16219 - Exploring the origin of the M31-M33 filament

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) GALEX-J010328.6+354730	COS/FUV COS/NUV	4	23-Nov-2020 18:00:19.0	yes
02	(1) GALEX-J010328.6+354730	COS/FUV COS/NUV	3	23-Nov-2020 18:00:20.0	yes
03	(1) GALEX-J010328.6+354730	COS/FUV COS/NUV	3	23-Nov-2020 18:00:21.0	yes
04	(2) GALEX-J010415.8+402243	COS/FUV COS/NUV	2	23-Nov-2020 18:00:22.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
54	(2) GALEX-J010415.8+402243	COS/FUV COS/NUV	1	23-Nov-2020 18:00:22.0	yes

13 Total Orbits Used

ABSTRACT

Between M31 and M33 lies a debris field of HI clouds. These clouds may represent a tidal remnant from a past interaction between M31 and a satellite galaxy, a population of satellite galaxies, halo gas condensations, cooling gas along an intergalactic medium filament, or M31 stellar or weak AGN feedback. We request HST/COS UV absorption-line and coordinated GBT HI emission-line observations along 2 UV bright background QSO sightlines to conduct a detailed investigation of the chemical composition, dust depletion patterns, and kinematics of the M31-M33 clouds to constrain their origin. Using the requested observations, along with archival observations, we will further measure their ionization properties to determine the relative influence of the surrounding coronal gas and the incident radiation field has on them. Combined, this will enable us to assess where this gas came from, how much material it contains in neutral and ionized gas, and whether this stream could survive a journey to M31. This study will provide insight on how L* galaxies replenish their gas reservoirs by measuring the physical properties of material that is inflowing onto M31 in absorption- and emission-line spectroscopy out to 1/3 of a virial radius.

OBSERVING DESCRIPTION

This is a 12-orbit proposal to observe two background QSO targets that lie between M31-M33.

For all visits, we begin with an ACQ SEARCH followed by an ACQ IMAGE, which are then both followed by science observations. For all sceince observations, we use 2 FP-POS positions (positions 3 and 4) to dither the placing of the spectrum on the COS G130M grating with central wavelength set to 1291 AA.

V01 to V03 observes QSO (GALAX-J010328.6+354730, z=0.525) for a total of 10 orbits. We split these into 3 visits with V01 having 4 orbits and V01 and 2 both having 3 orbits.

V04 observes a QSO (GALAX-J010415.8+402243, z=0.193) for 2 orbits.

There are no scheduling constraints on any of the visits. All targets passed the instrument bright target checks such that they are below the COS brightness limits.

Visit

Proposal 16219, J010328 4-orbit (01), scheduled Mon Nov 23 23:00:23 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

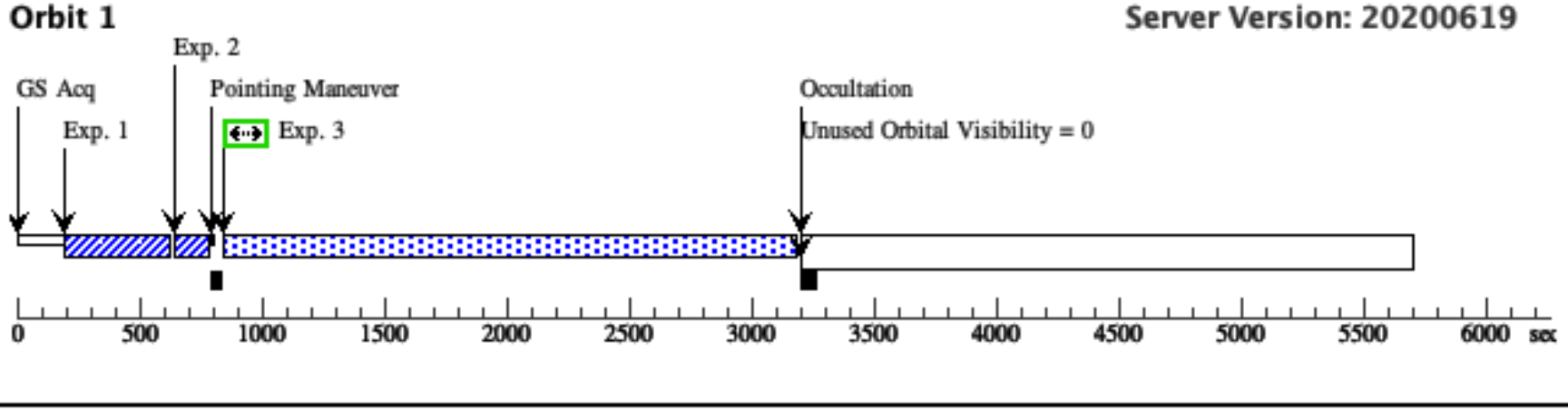
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GALEX-J010328.6+354730	RA: 01 03 28.6560 (15.8694000d) Dec: +35 47 29.87 (35.79163d) Equinox: J2000		V=18.82876 V=15.4 mag, FUV=18.83 mag, NUV=17.57 mag	Reference Frame: ICRS

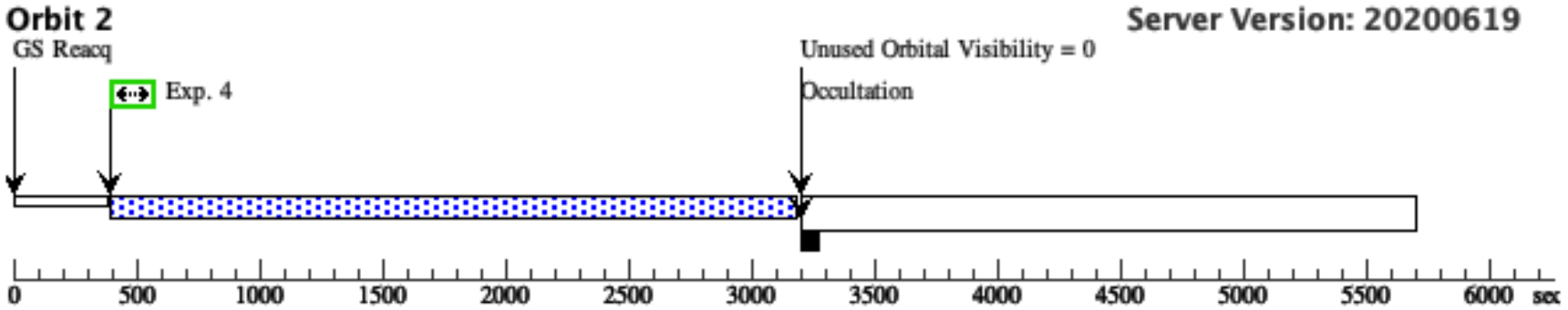
Comments: This object was generated by the target selector and retrieved from the GALEX database.
Category=ISM
Description=[ABSORPTION LINE SYSTEM - EXTRAGALACTIC, FILAMENT, HIGH VELOCITY CLOUD, IGM, TIDAL TAIL]
Extended=NO

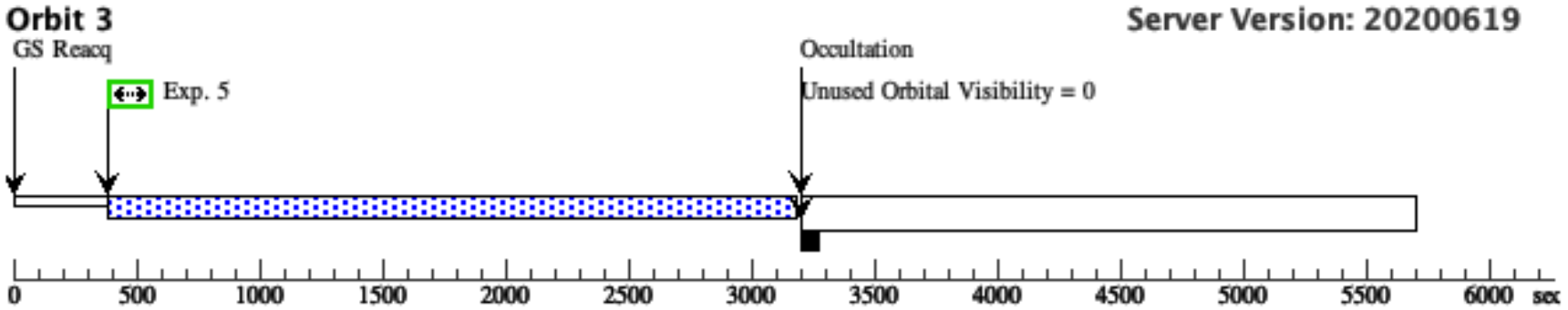
Exposures

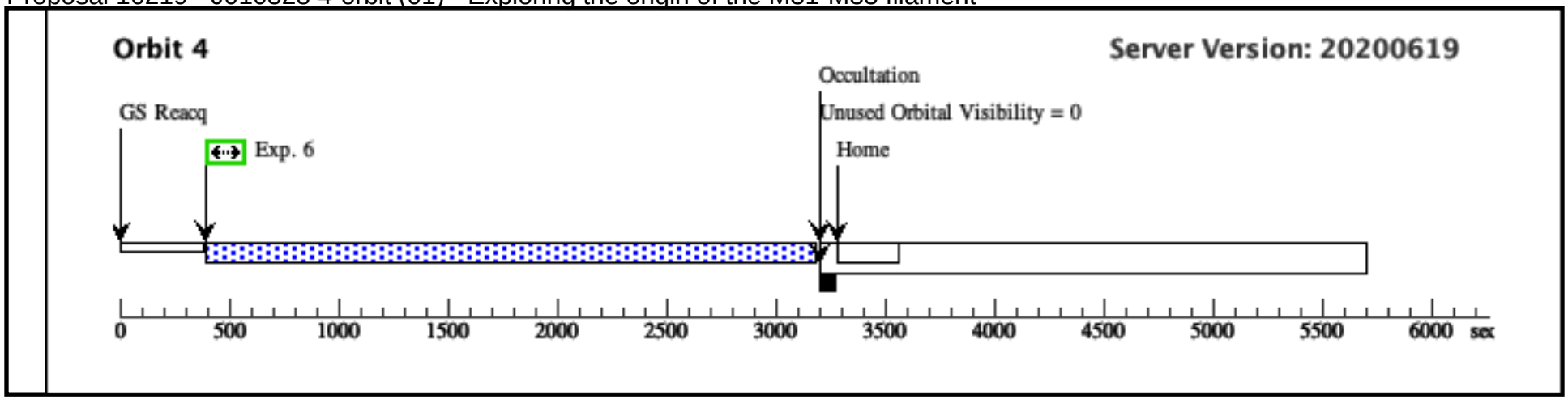
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/SEARCH (1446565)	(1) GALEX-J010328.6+354730	COS/NUV, ACQ/SEARCH, PSA	MIRRORB	SCAN-SIZE=2; STEP-SIZE=1.767; CENTER=FLUX-WT			22 Secs (22 Secs) *[==>]*	*[1]*
2	ACQ/IMAGE (1446565)	(1) GALEX-J010328.6+354730	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				22 Secs (22 Secs) *[==>]*	*[1]*
3	1st Orbit, 1st FP-POS=3 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=4867			2168 Secs (2168 Secs) *[==>]*	*[1]*
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								
4	2nd Orbit, 2nd FP-POS=3 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=4867			2744 Secs (2744 Secs) *[==>]*	*[2]*
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								
5	3rd Orbit, 1st FP-POS=4 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=4867			2744 Secs (2744 Secs) *[==>]*	*[3]*
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								
6	4th Orbit, 2nd FP-POS=4 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=4867			2744 Secs (2744 Secs) *[==>]*	*[4]*
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								

Orbit Structure





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Visit

Proposal 16219, J010328 3-orbit set 1 (02), scheduling Mon Nov 23 23:00:23 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

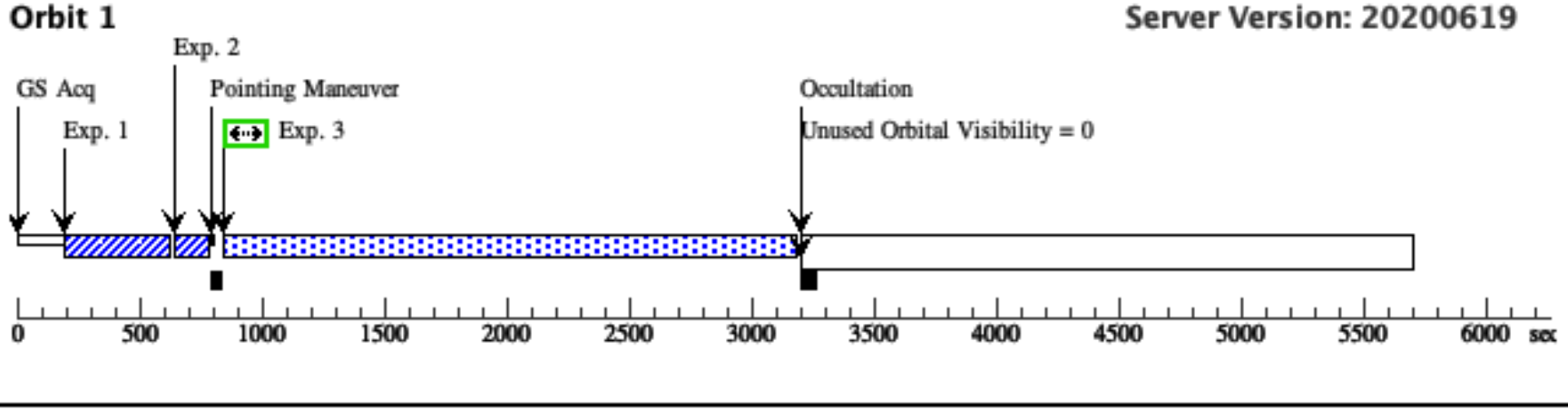
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GALEX-J010328.6+354730	RA: 01 03 28.6560 (15.8694000d) Dec: +35 47 29.87 (35.79163d) Equinox: J2000		V=18.82876 V=15.4 mag, FUV=18.83 mag, NUV=17.57 mag	Reference Frame: ICRS

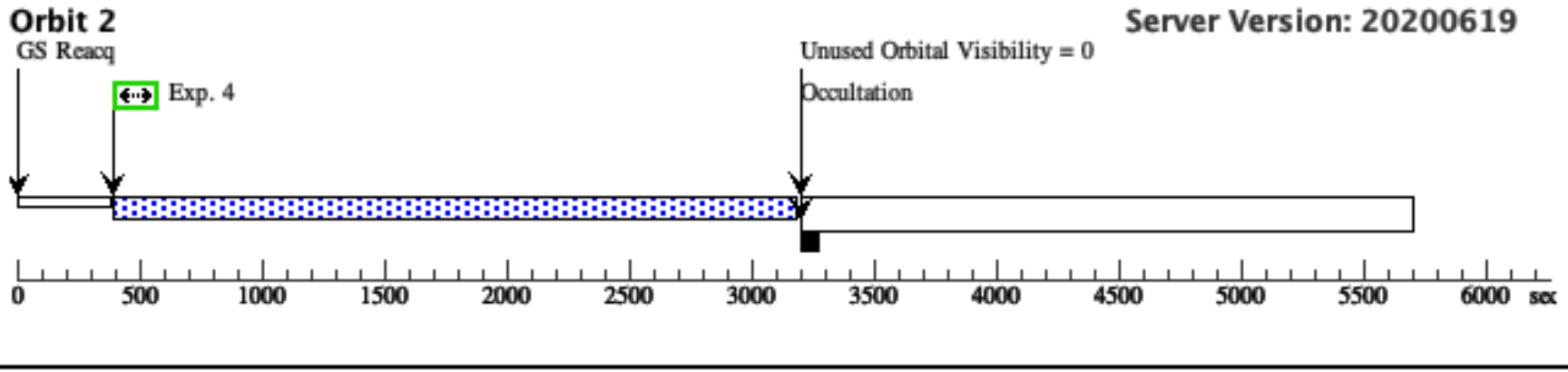
Comments: This object was generated by the target selector and retrieved from the GALEX database.
Category=ISM
Description=[ABSORPTION LINE SYSTEM - EXTRAGALACTIC, FILAMENT, HIGH VELOCITY CLOUD, IGM, TIDAL TAIL]
Extended=NO

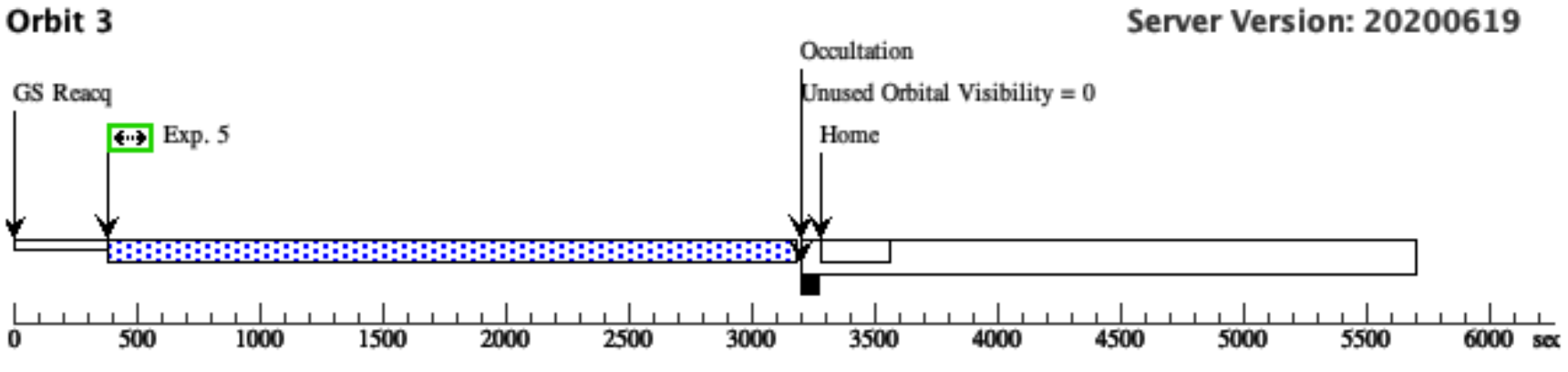
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/Search (1446565)	(1) GALEX-J010328.6+354730	COS/NUV, ACQ/SEARCH, PSA	MIRRORB	SCAN-SIZE=2; STEP-SIZE=1.767; CENTER=FLUX-WT			22 Secs (22 Secs) *[==>]*	***[1]***
2	ACQ/IIMAGE (1446565)	(1) GALEX-J010328.6+354730	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				22 Secs (22 Secs) *[==>]*	***[1]***
3	1st Orbit, 1st FP-POS=3 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=4867			2168 Secs (2168 Secs) *[==>]*	***[1]***
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								
4	2nd Orbit, 2nd FP-POS=3 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=4867			2744 Secs (2744 Secs) *[==>]*	***[2]***
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								
5	3rd Orbit, 1st FP-POS=4 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=4867			2744 Secs (2744 Secs) *[==>]*	***[3]***
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								

Orbit Structure







Visit

Proposal 16219, J010328 3-orbit set 2 (03), scheduling Mon Nov 23 23:00:23 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

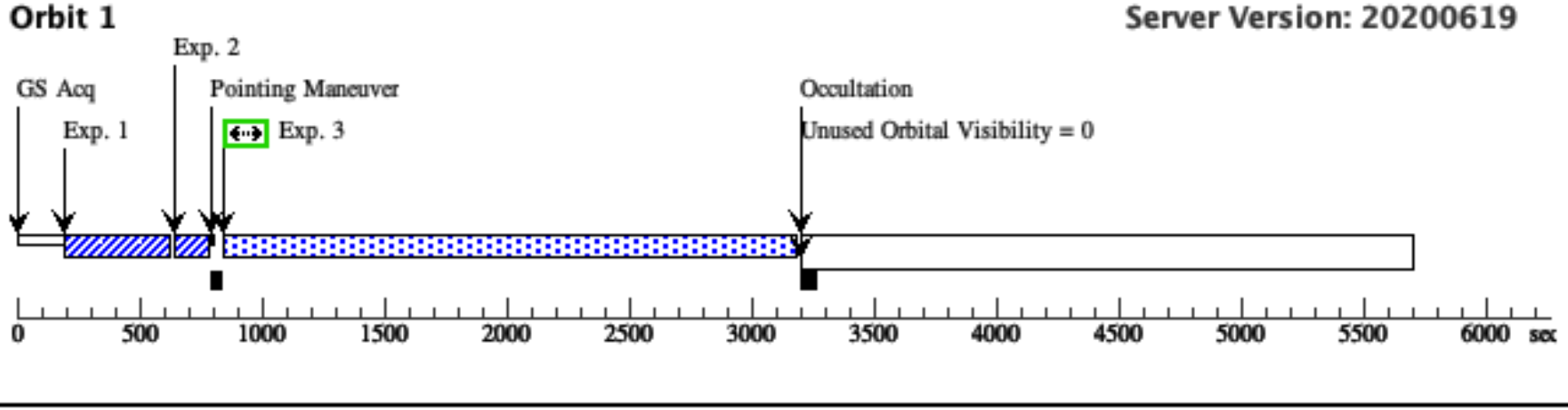
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GALEX-J010328.6+354730	RA: 01 03 28.6560 (15.8694000d) Dec: +35 47 29.87 (35.79163d) Equinox: J2000		V=18.82876 V=15.4 mag, FUV=18.83 mag, NUV=17.57 mag	Reference Frame: ICRS

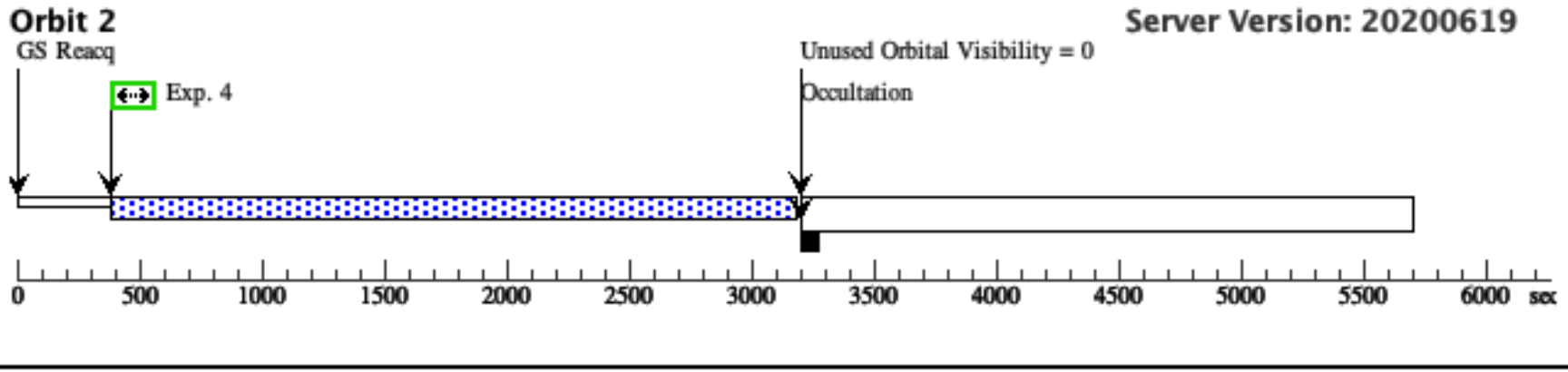
Comments: This object was generated by the target selector and retrieved from the GALEX database.
Category=ISM
Description=[ABSORPTION LINE SYSTEM - EXTRAGALACTIC, FILAMENT, HIGH VELOCITY CLOUD, IGM, TIDAL TAIL]
Extended=NO

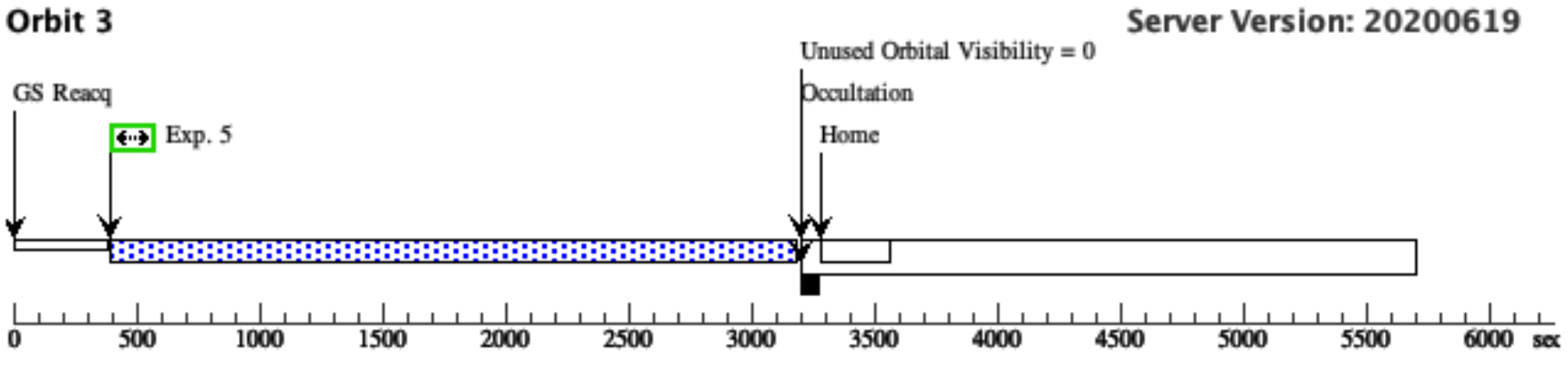
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/Search (1446565)	(1) GALEX-J010328.6+354730	COS/NUV, ACQ/SEARCH, PSA	MIRRORB	SCAN-SIZE=2; STEP-SIZE=1.767; CENTER=FLUX-WT			22 Secs (22 Secs) *[==>]*	***[1]***
2	ACQ/IIMAGE (1446565)	(1) GALEX-J010328.6+354730	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				22 Secs (22 Secs) *[==>]*	***[1]***
3	1st Orbit, 1st FP-POS=3 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=4867			2168 Secs (2168 Secs) *[==>]*	***[1]***
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								
4	2rd Orbit, 1st FP-POS=4 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=4867			2744 Secs (2744 Secs) *[==>]*	***[2]***
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								
5	3th Orbit, 2nd FP-POS=4 Exposure (1446580)	(1) GALEX-J010328.6+354730	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=4867			2744 Secs (2744 Secs) *[==>]*	***[3]***
	Comments: Total Buffer for Target J0103 from ETC: 7301 s *Message in APT states that "For APT purposes, the recommended buffer time should be 2/3 of the buffer time calculated above", which would give 4867 s*								

Orbit Structure







Visit

Proposal 16219, J010415 2-orbit (04), failed Mon Nov 23 23:00:23 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Fixed Targets

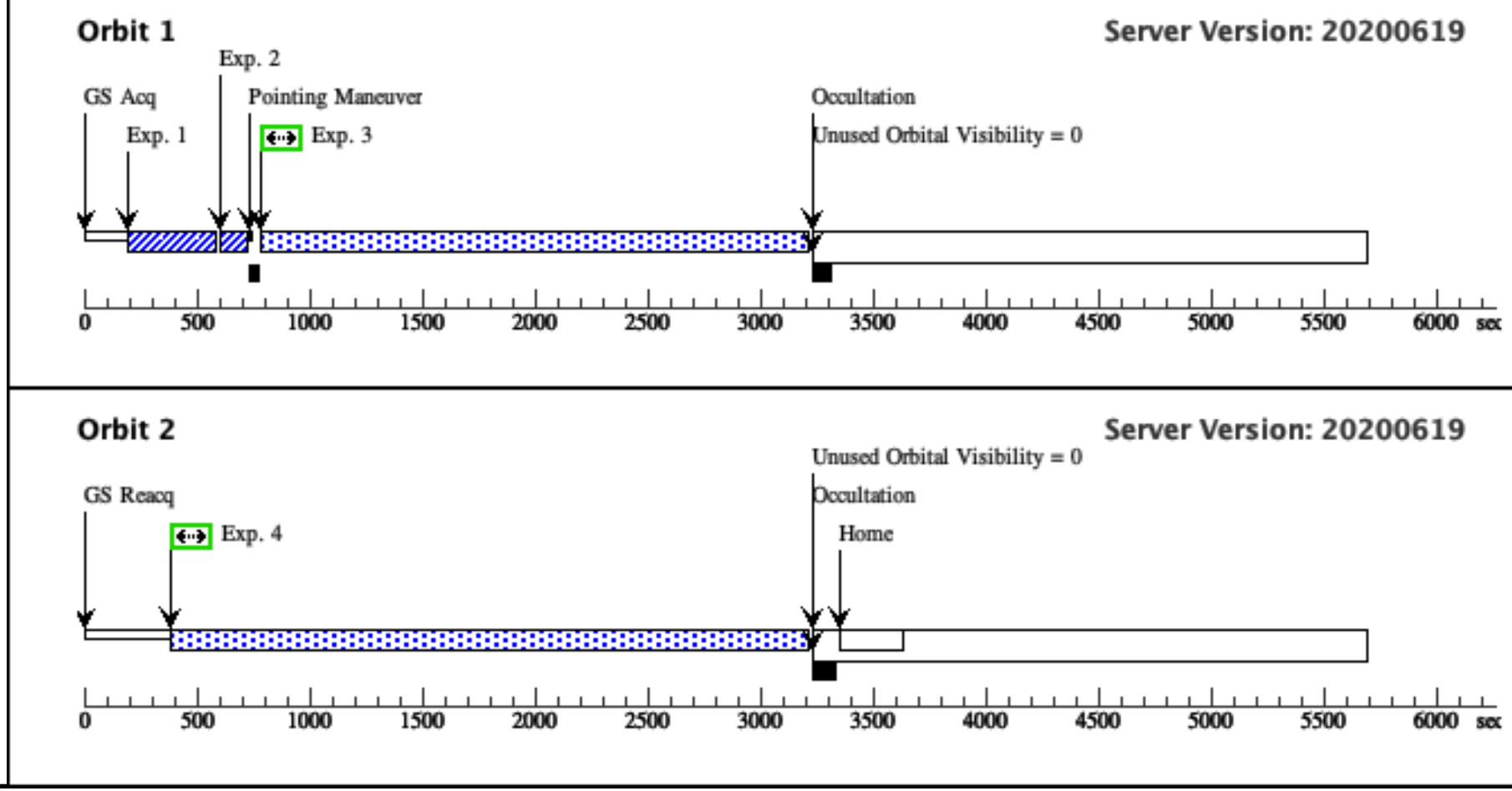
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	GALEX-J010415.8+402243	RA: 01 04 15.7810 (16.0657542d) Dec: +40 22 44.00 (40.37889d) Equinox: J2000		V=16.80416 g=15.91 mag, FUV=16.79 mag, NUV=16.38 mag	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the GALEX database.
Category=ISM
Description=[ABSORPTION LINE SYSTEM - EXTRAGALACTIC, FILAMENT, HIGH VELOCITY CLOUD, IGM, TIDAL TAIL]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/SEARCH (1446595)	(2) GALEX-J010415.8+402243	COS/NUV, ACQ/SEARCH, PSA	MIRRORB	SCAN-SIZE=2; STEP-SIZE=1.767; CENTER=FLUX-WT			12 Secs (12 Secs) *[==>]*	 ***[1]***
2	ACQ/IMAGE (1446595)	(2) GALEX-J010415.8+402243	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				12 Secs (12 Secs) *[==>]*	 ***[1]***
3	1st Orbit, 1st FP-POS=3 Exposure (1446597)	(2) GALEX-J010415.8+402243	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=2942			2266 Secs (2266 Secs) *[==>]*	 ***[1]***
Comments: ETC gives a buffer time of 4413s, 2/3 is 2942 s									
4	2nd Orbit, 1st FP-POS=4 Exposure (1446597)	(2) GALEX-J010415.8+402243	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=4; BUFFER-TIME=2942			2782 Secs (2782 Secs) *[==>]*	 ***[2]***
Comments: ETC gives a buffer time of 4413s, 2/3 is 2942 s									

Orbit Structure



Visit

Proposal 16219, J010415 2-orbit (54) Mon Nov 23 23:00:23 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)	GALEX-J010415.8+402243	RA: 01 04 15.7810 (16.0657542d) Dec: +40 22 44.00 (40.37889d) Equinox: J2000		V=16.80416 g=15.91 mag, FUV=16.79 mag, NUV=16.38 mag	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the GALEX database.
Category=ISM
Description=[ABSORPTION LINE SYSTEM - EXTRAGALACTIC, FILAMENT, HIGH VELOCITY CLOUD, IGM, TIDAL TAIL]
Extended=NO

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ACQ/SEARCH (1446595)	(2) GALEX-J010415.8+402243	COS/NUV, ACQ/SEARCH, PSA	MIRRORB	SCAN-SIZE=2; STEP-SIZE=1.767; CENTER=FLUX-WT			12 Secs (12 Secs) *[==>]*	 ***[1]***
2	ACQ/IMAGE (1446595)	(2) GALEX-J010415.8+402243	COS/NUV, ACQ/IMAGE, PSA	MIRRORB				12 Secs (12 Secs) *[==>]*	 ***[1]***
3	1st Orbit, 1st FP-POS=3 Exposure (1446597)	(2) GALEX-J010415.8+402243	COS/FUV, TIME-TAG, PSA	G130M 1291 A	FP-POS=3; BUFFER-TIME=2942			2266 Secs (2266 Secs) *[==>]*	 ***[1]***

Comments: ETC gives a buffer time of 4413s, 2/3 is 2942 s

Orbit Structure