16511 - ULLYSES NGC 3109 COS Spectroscopy

Cycle: 28, Proposal Category: GO

(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?*
1C	(1) NGC-3109-EBU-07	COS/FUV COS/NUV	2	21-Jun-2021 21:00:59.0	yes
AC	(1) NGC-3109-EBU-07	COS/FUV COS/NUV	2	21-Jun-2021 21:01:00.0	yes
2C	(2) NGC-3109-EBU-20	COS/FUV COS/NUV	2	21-Jun-2021 21:01:01.0	yes
BC	(2) NGC-3109-EBU-20	COS/FUV COS/NUV	2	21-Jun-2021 21:01:01.0	yes
3C	(2) NGC-3109-EBU-20	COS/FUV COS/NUV	2	21-Jun-2021 21:01:02.0	yes
CC	(2) NGC-3109-EBU-20	COS/FUV COS/NUV	2	21-Jun-2021 21:01:03.0	yes
4C	(3) NGC-3109-EBU-34	COS/FUV COS/NUV	3	21-Jun-2021 21:01:04.0	yes
DC	(3) NGC-3109-EBU-34	COS/FUV COS/NUV	3	21-Jun-2021 21:01:05.0	yes

18 Total Orbits Used

ABSTRACT

The Space Telescope Science Institute (STScI) Director has decided to devote up to 1000 orbits of Director's Discretionary time in observing Cycles 27-29 to a new Hubble Ultraviolet Legacy program focused on star formation and associated stellar physics. This new program, ULLYSES (UV Legacy Library of Young Stars as Essential Standards), will provide a UV spectroscopic reference sample of young (< 10 Myr) high- and low-mass stars. It will target over ~150 OB stars in the Magellanic Clouds and lower metallicity galaxies in the Local Group, and ~40 T Tauri stars and brown dwarfs in the Milky Way. In addition, ULLYSES will monitor 4 typical T Tauri stars over different rotational phases through at least three rotation periods, and over timescales of months to years. The resulting library will provide template spectra of massive stars at metallicities substantially below the well studied, while the low mass sample will cover a wide range of ages, accretion rates, and masses, including objects down to well below 0.5 M_sun. The legacy of this large UV dataset on the first 10 Myr of stellar evolution will be enhanced by complementary datasets obtained by the scientific community. In addition to the core goals of the program related to stellar astrophysics of low and high mass stars, this data will also enable exciting science in the fields of ISM, CGM, jets, and exoplanets. ULLYSES will be modeled after the Frontier Fields program: all data obtained will be non-proprietary. The implementation team at STScI is developing high-level science data products and a sophisticated database and website for disseminating data from the ULLYSES program and ancillary datasets for the ULLYSES target sample from space and ground-based facilities.

OBSERVING DESCRIPTION

This proposal includes3 massive stars in NGC3109, to be observed with G140L/800, so as to maximize the wavelength coverage of these faint targets.

For all targets, exposure times were computed to reach S/N = 15 at 1130 A.

Model spectra for each target were obtained from fitting the WFC3 F225W, F275W, F336W, F475W, and F814W SED from program 16104 with 1) the BEAST code (Gordon+2016), and 2) CMFGEN stellar models with LMC Average dust extinction. In the first case, the BEAST code output predictions for UV fluxes at 1080, 1150, 1200, 1590 and 1800A. These fluxes were within a factor of 2 of those values were obtained from fitting the WFC3 SED to CMFGEN + extinction models (with the BEAST fluxes usually lower than the CMFGEN fluxes). The exposure time was selected based on the maximum exposure time from these two ETC calculations, i.e., from the BEAST fluxes.

The actual implemented exposure times may be adjusted to efficiently use HST orbits, but should always provide at least 80% of the desired time as

defined by the above requirements.

Additional details about the scientific motivation and technical implementation strategy of the ULLYSES observations can be found at http://www.stsci.edu/stsci-research/research-topics-and-programs/ullyses. The ULLYSES program is based on the recommendations of a working group led by Sally Oey; the full text of that group's report can be found at http://www.stsci.edu/files/live/sites/www/files/home/stsci-research/research-topics-and-programs/ullyses/_documents/HSTUV-report-ULLYSES.pdf.

Visit

Proposal 16511, NGC3109-7 (1C), completed Tue Jun 22 01:01:06 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Comments: vstatus; 1C; NGC-3109-EBU-07; P/COS approved for submission ; P/JRD 19/03/21 ; intrev: complete; P/AF 12/05/21
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC-3109-EBU-7 ; COS ; JRD
vcheck; ETC numbers entered in APT?; Yes
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; Yes
vcheck; Field images checked & saved?; Yes
vcheck; Selected ACQ strategy?; Yes
vcheck; Possible ACQ or Sci spoilers?; no
vcheck; Field BOT clear?; Yes
vcheck; Visual BOT check for stars not in catalog?; Yes
vcheck; Orbit packing finalized?; Yes
vcheck; Buffer times optimized?; Yes
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated COS orbits = 2

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-3109-EBU-07	RA: 10 02 54.7200 (150.7280000d) Dec: -26 08 59.66 (-26.14991d) Equinox: J2000		V=18.69 ST mags: F225W = 16.24; F275W = 16.62; F336W = 17.23; F475W = 18.27; F814W = 20.12; SpT = B0 I; A_V = 0.2 (Evans+2007 SpT = B0-1 I)	Reference Frame: ICRS

Comments: From 2007ApJ...659.1198E (Evans+2007)
Gaia coordinates -> No need for ACQ/SEARCH

tstatus; NGC-3109-EBU-07; P/COS approved for submission; S/ins N/A; P/JRD 04/21/2021; S/NA 04/21/2021
tcheck; APT/SIMBAD target names: ; [EBU2007] 7, Gaia DR2 5467163548681557376; JRD 17/03/21
tcheck; Target info verification status?; complete ; JRD 17/03/21
tcheck; Coordinates & P.M. updated?; yes - Gaia coords - PM set to zero; JRD 17/03/21
tcheck; Adopted SED compared to Observations?; OK ; JRD 17/03/21

BEAST parameters:

star	log_g	Teff	SpT	LC	A_V	F1080	F1150	F1200	F1590	F1800
NGC-3109-7	3.3	33883	O9	I	0.41	-14.50092	-14.48306	-14.49509	-14.64450	-14.75866

Revised to: B0 I with A_V = 0.2 for better fit to photometry with our WM-Basic models. SED (sed_WM-B_NGC-3109-7.fits) is WM-Basic with those parameters normalized to F225W = 16.24. To get the systematic uncertainty range in modeling, we also produce an SED with the same parameters and normalization, but the Castelli & Kurucz 2004 model (sed_CK_NGC-3109-7.fits)
Category=EXT-STAR
Description=[SUPERGIANT O]
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/IMAGE (COS.ta.1484308)	(1) NGC-3109-EBU-07	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				3 Secs (3 Secs) *[==>]*	***[1]***

Comments: Multiplied the exposure time by two to account for uncertainties on UV flux

Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe with PSA + MIRRORA and is the brightest NUV object, any other object in the macroaperture will be safe with both PSA and MIRRORA. The red star on the bottom right falls in the PSA/MIRRORB macro-aperture but has little or no UV flux in the GALEX images, so will not be a concern (thi s oject's UV flux is lower than the target, which is safe with MIRRORA - therefore the field object is safe with MIRRORB).

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	G140L/800/FP1 (COS.sp.1514675)	(1) NGC-3109-EBU-07	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=1; BUFFER-TIME=5000			1200 Secs (1200 Secs) *[==>]*	***[1]***

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514671 - 4ks
2) CK: COS.sp.1514675 - 4.3 ks

ETC ID in the box above is the most conservative one (highest exptime)

Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe for spectroscopy with PSA and is the brightest NUV object, any other objec t in the macroaperture will be safe with both BOA spectroscopy (field stars fainter than target in the field).

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G140L/800/FP2 (COS.sp.1514675)	(1) NGC-3109-EBU-07	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=2; BUFFER-TIME=5000			1099 Secs (1099 Secs) *[==>]*	***[1]***

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514671 - 4ks
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#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G140L/800/FP3 (COS.sp.1514675)	(1) NGC-3109-EBU-07	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=3; BUFFER-TIME=5000			1300 Secs (1300 Secs) *[==>]*	***[2]***

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514671 - 4ks
2) CK: COS.sp.1514675 - 4.3 ks

ETC ID in the box above is the most conservative one (highest exptime)

Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe for spectroscopy with PSA and is the brightest NUV object, any other objec t in the macroaperture will be safe with both BOA spectroscopy (field stars fainter than target in the field).

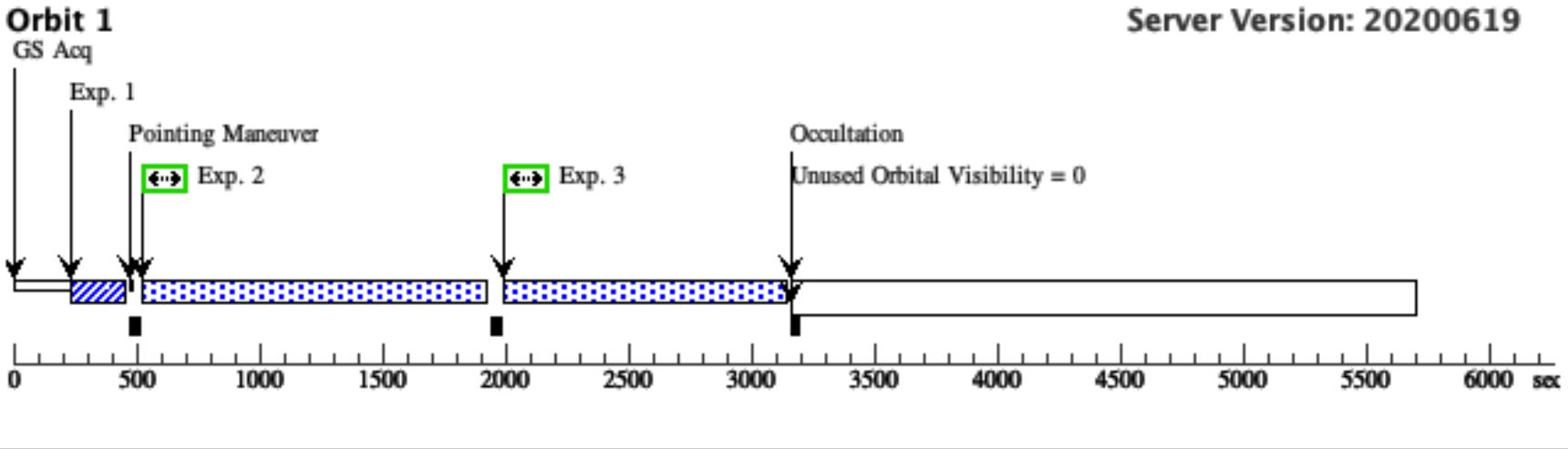
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
5	G140L/800/FP4 (COS.sp.1514675)	(1) NGC-3109-EBU-07	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=4; BUFFER-TIME=5000			1285 Secs (1285 Secs) *[==>]*	***[2]***

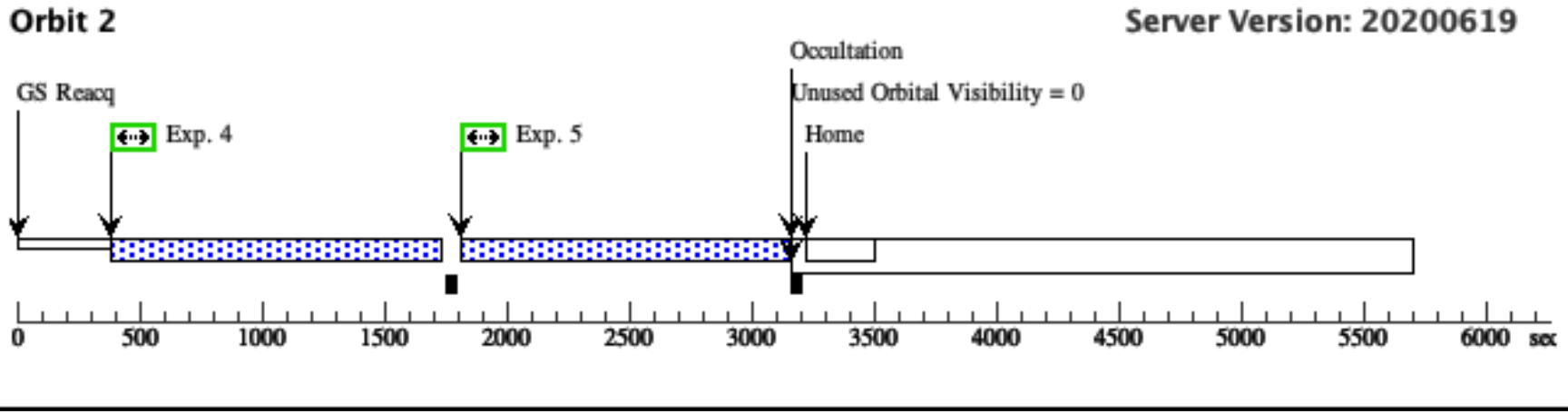
Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514671 - 4ks
2) CK: COS.sp.1514675 - 4.3 ks

ETC ID in the box above is the most conservative one (highest exptime)

Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe for spectroscopy with PSA and is the brightest NUV object, any other objec t in the macroaperture will be safe with both BOA spectroscopy (field stars fainter than target in the field).

Orbit Structure





Visit

Proposal 16511, NGC3109-7 (AC), implementation Tue Jun 22 01:01:06 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Comments: vstatus; 1C; NGC-3109-EBU-07; P/COS approved for submission ; P/JRD 19/03/21 ; intrev: complete; P/AF 12/05/21
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC-3109-EBU-7 ; COS ; JRD
vcheck; ETC numbers entered in APT?; Yes
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; Yes
vcheck; Field images checked & saved?; Yes
vcheck; Selected ACQ strategy?; Yes
vcheck; Possible ACQ or Sci spoilers?; no
vcheck; Field BOT clear?; Yes
vcheck; Visual BOT check for stars not in catalog?; Yes
vcheck; Orbit packing finalized?; Yes
vcheck; Buffer times optimized?; Yes
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated COS orbits = 2

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC-3109-EBU-07	RA: 10 02 54.7200 (150.7280000d) Dec: -26 08 59.66 (-26.14991d) Equinox: J2000		V=18.69 ST mags: F225W = 16.24; F275W = 16.62; F336W = 17.23; F475W = 18.27; F814W = 20.12; SpT = B0 I; A_V = 0.2 (Evans+2007 SpT = B0-1 I)	Reference Frame: ICRS

Comments: From 2007ApJ...659.1198E (Evans+2007)
Gaia coordinates -> No need for ACQ/SEARCH

tstatus; NGC-3109-EBU-07; P/COS approved for submission; S/ins N/A; P/JRD 04/21/2021; S/NA 04/21/2021
tcheck; APT/SIMBAD target names: ; [EBU2007] 7, Gaia DR2 5467163548681557376; JRD 17/03/21
tcheck; Target info verification status?; complete ; JRD 17/03/21
tcheck; Coordinates & P.M. updated?; yes - Gaia coords - PM set to zero; JRD 17/03/21
tcheck; Adopted SED compared to Observations?; OK ; JRD 17/03/21

BEAST parameters:

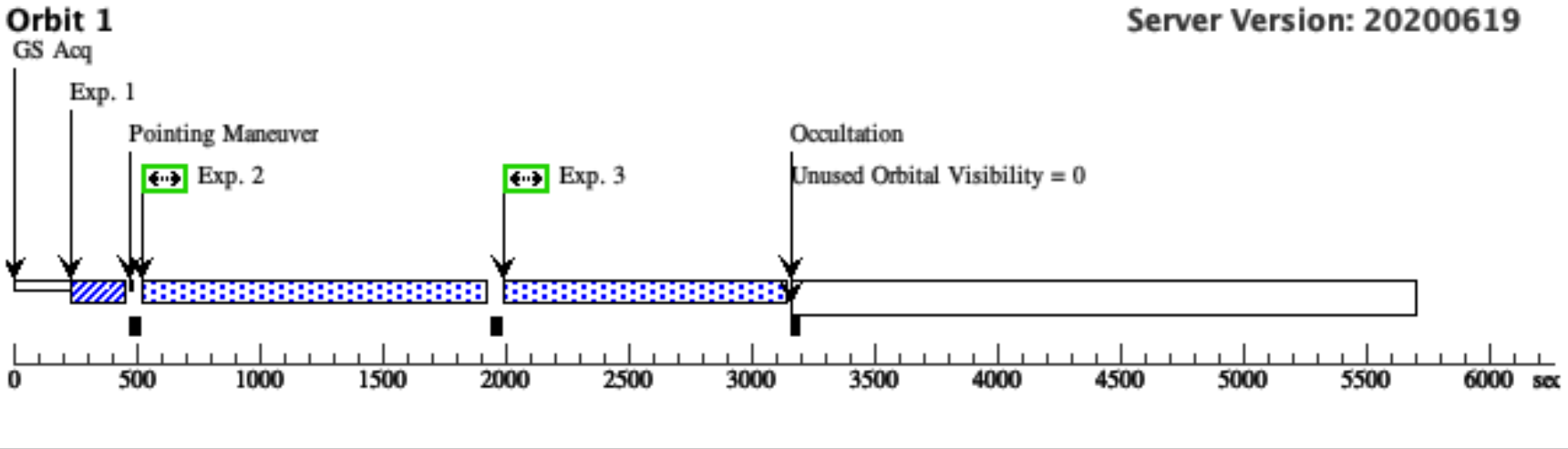
star	log_g	Teff	SpT	LC	A_V	F1080	F1150	F1200	F1590	F1800
NGC-3109-7	3.3	33883	O9	I	0.41	-14.50092	-14.48306	-14.49509	-14.64450	-14.75866

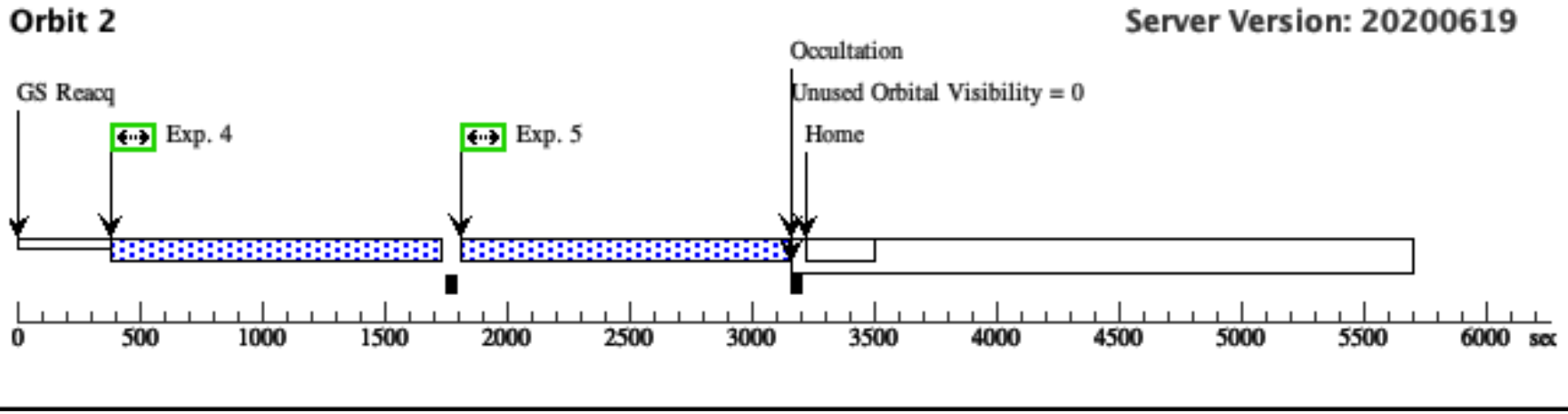
Revised to: B0 I with A_V = 0.2 for better fit to photometry with our WM-Basic models. SED (sed_WM-B_NGC-3109-7.fits) is WM-Basic with those parameters normalized to F225W = 16.24. To get the systematic uncertainty range in modeling, we also produce an SED with the same parameters and normalization, but the Castelli & Kurucz 2004 model (sed_CK_NGC-3109-7.fits)
Category=EXT-STAR
Description=[SUPERGIANT O]
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/IMAGE (COS.ta.1484308)	(1) NGC-3109-EBU-07	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				3 Secs (3 Secs) *[==>]*	***[1]***
	Comments: Multiplied the exposure time by two to account for uncertainties on UV flux *Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe with PSA + MIRRORA and is the brightest NUV object, any other object in the macroaperture will be safe with both PSA and MIRRORA. The red star on the bottom right falls in the PSA/MIRRORB macro-aperture but has little or no UV flux in the GALEX images, so will not be a concern (thi s oject's UV flux is lower than the target, which is safe with MIRRORA - therefore the field object is safe with MIRRORB).*								
2	G140L/800/FP1 (COS.sp.1514675)	(1) NGC-3109-EBU-07	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=1; BUFFER-TIME=5000			1200 Secs (1200 Secs) *[==>]*	***[1]***
	Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514671 - 4ks* *2) CK: COS.sp.1514675 - 4.3 ks* *ETC ID in the box above is the most conservative one (highest exptime)* *Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe for spectroscopy with PSA and is the brightest NUV object, any other objec t in the macroaperture will be safe with both BOA spectroscopy (field stars fainter than target in the field).*								
3	G140L/800/FP2 (COS.sp.1514675)	(1) NGC-3109-EBU-07	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=2; BUFFER-TIME=5000			1099 Secs (1099 Secs) *[==>]*	***[1]***
	Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514671 - 4ks* *2) CK: COS.sp.1514675 - 4.3 ks* *ETC ID in the box above is the most conservative one (highest exptime)* *Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe for spectroscopy with PSA and is the brightest NUV object, any other objec t in the macroaperture will be safe with both BOA spectroscopy (field stars fainter than target in the field).*								
4	G140L/800/FP3 (COS.sp.1514675)	(1) NGC-3109-EBU-07	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=3; BUFFER-TIME=5000			1300 Secs (1300 Secs) *[==>]*	***[2]***
	Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514671 - 4ks* *2) CK: COS.sp.1514675 - 4.3 ks* *ETC ID in the box above is the most conservative one (highest exptime)* *Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe for spectroscopy with PSA and is the brightest NUV object, any other objec t in the macroaperture will be safe with both BOA spectroscopy (field stars fainter than target in the field).*								
5	G140L/800/FP4 (COS.sp.1514675)	(1) NGC-3109-EBU-07	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=4; BUFFER-TIME=5000			1285 Secs (1285 Secs) *[==>]*	***[2]***
	Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514671 - 4ks* *2) CK: COS.sp.1514675 - 4.3 ks* *ETC ID in the box above is the most conservative one (highest exptime)* *Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe for spectroscopy with PSA and is the brightest NUV object, any other objec t in the macroaperture will be safe with both BOA spectroscopy (field stars fainter than target in the field).*								

Orbit Structure





Visit

Proposal 16511, NGC3109-20-1 (2C), completed Tue Jun 22 01:01:06 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Comments: vstatus; 1C; NGC-3109-EBU-20; P/COS approved for submission; P/JRD 19/03/21 ; intrev: complete; P/AF 12/05/21
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC-3109-EBU-20 ; COS ; JRD
vcheck; ETC numbers entered in APT?; Yes
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; Yes
vcheck; Field images checked & saved?; Yes
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vcheck; Buffer times optimized?; Yes
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated COS orbits = 4

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-3109-EBU-20	RA: 10 03 3.2200 (150.7634167d) Dec: -26 09 21.41 (-26.15595d) Equinox: J2000		V=19.33 ST mags: F225W = 17.03; F275W = 17.34; F336W = 17.90; F475W = 18.91; F814W = 20.69; SpT = B1 I; A_V = 0.26 (Evans+2007 SpT = O8 I)	Reference Frame: ICRS

Comments: From 2007ApJ...659.1198E (Evans+2007)

tstatus; NGC-3109-EBU-20; P/COS approved for submission; S/ins N/A; P/JRD 04/21/2021; S/NA 04/21/2021
tcheck; APT/SIMBAD target names: ; [EBU2007] 20; JRD 17/03/21
tcheck; Target info verification status?; complete ; JRD 17/03/21
tcheck; Coordinates & P.M. updated?; yes - Gaia coords - PM set to zero; JRD 17/03/21
tcheck; Adopted SED compared to Observations?; OK ; JRD 17/03/21

BEAST PARAMETERS:

star	log_g	Teff	SpT	LC	A_V	F1080	F1150	F1200	F1590	F1800
NGC-3109-20	2.57	19000	B3	I	0.23	-14.92836	-14.91036	-14.99300	-15.07217	-15.14300

Revised to O81 I with A_V = 0.4 for better fit to WFC3 photometry with WM-Basic models. SED (sed_WM-B_NGC-3109-20.fits) is WM-Basic O8 I (A_V = 0.40) normalized to F225W=17.03. Note that the BEAST was finding 2 peaks, one cool (B3 I) with low extinction, one hot (O8I) with high extinction. Given the prior on SpT from Evans+2007 (optical-IR spectroscopy, line ratios), the hot/high extinction option was preferred. To get the systematic uncertainty range in modeling, we also produce an SED with the same parameters and normalization, but the Castelli & Kurucz 2004 model (sed_CK_NGC-3109-20.fits)
Category=EXT-STAR
Description=[B0-B2 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	ACQ/SEARCH (COS.ta.1514681)	(2) NGC-3109-EBU-20	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2; STEP-SIZE=1.767			24 Secs (24 Secs) *[==>]*	*[1]*

Comments: Two UV bright stars in the field (from GALEX), illuminating the BOA
1) Bright star to NE is NGC3109 EBU 55 (B0-2, V = 20.12)
2) Star SW is #33, O9 I V = 19.57

Both are safe with BOA+MIRRORA, assuming no extinction
#55: COS.ta.1514676; brightest pixel at 0.1 1 cts/pix/s with BOA + MIRRORA
#33: COS.ta.1514677; brightest pixel at 0.15 cts/pix/s with BOA + MIRRORA

No Gaia coordinates -> ACQ/SEARCH (Evans+2007 do not give their astrometric uncertainty, but the difference between GAIA EDR3 and Evans+2007 coordinates for #7, the only star with both sets of coordinates, is 0.4", right at the limit where an ACQ/SEARCH is needed. To be on the safe side, we choose an ACQ/SEARCH

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	ACQ/IMAGE (COS.ta.1514680)	(2) NGC-3109-EBU-20	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				6 Secs (6 Secs) *[==>]*	*[1]*

Comments: Two UV bright stars in the field (from GALEX), illuminating the BOA
1) Bright star to NE is NGC3109 EBU 55 (B0-2, V = 20.12)
2) Star SW is #33, O9 I V = 19.57

Both are safe with BOA+MIRRORA, assuming no extinction
#55: COS.ta.1514676; brightest pixel at 0.1 1 cts/pix/s with BOA + MIRRORA
#33: COS.ta.1514677; brightest pixel at 0.15 cts/pix/s with BOA + MIRRORA

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G140L/800/FP1 (COS.sp.1514678)	(2) NGC-3109-EBU-20	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=1; BUFFER-TIME=5000			2107 Secs (2107 Secs) *[==>]*	*[1]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514678 - 7.4ks
2) CK: COS.sp.1514679 - 7.2ks

ETC ID in the box above is the most conservative one (highest exptime).

Since 1) 7.4 ks just barely fits in 3 orbits, 2) we are only observing 3 massive stars, and 3) there is still some uncertainty on the FUV flux level, we padded the exptime with an extra orbit (9.5ks) to ensure we get the S/N we need (15 at 1130A). Thus, the observations of this target were split in 2 visits of 2 orbits each.

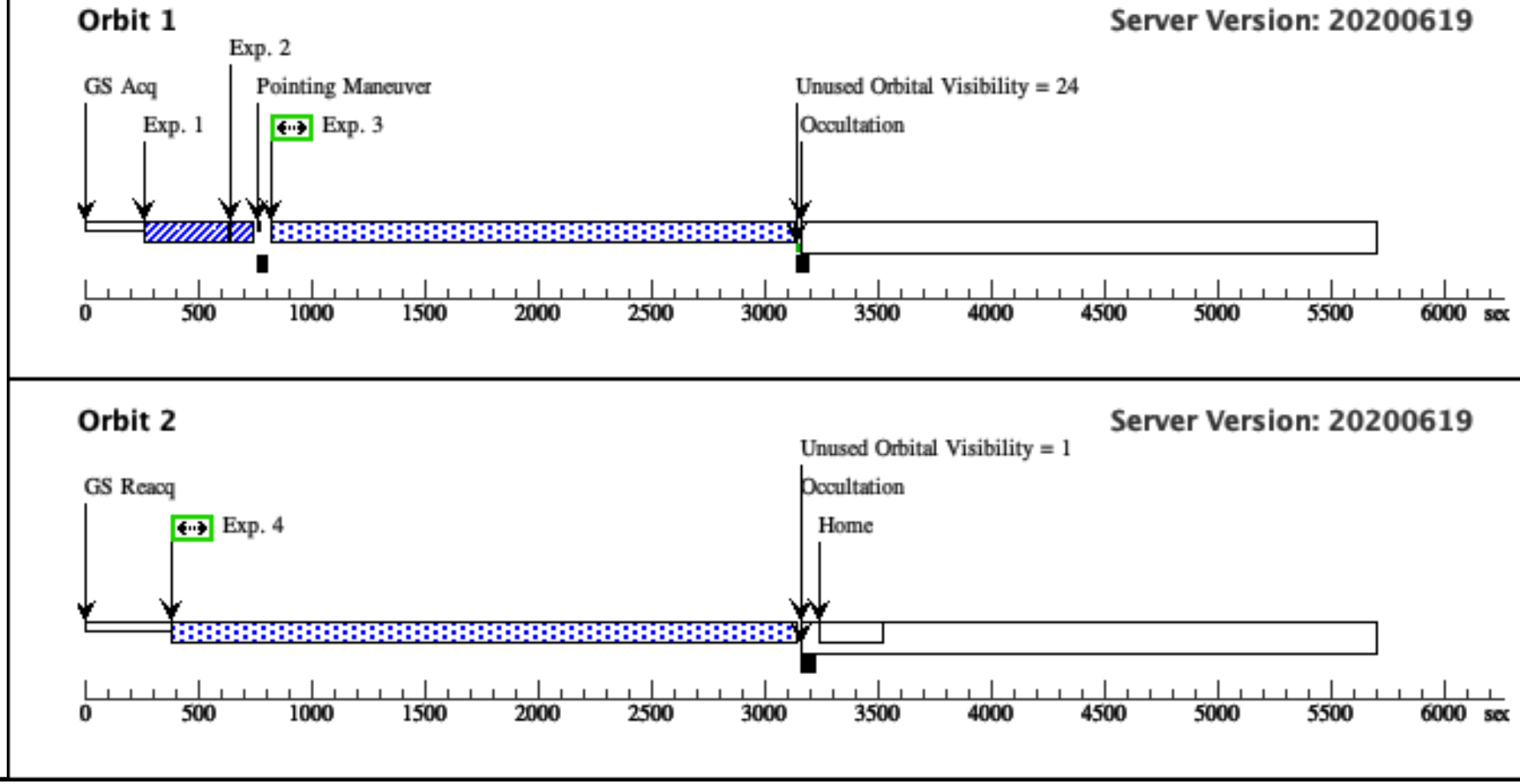
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G140L/800/FP2 (COS.sp.1514678)	(2) NGC-3109-EBU-20	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=2; BUFFER-TIME=5000			2708 Secs (2708 Secs) *[==>]*	*[2]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514678 - 7.4ks
2) CK: COS.sp.1514679 - 7.2ks

ETC ID in the box above is the most conservative one (highest exptime)

Since 1) 7.4 ks just barely fits in 3 orbits, 2) we are only observing 3 massive stars, and 3) there is still some uncertainty on the FUV flux level, we padded the exptime with an extra orbit (9.5ks) to ensure we get the S/N we need (15 at 1130A). Thus, the observations of this target were split in 2 visits of 2 orbits each.

Orbit Structure



Visit

Proposal 16511, NGC3109-20-1 (BC), implementation Tue Jun 22 01:01:06 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Comments: vstatus; 1C; NGC-3109-EBU-20; P/COS approved for submission; P/JRD 19/03/21 ; intrev: complete; P/AF 12/05/21
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC-3109-EBU-20 ; COS ; JRD
vcheck; ETC numbers entered in APT?; Yes
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; Yes
vcheck; Field images checked & saved?; Yes
vcheck; Selected ACQ strategy?; Yes
vcheck; Possible ACQ or Sci spoilers?; Yes
vcheck; Field BOT clear?; Yes
vcheck; Visual BOT check for stars not in catalog?; Yes
vcheck; Orbit packing finalized?; Yes
vcheck; Buffer times optimized?; Yes
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated COS orbits = 4

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-3109-EBU-20	RA: 10 03 3.2200 (150.7634167d) Dec: -26 09 21.41 (-26.15595d) Equinox: J2000		V=19.33 ST mags: F225W = 17.03; F275W = 17.34; F336W = 17.90; F475W = 18.91; F814W = 20.69; SpT = B1 I; A_V = 0.26 (Evans+2007 SpT = O8 I)	Reference Frame: ICRS

Comments: From 2007ApJ...659.1198E (Evans+2007)

tstatus; NGC-3109-EBU-20; P/COS approved for submission; S/ins N/A; P/JRD 04/21/2021; S/NA 04/21/2021
tcheck; APT/SIMBAD target names: ; [EBU2007] 20; JRD 17/03/21
tcheck; Target info verification status?; complete ; JRD 17/03/21
tcheck; Coordinates & P.M. updated?; yes - Gaia coords - PM set to zero; JRD 17/03/21
tcheck; Adopted SED compared to Observations?; OK ; JRD 17/03/21

BEAST PARAMETERS:

star	log_g	Teff	SpT	LC	A_V	F1080	F1150	F1200	F1590	F1800
NGC-3109-20	2.57	19000	B3	I	0.23	-14.92836	-14.91036	-14.99300	-15.07217	-15.14300

Revised to O81 I with A_V = 0.4 for better fit to WFC3 photometry with WM-Basic models. SED (sed_WM-B_NGC-3109-20.fits) is WM-Basic O8 I (A_V = 0.40) normalized to F225W=17.03. Note that the BEAST was finding 2 peaks, one cool (B3 I) with low extinction, one hot (O8I) with high extinction. Given the prior on SpT from Evans+2007 (optical-IR spectroscopy, line ratios), the hot/high extinction option was preferred. To get the systematic uncertainty range in modeling, we also produce an SED with the same parameters and normalization, but the Castelli & Kurucz 2004 model (sed_CK_NGC-3109-20.fits)
Category=EXT-STAR
Description=[B0-B2 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	ACQ/SEARCH (COS.ta.1514681)	(2) NGC-3109-EBU-20	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2; STEP-SIZE=1.767			24 Secs (24 Secs) *[==>]*	*[1]*

Comments: Two UV bright stars in the field (from GALEX), illuminating the BOA
1) Bright star to NE is NGC3109 EBU 55 (B0-2, V = 20.12)
2) Star SW is #33, O9 I V = 19.57

Both are safe with BOA+MIRRORA, assuming no extinction
#55: COS.ta.1514676; brightest pixel at 0.1 1 cts/pix/s with BOA + MIRRORA
#33: COS.ta.1514677; brightest pixel at 0.15 cts/pix/s with BOA + MIRRORA

No Gaia coordinates -> ACQ/SEARCH (Evans+2007 do not give their astrometric uncertainty, but the difference between GAIA EDR3 and Evans+2007 coordinates for #7, the only star with both sets of coordinates, is 0.4", right at the limit where an ACQ/SEARCH is needed. To be on the safe side, we choose an ACQ/SEARCH

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	ACQ/IMAGE (COS.ta.1514680)	(2) NGC-3109-EBU-20	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				6 Secs (6 Secs) *[==>]*	*[1]*

Comments: Two UV bright stars in the field (from GALEX), illuminating the BOA
1) Bright star to NE is NGC3109 EBU 55 (B0-2, V = 20.12)
2) Star SW is #33, O9 I V = 19.57

Both are safe with BOA+MIRRORA, assuming no extinction
#55: COS.ta.1514676; brightest pixel at 0.1 1 cts/pix/s with BOA + MIRRORA
#33: COS.ta.1514677; brightest pixel at 0.15 cts/pix/s with BOA + MIRRORA

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G140L/800/FP1 (COS.sp.1514678)	(2) NGC-3109-EBU-20	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=1; BUFFER-TIME=5000			2107 Secs (2107 Secs) *[==>]*	*[1]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514678 - 7.4ks
2) CK: COS.sp.1514679 - 7.2ks

ETC ID in the box above is the most conservative one (highest exptime).

Since 1) 7.4 ks just barely fits in 3 orbits, 2) we are only observing 3 massive stars, and 3) there is still some uncertainty on the FUV flux level, we padded the exptime with an extra orbit (9.5ks) to ensure we get the S/N we need (15 at 1130A). Thus, the observations of this target were split in 2 visits of 2 orbits each.

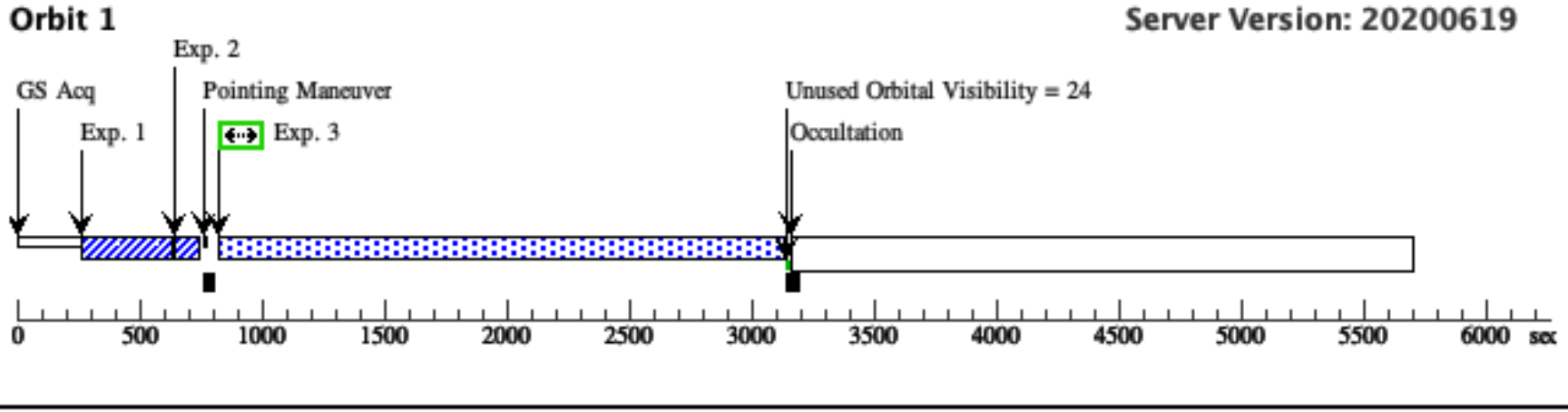
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G140L/800/FP2 (COS.sp.1514678)	(2) NGC-3109-EBU-20	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=2; BUFFER-TIME=5000			2708 Secs (2708 Secs) *[==>]*	*[2]*

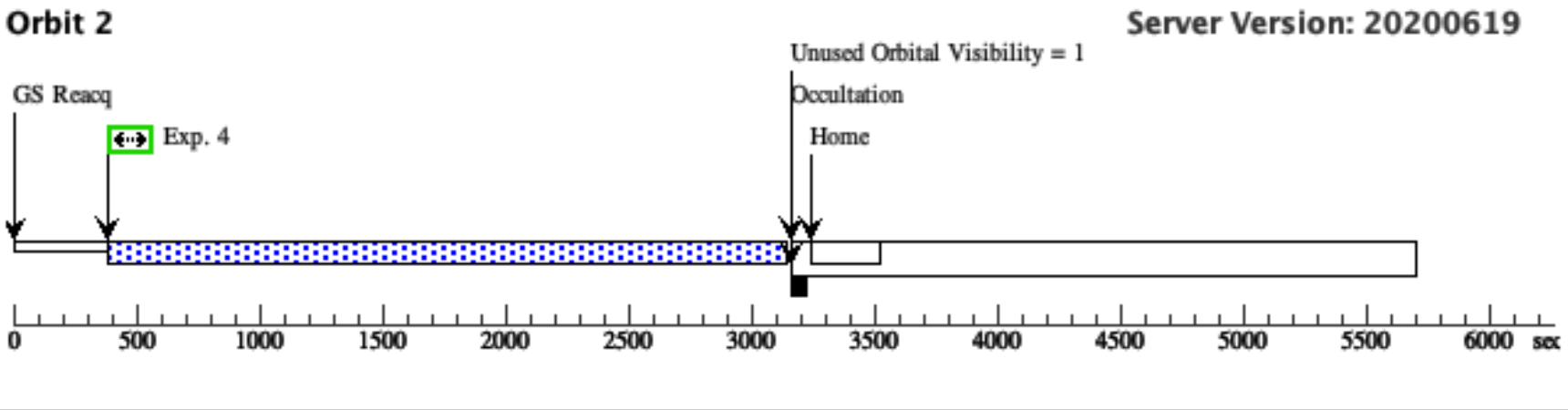
Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514678 - 7.4ks
2) CK: COS.sp.1514679 - 7.2ks

ETC ID in the box above is the most conservative one (highest exptime)

Since 1) 7.4 ks just barely fits in 3 orbits, 2) we are only observing 3 massive stars, and 3) there is still some uncertainty on the FUV flux level, we padded the exptime with an extra orbit (9.5ks) to ensure we get the S/N we need (15 at 1130A). Thus, the observations of this target were split in 2 visits of 2 orbits each.

Orbit Structure





Visit

Proposal 16511, NGC3109-20-2 (3C), completed Tue Jun 22 01:01:06 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Comments: vstatus; 1C; NGC-3109-EBU-20; P/COS approved for submission ; P/JRD 19/03/21 ; intrev: complete; P/AF 12/05/21
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC-3109-EBU-20 ; COS ; JRD
vcheck; ETC numbers entered in APT?; Yes
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; Yes
vcheck; Field images checked & saved?; Yes
vcheck; Selected ACQ strategy?; Yes
vcheck; Possible ACQ or Sci spoilers?; Yes
vcheck; Field BOT clear?; Yes
vcheck; Visual BOT check for stars not in catalog?; Yes
vcheck; Orbit packing finalized?; Yes
vcheck; Buffer times optimized?; Yes
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated COS orbits = 4

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-3109-EBU-20	RA: 10 03 3.2200 (150.7634167d) Dec: -26 09 21.41 (-26.15595d) Equinox: J2000		V=19.33 ST mags: F225W = 17.03; F275W = 17.34; F336W = 17.90; F475W = 18.91; F814W = 20.69; SpT = B1 I; A_V = 0.26 (Evans+2007 SpT = O8 I)	Reference Frame: ICRS

Comments: From 2007ApJ...659.1198E (Evans+2007)

tstatus; NGC-3109-EBU-20; P/COS approved for submission; S/ins N/A; P/JRD 04/21/2021; S/NA 04/21/2021
tcheck; APT/SIMBAD target names: ; [EBU2007] 20; JRD 17/03/21
tcheck; Target info verification status?; complete ; JRD 17/03/21
tcheck; Coordinates & P.M. updated?; yes - Gaia coords - PM set to zero; JRD 17/03/21
tcheck; Adopted SED compared to Observations?; OK ; JRD 17/03/21

BEAST PARAMETERS:

star	log_g	Teff	SpT	LC	A_V	F1080	F1150	F1200	F1590	F1800
NGC-3109-20	2.57	19000	B3	I	0.23	-14.92836	-14.91036	-14.99300	-15.07217	-15.14300

Revised to O81 I with A_V = 0.4 for better fit to WFC3 photometry with WM-Basic models. SED (sed_WM-B_NGC-3109-20.fits) is WM-Basic O8 I (A_V = 0.40) normalized to F225W=17.03. Note that the BEAST was finding 2 peaks, one cool (B3 I) with low extinction, one hot (O8I) with high extinction. Given the prior on SpT from Evans+2007 (optical-IR spectroscopy, line ratios), the hot/high extinction option was preferred. To get the systematic uncertainty range in modeling, we also produce an SED with the same parameters and normalization, but the Castelli & Kurucz 2004 model (sed_CK_NGC-3109-20.fits)
Category=EXT-STAR
Description=[B0-B2 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	ACQ/SEARCH (COS.ta.1514681)	(2) NGC-3109-EBU-20	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2; STEP-SIZE=1.767			24 Secs (24 Secs) *[==>]*	*[1]*

Comments: Two UV bright stars in the field (from GALEX), illuminating the BOA
1) Bright star to NE is NGC3109 EBU 55 (B0-2, V = 20.12)
2) Star SW is #33, O9 I V = 19.57

Both are safe with BOA+MIRRORA, assuming no extinction
#55: COS.ta.1514676; brightest pixel at 0.1 1 cts/pix/s with BOA + MIRRORA
#33: COS.ta.1514677; brightest pixel at 0.15 cts/pix/s with BOA + MIRRORA

No Gaia coordinates -> ACQ/SEARCH (Evans+2007 do not give their astrometric uncertainty, but the difference between GAIA EDR3 and Evans+2007 coordinates for #7, the only star with both sets of coordinates, is 0.4", right at the limit where an ACQ/SEARCH is needed. To be on the safe side, we choose an ACQ/SEARCH

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	ACQ/IMAGE (COS.ta.1514680)	(2) NGC-3109-EBU-20	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				6 Secs (6 Secs) *[==>]*	*[1]*

Comments: Two UV bright stars in the field (from GALEX), illuminating the BOA
1) Bright star to NE is NGC3109 EBU 55 (B0-2, V = 20.12)
2) Star SW is #33, O9 I V = 19.57

Both are safe with BOA+MIRRORA, assuming no extinction
#55: COS.ta.1514676; brightest pixel at 0.1 1 cts/pix/s with BOA + MIRRORA
#33: COS.ta.1514677; brightest pixel at 0.15 cts/pix/s with BOA + MIRRORA

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G140L/800/FP3 (COS.sp.1514678)	(2) NGC-3109-EBU-20	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=3; BUFFER-TIME=5000			2107 Secs (2107 Secs) *[==>]*	*[1]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514678 - 7.4ks
2) CK: COS.sp.1514679 - 7.2ks

ETC ID in the box above is the most conservative one (highest exptime)

Since 1) 7.4 ks just barely fits in 3 orbits, 2) we are only observing 3 massive stars, and 3) there is still some uncertainty on the FUV flux level, we padded the exptime with an extra orbit (9.5ks) to ensure we get the S/N we need (15 at 1130A). Thus, the observations of this target were split in 2 visits of 2 orbits each.

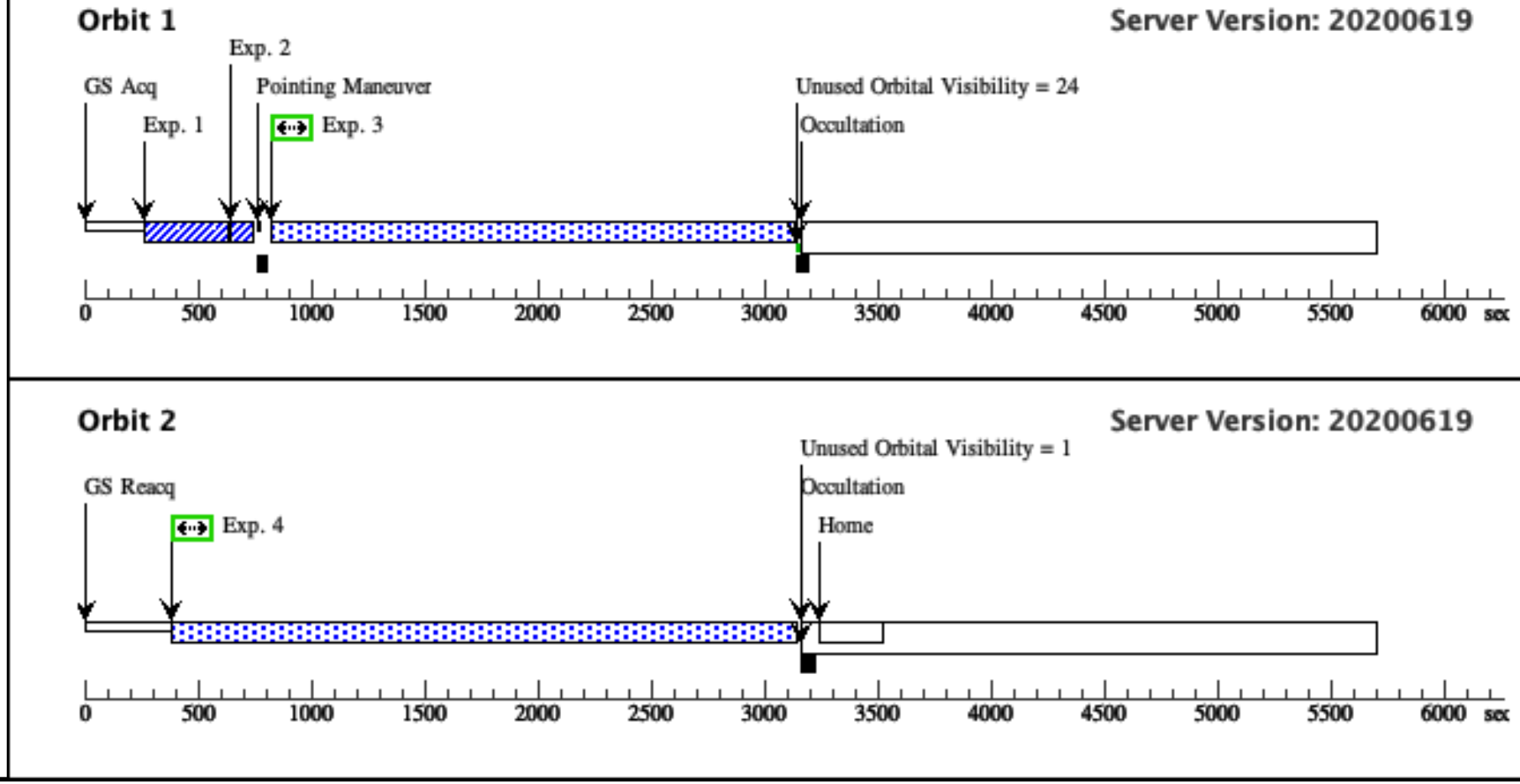
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G140L/800/FP4 (COS.sp.1514678)	(2) NGC-3109-EBU-20	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=4; BUFFER-TIME=5000			2708 Secs (2708 Secs) *[==>]*	*[2]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514678 - 7.4ks
2) CK: COS.sp.1514679 - 7.2ks

ETC ID in the box above is the most conservative one (highest exptime)

Since 1) 7.4 ks just barely fits in 3 orbits, 2) we are only observing 3 massive stars, and 3) there is still some uncertainty on the FUV flux level, we padded the exptime with an extra orbit (9.5ks) to ensure we get the S/N we need (15 at 1130A). Thus, the observations of this target were split in 2 visits of 2 orbits each.

Orbit Structure



Visit

Proposal 16511, NGC3109-20-2 (CC) Tue Jun 22 01:01:06 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Comments: vstatus; 1C; NGC-3109-EBU-20; P/COS approved for submission ; P/JRD 19/03/21 ; intrev: complete; P/AF 12/05/21
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC-3109-EBU-20 ; COS ; JRD
vcheck; ETC numbers entered in APT?; Yes
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; Yes
vcheck; Field images checked & saved?; Yes
vcheck; Selected ACQ strategy?; Yes
vcheck; Possible ACQ or Sci spoilers?; Yes
vcheck; Field BOT clear?; Yes
vcheck; Visual BOT check for stars not in catalog?; Yes
vcheck; Orbit packing finalized?; Yes
vcheck; Buffer times optimized?; Yes
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated COS orbits = 4

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-3109-EBU-20	RA: 10 03 3.2200 (150.7634167d) Dec: -26 09 21.41 (-26.15595d) Equinox: J2000		V=19.33 ST mags: F225W = 17.03; F275W = 17.34; F336W = 17.90; F475W = 18.91; F814W = 20.69; SpT = B1 I; A_V = 0.26 (Evans+2007 SpT = O8 I)	Reference Frame: ICRS

Comments: From 2007ApJ...659.1198E (Evans+2007)

tstatus; NGC-3109-EBU-20; P/COS approved for submission; S/ins N/A; P/JRD 04/21/2021; S/NA 04/21/2021
tcheck; APT/SIMBAD target names: ; [EBU2007] 20; JRD 17/03/21
tcheck; Target info verification status?; complete ; JRD 17/03/21
tcheck; Coordinates & P.M. updated?; yes - Gaia coords - PM set to zero; JRD 17/03/21
tcheck; Adopted SED compared to Observations?; OK ; JRD 17/03/21

BEAST PARAMETERS:

star	log_g	Teff	SpT	LC	A_V	F1080	F1150	F1200	F1590	F1800
NGC-3109-20	2.57	19000	B3	I	0.23	-14.92836	-14.91036	-14.99300	-15.07217	-15.14300

Revised to O81 I with A_V = 0.4 for better fit to WFC3 photometry with WM-Basic models. SED (sed_WM-B_NGC-3109-20.fits) is WM-Basic O8 I (A_V = 0.40) normalized to F225W=17.03. Note that the BEAST was finding 2 peaks, one cool (B3 I) with low extinction, one hot (O8I) with high extinction. Given the prior on SpT from Evans+2007 (optical-IR spectroscopy, line ratios), the hot/high extinction option was preferred. To get the systematic uncertainty range in modeling, we also produce an SED with the same parameters and normalization, but the Castelli & Kurucz 2004 model (sed_CK_NGC-3109-20.fits)
Category=EXT-STAR
Description=[B0-B2 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	ACQ/SEARCH (COS.ta.1514681)	(2) NGC-3109-EBU-20	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2; STEP-SIZE=1.767			24 Secs (24 Secs) *[==>]*	*[1]*

Comments: Two UV bright stars in the field (from GALEX), illuminating the BOA
1) Bright star to NE is NGC3109 EBU 55 (B0-2, V = 20.12)
2) Star SW is #33, O9 I V = 19.57

Both are safe with BOA+MIRRORA, assuming no extinction
#55: COS.ta.1514676; brightest pixel at 0.1 1 cts/pix/s with BOA + MIRRORA
#33: COS.ta.1514677; brightest pixel at 0.15 cts/pix/s with BOA + MIRRORA

No Gaia coordinates -> ACQ/SEARCH (Evans+2007 do not give their astrometric uncertainty, but the difference between GAIA EDR3 and Evans+2007 coordinates for #7, the only star with both sets of coordinates, is 0.4", right at the limit where an ACQ/SEARCH is needed. To be on the safe side, we choose an ACQ/SEARCH

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	ACQ/IMAGE (COS.ta.1514680)	(2) NGC-3109-EBU-20	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				6 Secs (6 Secs) *[==>]*	*[1]*

Comments: Two UV bright stars in the field (from GALEX), illuminating the BOA
1) Bright star to NE is NGC3109 EBU 55 (B0-2, V = 20.12)
2) Star SW is #33, O9 I V = 19.57

Both are safe with BOA+MIRRORA, assuming no extinction
#55: COS.ta.1514676; brightest pixel at 0.1 1 cts/pix/s with BOA + MIRRORA
#33: COS.ta.1514677; brightest pixel at 0.15 cts/pix/s with BOA + MIRRORA

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G140L/800/FP3 (COS.sp.1514678)	(2) NGC-3109-EBU-20	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=3; BUFFER-TIME=5000			2107 Secs (2107 Secs) *[==>]*	*[1]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514678 - 7.4ks
2) CK: COS.sp.1514679 - 7.2ks

ETC ID in the box above is the most conservative one (highest exptime)

Since 1) 7.4 ks just barely fits in 3 orbits, 2) we are only observing 3 massive stars, and 3) there is still some uncertainty on the FUV flux level, we padded the exptime with an extra orbit (9.5ks) to ensure we get the S/N we need (15 at 1130A). Thus, the observations of this target were split in 2 visits of 2 orbits each.

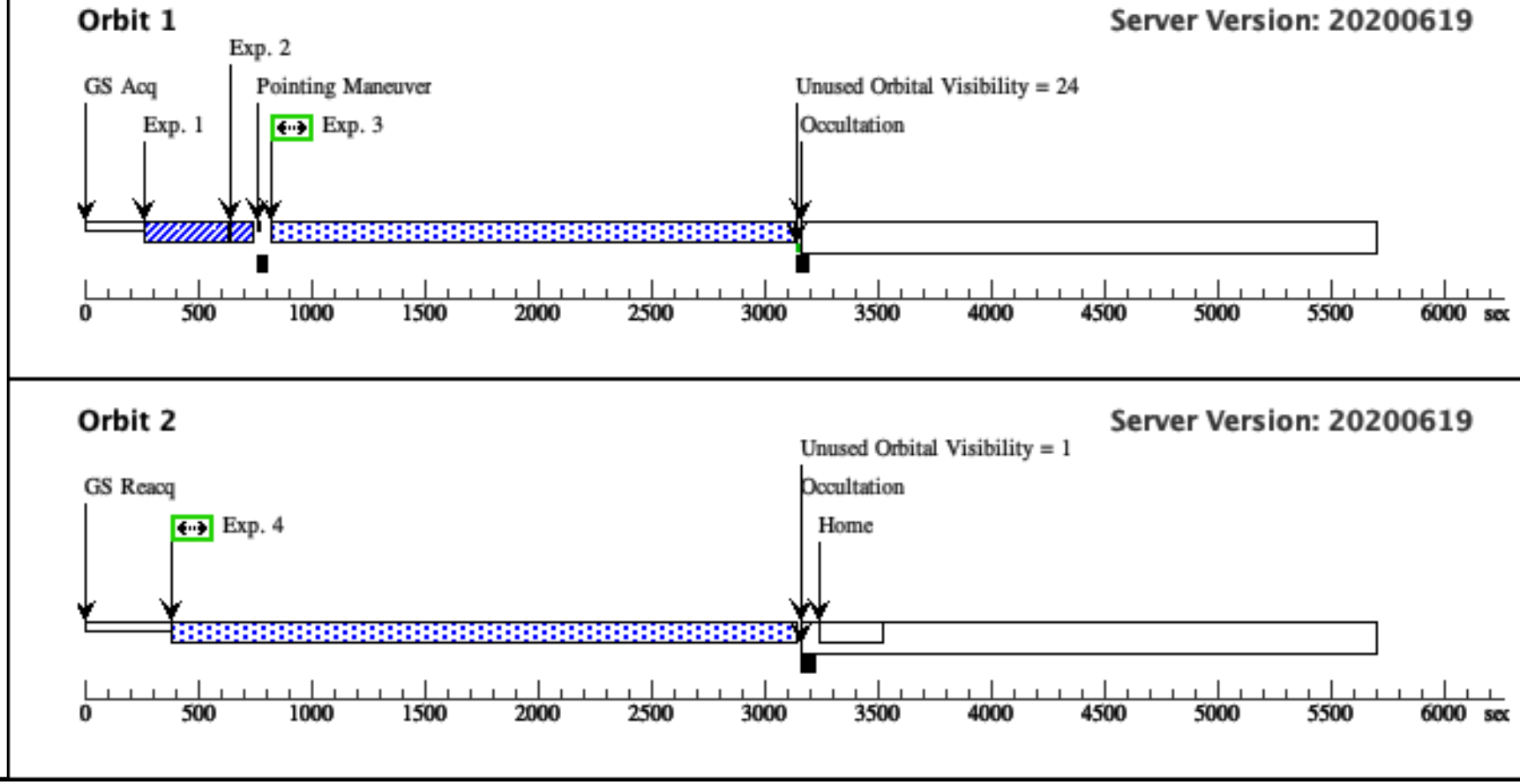
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G140L/800/FP4 (COS.sp.1514678)	(2) NGC-3109-EBU-20	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=4; BUFFER-TIME=5000			2708 Secs (2708 Secs) *[==>]*	*[2]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514678 - 7.4ks
2) CK: COS.sp.1514679 - 7.2ks

ETC ID in the box above is the most conservative one (highest exptime)

Since 1) 7.4 ks just barely fits in 3 orbits, 2) we are only observing 3 massive stars, and 3) there is still some uncertainty on the FUV flux level, we padded the exptime with an extra orbit (9.5ks) to ensure we get the S/N we need (15 at 1130A). Thus, the observations of this target were split in 2 visits of 2 orbits each.

Orbit Structure



Visit

Proposal 16511, NGC3109-34-1 (4C), completed Tue Jun 22 01:01:06 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Comments: vstatus; 1C; NGC-3109-EBU-34; P/COS approved for submission; P/JRD 19/03/21 ; intrev: complete ; P/AF 12/05/21
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC-3109-EBU-34 ; COS ; JRD
vcheck; ETC numbers entered in APT?; Yes
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; Yes
vcheck; Field images checked & saved?; Yes
vcheck; Selected ACQ strategy?; Yes
vcheck; Possible ACQ or Sci spoilers?;Yes
vcheck; Field BOT clear?; Yes
vcheck; Visual BOT check for stars not in catalog?; Yes
vcheck; Orbit packing finalized?; Yes
vcheck; Buffer times optimized?; Yes
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated COS orbits = 3

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	NGC-3109-EBU-34	RA: 10 03 14.2400 (150.8093333d) Dec: -26 09 16.96 (-26.15471d) Equinox: J2000		V=19.61 ST mags: F225W = 16.99; F275W = 17.39; F336W = 18.02; F475W = 19.16; F814W = 21.07; SpT = O8 I; A_V = 0.2 (Evans+2007 SpT = O8 I)	Reference Frame: ICRS

Comments: From 2007ApJ...659.1198E (Evans+2007)

tstatus; NGC-3109-EBU-34; P/COS approved for submission; S/ins N/A; P/JRD 04/21/2021; S/NA 04/21/2021
tcheck; APT/SIMBAD target names: ; [EBU2007] 34; JRD 17/03/21
tcheck; Target info verification status?; complete ; JRD 17/03/21
tcheck; Coordinates & P.M. updated?; yes - Gaia coords - PM set to zero; JRD 17/03/21
tcheck; Adopted SED compared to Observations?; OK ; JRD 17/03/21

BEAST PARAMETERS:

star	log_g	Teff	SpT	LC	A_V	F1080	F1150	F1200	F1590	F1800
NGC-3109-34	3.3	30037	O9	I	0.28	-14.70985	-14.71295	-14.74526	-14.93388	-15.04641

Revised to O8 I with A_V = 0.2 for better fit to WFC3 photometry with WM-Basic models. SED (sed_WM-B_NGC-3109-34.fits) is a WM-Basic model with those parameters normalized to F225W =16.99. The prior on SpT from Evans+2007 spectroscopy was used. To get the systematic uncertainty range in modeling, we also produce an SED with the same parameters and normalization, but the Castelli & Kurucz 2004 model (sed_CK_NGC-3109-34.fits)
Category=EXT-STAR
Description=[B0-B2 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	ACQ/SEARCH (COS.ta.1484392)	(3) NGC-3109-EBU-34	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2; STEP-SIZE=1.767			30 Secs (30 Secs) *[==>]*	*[1]*

Comments: No Gaia coordinates -> ACQ/SEARCH (Evans+2007 do not give their astrometric uncertainty, but the difference between GAIA EDR3 and Evans+2007 coordinates for #7, the only star with both sets of coordinates, is 0.4", right at the limit where an ACQ/SEARCH is needed. To be on the safe side, we choose an ACQ/SEARCH

Multiplied the exposure time by two to account for uncertainties on UV flux

Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe with PSA + MIRRORA and is the brightest NUV object, any other object in the macroaperture will be safe with both PSA and MIRRORA, and even more so with BOA (stars in the field)

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
2	ACQ/IMAGE (COS.ta.1484363)	(3) NGC-3109-EBU-34	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				6 Secs (6 Secs) *[==>]*	*[1]*

Comments: Multiplied the exposure time by two to account for uncertainties on UV flux
Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe with PSA + MIRRORA and is the brightest NUV object, any other object in the macroaperture will be safe with both PSA and MIRRORA, and even more so with BOA (stars in the field)

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
3	G140L/800/FP1 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=1; BUFFER-TIME=5000			1600 Secs (1600 Secs) *[==>]*	*[1]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514686 -5.3ks
2) CK: COS.sp.1514687 - 5.2 ks

ETC ID in the box above is the most conservative one (highest exptime)

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
4	G140L/800/FP2 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=2; BUFFER-TIME=5000			383 Secs (383 Secs) *[==>]*	*[1]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514686 -5.3ks
2) CK: COS.sp.1514687 - 5.2 ks

ETC ID in the box above is the most conservative one (highest exptime)

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
5	G140L/800/FP2 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=2; BUFFER-TIME=5000			1400 Secs (1400 Secs) *[==>]*	*[2]*

Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514686 -5.3ks
2) CK: COS.sp.1514687 - 5.2 ks

ETC ID in the box above is the most conservative one (highest exptime)

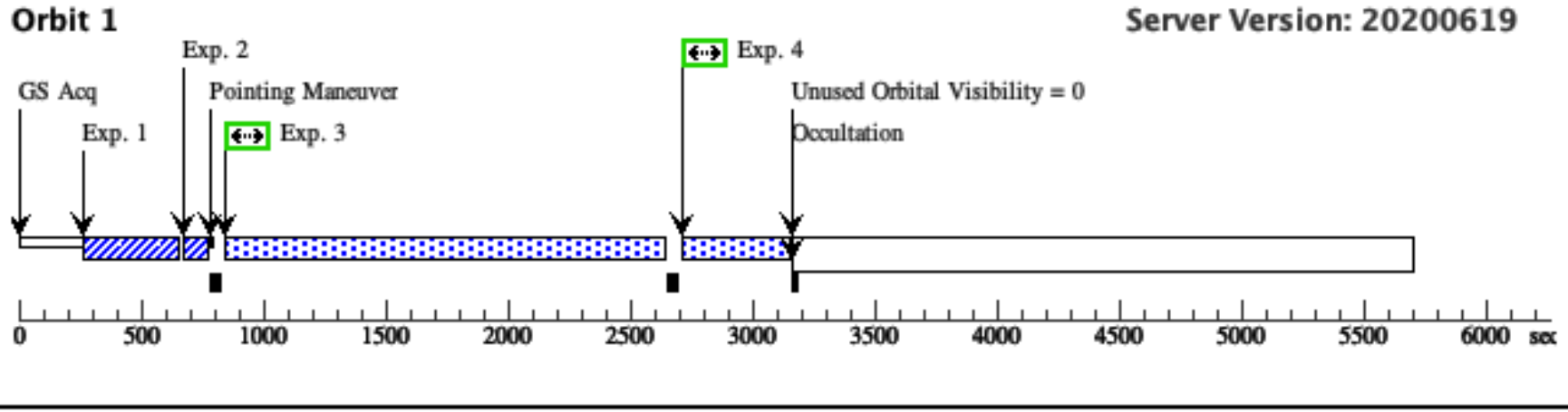
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
6	G140L/800/FP3 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=3; BUFFER-TIME=5000			1185 Secs (1185 Secs) *[==>]*	*[2]*

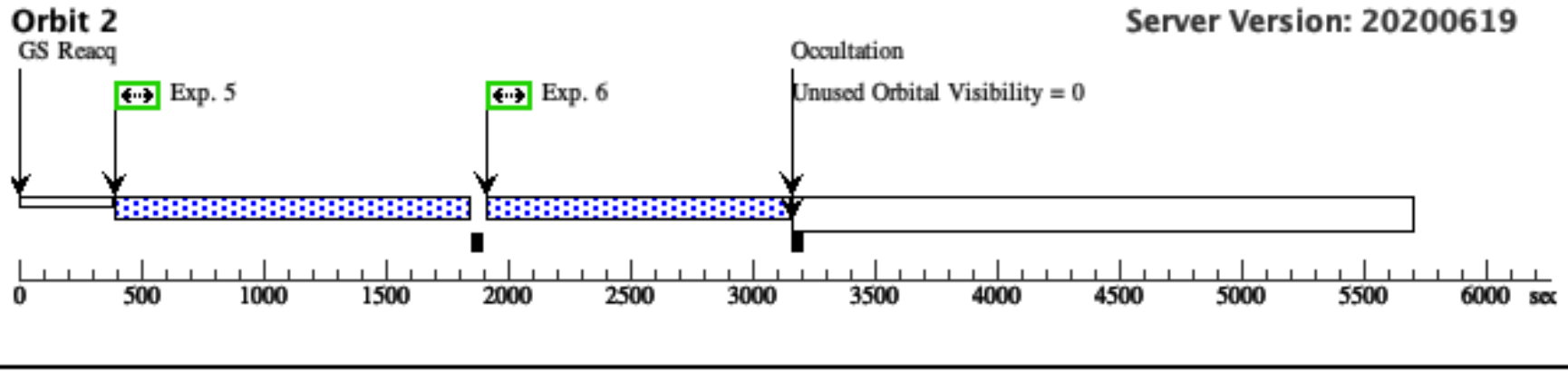
Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section)
1) WM: COS.sp.1514686 -5.3ks
2) CK: COS.sp.1514687 - 5.2 ks

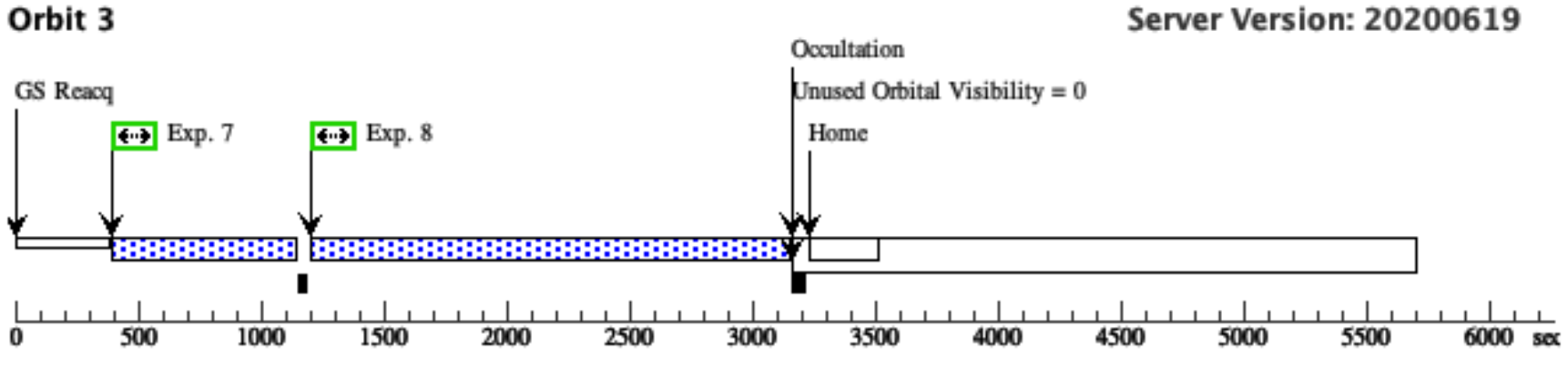
ETC ID in the box above is the most conservative one (highest exptime)

	7	G140L/800/ FP3 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=3; BUFFER-TIME=5000	700 Secs (700 Secs) *[==>]*	***[3]***
		Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514686 -5.3ks* *2) CK: COS.sp.1514687 - 5.2 ks* *ETC ID in the box above is the most conservative one (highest exptime)*						
	8	G140L/800/ FP4 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=4; BUFFER-TIME=5000	1894 Secs (1894 Secs) *[==>]*	***[3]***
		Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514686 -5.3ks* *2) CK: COS.sp.1514687 - 5.2 ks* *ETC ID in the box above is the most conservative one (highest exptime)*						

Orbit Structure







Visit

Proposal 16511, NGC3109-34-1 (DC) Tue Jun 22 01:01:06 GMT 2021

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: (none)

Comments: vstatus; 1C; NGC-3109-EBU-34; P/COS approved for submission; P/JRD 19/03/21 ; intrev: complete ; P/AF 12/05/21
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC-3109-EBU-34 ; COS ; JRD
vcheck; ETC numbers entered in APT?; Yes
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; Yes
vcheck; Field images checked & saved?; Yes
vcheck; Selected ACQ strategy?; Yes
vcheck; Possible ACQ or Sci spoilers?;Yes
vcheck; Field BOT clear?; Yes
vcheck; Visual BOT check for stars not in catalog?; Yes
vcheck; Orbit packing finalized?; Yes
vcheck; Buffer times optimized?; Yes
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated COS orbits = 3

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	NGC-3109-EBU-34	RA: 10 03 14.2400 (150.8093333d) Dec: -26 09 16.96 (-26.15471d) Equinox: J2000		V=19.61 ST mags: F225W = 16.99; F275W = 17.39; F336W = 18.02; F475W = 19.16; F814W = 21.07; SpT = O8 I; A_V = 0.2 (Evans+2007 SpT = O8 I)	Reference Frame: ICRS

Comments: From 2007ApJ...659.1198E (Evans+2007)

tstatus; NGC-3109-EBU-34; P/COS approved for submission; S/ins N/A; P/JRD 04/21/2021; S/NA 04/21/2021
tcheck; APT/SIMBAD target names: ; [EBU2007] 34; JRD 17/03/21
tcheck; Target info verification status?; complete ; JRD 17/03/21
tcheck; Coordinates & P.M. updated?; yes - Gaia coords - PM set to zero; JRD 17/03/21
tcheck; Adopted SED compared to Observations?; OK ; JRD 17/03/21

BEAST PARAMETERS:

star	log_g	Teff	SpT	LC	A_V	F1080	F1150	F1200	F1590	F1800
NGC-3109-34	3.3	30037	O9	I	0.28	-14.70985	-14.71295	-14.74526	-14.93388	-15.04641

Revised to O8 I with A_V = 0.2 for better fit to WFC3 photometry with WM-Basic models. SED (sed_WM-B_NGC-3109-34.fits) is a WM-Basic model with those parameters normalized to F225W =16.99. The prior on SpT from Evans+2007 spectroscopy was used. To get the systematic uncertainty range in modeling, we also produce an SED with the same parameters and normalization, but the Castelli & Kurucz 2004 model (sed_CK_NGC-3109-34.fits)
Category=EXT-STAR
Description=[B0-B2 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	ACQ/SEARCH (COS.ta.1484392)	(3) NGC-3109-EBU-34	COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2; STEP-SIZE=1.767			30 Secs (30 Secs) *[==>]*	*[1]*
	Comments: No Gaia coordinates -> ACQ/SEARCH (Evans+2007 do not give their astrometric uncertainty, but the difference between GAIA EDR3 and Evans+2007 coordinates for #7, the only star with both sets of coordinates, is 0.4", right at the limit where an ACQ/SEARCH is needed. To be on the safe side, we choose an ACQ/SEARCH *Multiplied the exposure time by two to account for uncertainties on UV flux* *Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe with PSA + MIRRORA and is the brightest NUV object, any other object in the macroaperture will be safe with both PSA and MIRRORA, and even more so with BOA (stars in the field)*								
2	ACQ/IMAGE (COS.ta.1484363)	(3) NGC-3109-EBU-34	COS/NUV, ACQ/IMAGE, PSA	MIRRORA				6 Secs (6 Secs) *[==>]*	*[1]*
	Comments: Multiplied the exposure time by two to account for uncertainties on UV flux *Checked the field with GALEX images. Target is the brightest object in GALEX FUV and NUV in the macroapertures. SInce the target is safe with PSA + MIRRORA and is the brightest NUV object, any other object in the macroaperture will be safe with both PSA and MIRRORA, and even more so with BOA (stars in the field)*								
3	G140L/800/FP1 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=1; BUFFER-TIME=5000			1600 Secs (1600 Secs) *[==>]*	*[1]*
	Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514686 -5.3ks* *2) CK: COS.sp.1514687 - 5.2 ks* *ETC ID in the box above is the most conservative one (highest exptime)*								
4	G140L/800/FP2 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=2; BUFFER-TIME=5000			383 Secs (383 Secs) *[==>]*	*[1]*
	Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514686 -5.3ks* *2) CK: COS.sp.1514687 - 5.2 ks* *ETC ID in the box above is the most conservative one (highest exptime)*								
5	G140L/800/FP2 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=2; BUFFER-TIME=5000			1400 Secs (1400 Secs) *[==>]*	*[2]*
	Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514686 -5.3ks* *2) CK: COS.sp.1514687 - 5.2 ks* *ETC ID in the box above is the most conservative one (highest exptime)*								
6	G140L/800/FP3 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=3; BUFFER-TIME=5000			1185 Secs (1185 Secs) *[==>]*	*[2]*
	Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514686 -5.3ks* *2) CK: COS.sp.1514687 - 5.2 ks* *ETC ID in the box above is the most conservative one (highest exptime)*								

	7	G140L/800/ FP3 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=3; BUFFER-TIME=5000	700 Secs (700 Secs) *[==>]*	***[3]***
		Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514686 -5.3ks* *2) CK: COS.sp.1514687 - 5.2 ks* *ETC ID in the box above is the most conservative one (highest exptime)*						
	8	G140L/800/ FP4 (COS.sp.1514686)	(3) NGC-3109-EBU-34	COS/FUV, TIME-TAG, PSA	G140L 800 A	FP-POS=4; BUFFER-TIME=5000	1894 Secs (1894 Secs) *[==>]*	***[3]***
		Comments: ETC calculation done wtih 2 SEDs: WM-Basic and Castelli&Kurcz, both normalized to F225W wtih proper SpT and EBV (see target section) *1) WM: COS.sp.1514686 -5.3ks* *2) CK: COS.sp.1514687 - 5.2 ks* *ETC ID in the box above is the most conservative one (highest exptime)*						

Orbit Structure