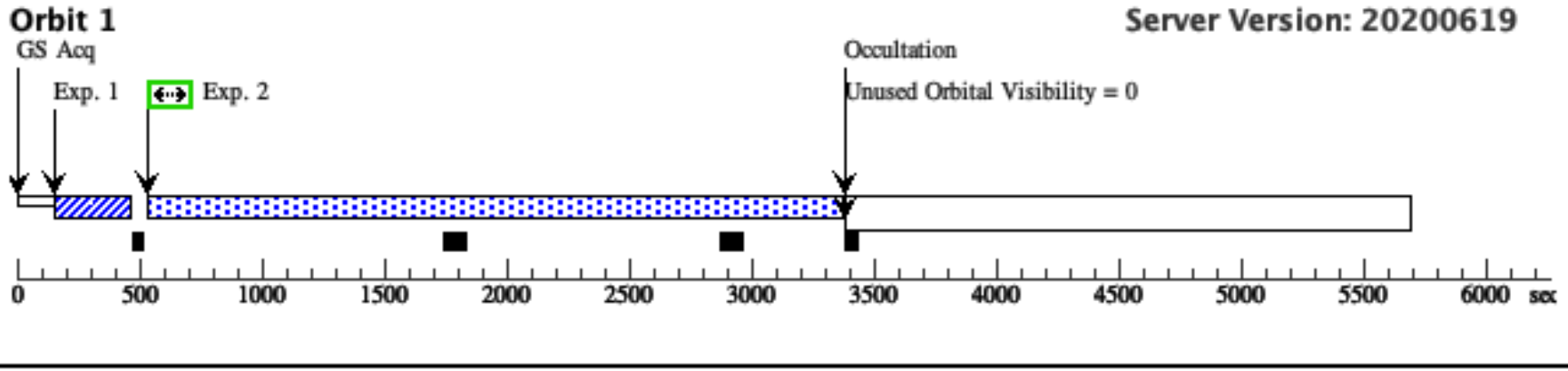
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(7)	WD1622+587	RA: 16 22 59.7310 (245.7488792d) Dec: +58 40 28.90 (58.67469d) Equinox: J2000	Proper Motion RA: 43.214 mas/yr Proper Motion Dec: -128.692 mas/yr Epoch of Position: 2015.5	V=16.9	Reference Frame: ICRS

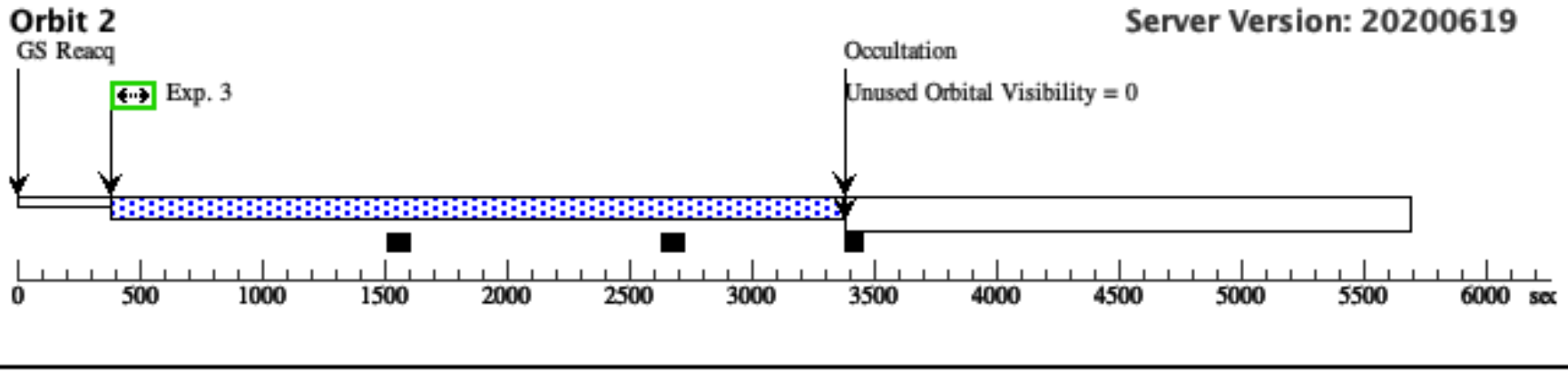
Comments:
Category=STAR
Description=[DB]
Extended=NO

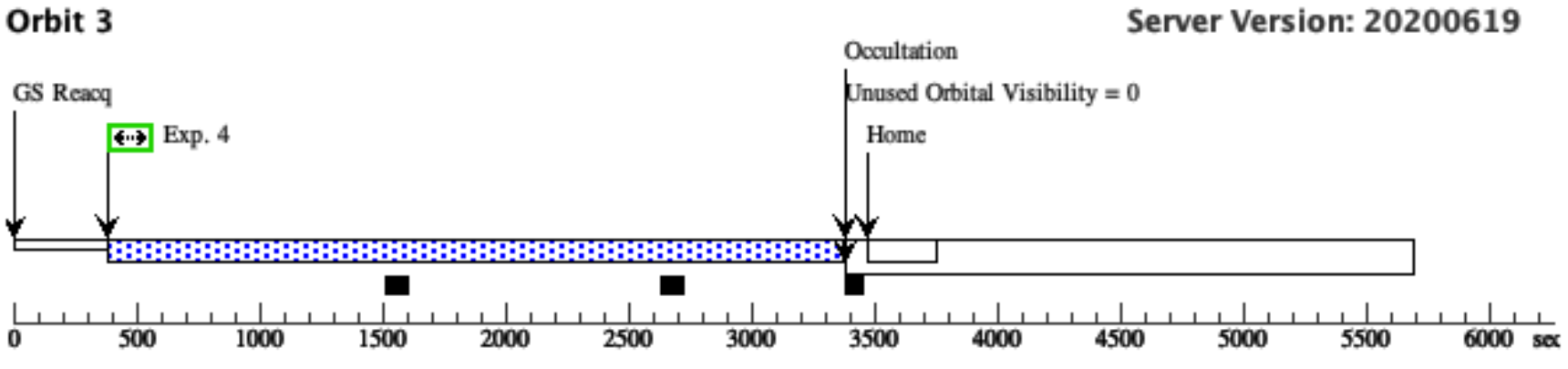
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	WD1622+587_ACQ/IMAGE (COS.ta.1449549)	(7) WD1622+587	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				6 Secs (6 Secs) *[==>]*	 ***[1]***
2	WD1622+587_COS_NUV_G230L_POS1 (COS.sp.1450387)	(7) WD1622+587	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=1119; FP-POS=1			2800 Secs (2732 Secs) *[==>2732.0 Secs]*	 ***[1]***
3	WD1622+587_COS_NUV_G230L_POS2 (COS.sp.1450387)	(7) WD1622+587	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=1119; FP-POS=2			2800 Secs (2970 Secs) *[==>2970.0 Secs]*	 ***[2]***
4	WD1622+587_COS_NUV_G230L_POS3 (COS.sp.1450387)	(7) WD1622+587	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=1119; FP-POS=3			2800 Secs (2970 Secs) *[==>2970.0 Secs]*	 ***[3]***

Orbit Structure







Visit

Proposal 16204, GAIAJ2100+2122 - Visit (08) Thu Jun 25 15:01:16 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(8)	GAIAJ2100+2122	RA: 21 00 34.7300 (315.1447083d) Dec: +21 22 57.48 (21.38263d) Equinox: J2000	Proper Motion RA: 73.725 mas/yr Proper Motion Dec: 38.423 mas/yr Epoch of Position: 2015.5	V=15.2	Reference Frame: ICRS

Comments:
Category=STAR
Description=[DA]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	GAIAJ2100+2122_ACQ/IMAGE (COS.ta.1450500)	(8) GAIAJ2100+2122	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				30 Secs (30 Secs) *[==>]*	 ***[1]***
2	GAIAJ2100+2122_COS_NUV_G230L (COS.sp.1450395)	(8) GAIAJ2100+2122	COS/NUV, TIME-TAG, PSA	G230L 2950 A	BUFFER-TIME=691; FP-POS=ALL			1400 Secs (4914 Secs) *[==>1156.0 Secs (Split 1)]* *[==>1156.0 Secs (Split 2)]* *[==>1301.0 Secs (Split 3)]* *[==>1301.0 Secs (Split 4)]*	 ***[1]*** ***[2]***

Orbit Structure