



16817 - ULLYSES LMC O5 Supergiants - COS

Cycle: 29, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

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Proposal 16817 (STScI Edit Number: 3, Created: Friday, April 15, 2022 at 11:00:21 AM Eastern Standard Time) - Overview

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
1C	(1) N11-ELS-020	COS/FUV COS/NUV	2	15-Apr-2022 12:00:21.0	yes

2 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 includes a subset of the massive ULLYSES stars being observed in the Magellanic clouds.

Depending on target brightness, the main FUV spectral range will generally use either the STIS E140M setting or the combination of the COS c1291 + c1611 settings. Sufficiently bright stars without good FUSE data in the archive will also be observed with the COS c1096 setting to provide coverage at shorter wavelengths. Where time permits, stars of type O9 or later will also be observed with STIS E230M/1978, while for supergiants of spectral type B5 or later E230M/2707 may also be included. Where possible, targets of a given spectral type were selected to span both a range in extinction and in rotation rates to support a variety of stellar and ISM studies.

Signal-to-noise requirements used to determine the desired exposures times were defined as follows:

COS/G130M/c1096: 20 / nine-pixel resel at 1080 Å

COS/G130M/c1291: 30 / six-pixel resel at 1150 Å

COS/G160M/c1611: 30 / six-pixel resel at 1590 Å

COS/G185M/c1953: 30 / three-pixel resel at 1860 Å

COS/G185M/c1986: 30 / three-pixel resel at 1980 Å

STIS/E140M/c1425: 20 / two-pixel resel at 1200 Å

STIS/E230M/c1978: 20 / two-pixel resel at 1800 Å

STIS/E230M/c2707: 20 / two-pixel resel at 2800 Å

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.

Proposal 16817 - N11-ELS-020-COS (1C) - ULLYSES LMC O5 Supergiants - COS

Fri Apr 15 16:00:22 GMT 2022

Proposal 16817, N11-ELS-020-COS (1C), implementation

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Comments: vstatus; 1C; N11-ELS-020; P/COS approved for submission; P/RP 11/04/22 ; intrev: complete ; P/AF 12/04/22

vcheck; Enter targ name & Inst. & Resp. Sci.; N11-ELS-020 ; COS ; RP

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 ... ACQ/IMAGE-BOA/MIRRORA

vcheck; Possible ACQ or Sci spoilers?; No

vcheck; Field BOT clear?; Yes ...

The unknown stars in the field are most likely:

- Gaia DR3 4662150750288097536 - K5V star with Gmag 17.98
- Gaia DR3 4662150754618470272 - A7V-A8V star with Gmag 18.66
- Gaia DR3 4662150754581323776 - G8V-G9V star with Gmag 18.69

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

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	N11-ELS-020 Alt Name1: ELS2006- N11-020	RA: 04 56 50.3052 (74.2096050d) Dec: -66 31 3.91 (-66.51775d) Equinox: J2000	Proper Motion RA: 1.941 mas/yr Proper Motion Dec: -0.253 mas/yr Parallax: 0" Epoch of Position: 2016	V=13.18 SpT=O5 Inf+p; E(B-V)=0.06; B =12.96; V=13.18; F1160=5.310e -13; F1360=4.560e-13; F1700=3 .630e-13	Reference Frame: ICRS
<p><i>Comments: N11-ELS-020 : [ELS2006] N11 020</i></p> <p><i>Previous name : N11-020</i></p> <p><i>Input file: ULLYSES_Cycle29_MassiveStar_ProgramInput_v5.csv</i></p> <p><i>SpT = O5 Inf+p</i></p> <p><i>COS/G130M/c1096 : rn(PoWR-OB-new(PoWR_39000_3.80_m7.00_Z0.50.fits, lmc-ob-i 39-38, Z=0.500 solar, Teff=39000, log_lum=5.54, log_g=3.80, log_mdod=-7.00) (extinction lmcavg=0.060), flux1160 +- 2.0A flux=5.3e-13 Flam)</i></p> <p><i>Coordinate pedigree: Gaia DR2</i></p> <p><i>Calculation performed 2021-10-25T00:58:05, v0.9</i></p> <p>-----</p> <p><i>tstatus; N11-ELS-020; P/COS approved for submission; S/ins not started; P/RP 11/04/22; S/xx DD/MM/YY</i></p> <p><i>tcheck; APT/SIMBAD target names: ; Yes</i></p> <p><i>tcheck; Target info verification status?; Yes</i></p> <p><i>tcheck; Coordinates & P.M. verified, epoch checked?; Yes</i></p> <p><i>tcheck; Adopted SED compared to Observations?; Yes ...</i></p> <p><i>Still using O5 I model, but extinction is increased to 0.18 to fit both the STIS data and the photometry. Flux = 5.2e-13 Flam at 1160A</i></p> <p>Category=STAR</p> <p>Description=[SUPERGIANT O, OF]</p> <p>Extended=NO</p>					

Proposal 16817 - N11-ELS-020-COS (1C) - ULLYSES LMC O5 Supergiants - COS

#	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.174 4644)	(1) N11-ELS-020	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				5 Secs (5 Secs) [==>]	[1]
<i>Comments: Expected S/N of ~30 for imaging TA</i>									
2	G130M/109 6 - 1 (COS.sp.174 4865)	(1) N11-ELS-020	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=23 0; FP-POS=1			1035 Secs (1035 Secs) [==>]	[1]
<i>Comments: rn(PoWR-OB-new(PoWR_39000_3.80_m7.00_Z0.50.fits, lmc-ob-i 39-38, Z=0.500 solar, Teff=39000, log_lum=5.54, log_g=3.80, log_mdodot=-7.00) (extinction lmcavg=0.060), flux1160 +- 2.0A flux=5.3e-13 Flam); cos.fuv.g130m.c1096.psa.mjd#59670; fp-pos=None, segment=None) From file ULLYSES_Cycle29_MassiveStar_ProgramInput_v5.csv Spectral type: O5 Inf+p SED = N11-ELS-20_COS_G130M_c1096_sed.fits For exptime=3251.1 s, spectral region: 1080.0 +- 0.5 A achieves SNR=20.0/resel global countrate (brightest segment): 5515.4 cts/s/segment brightest pixel: 0.108 cts/s/pix at 1220.0 A Calculation performed 2021-10-25T00:58:11, v0.9</i>									

<i>Expected S/N ~20 at 1180 A using the combined FPPOS. The exposure time was calculated using a new model with an extinction=0.18. This change much better reflects the existing STIS data and U, B photometry.</i>									
3	G130M/109 6 - 2 (COS.sp.174 4865)	(1) N11-ELS-020	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=26 3; FP-POS=2			1035 Secs (1035 Secs) [==>]	[1]
<i>Comments: rn(PoWR-OB-new(PoWR_39000_3.80_m7.00_Z0.50.fits, lmc-ob-i 39-38, Z=0.500 solar, Teff=39000, log_lum=5.54, log_g=3.80, log_mdodot=-7.00) (extinction lmcavg=0.060), flux1160 +- 2.0A flux=5.3e-13 Flam); cos.fuv.g130m.c1096.psa.mjd#59670; fp-pos=None, segment=None) From file ULLYSES_Cycle29_MassiveStar_ProgramInput_v5.csv Spectral type: O5 Inf+p SED = N11-ELS-20_COS_G130M_c1096_sed.fits For exptime=3251.1 s, spectral region: 1080.0 +- 0.5 A achieves SNR=20.0/resel global countrate (brightest segment): 5515.4 cts/s/segment brightest pixel: 0.108 cts/s/pix at 1220.0 A Calculation performed 2021-10-25T00:58:11, v0.9</i>									

<i>Expected S/N ~20 at 1180 A using the combined FPPOS. The exposure time was calculated using a new model with an extinction=0.18. This change much better reflects the existing STIS data and U, B photometry.</i>									
4	G130M/109 6 - 3 (COS.sp.174 4865)	(1) N11-ELS-020	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=26 3; FP-POS=3			1168 Secs (1168 Secs) [==>]	[2]
<i>Comments: rn(PoWR-OB-new(PoWR_39000_3.80_m7.00_Z0.50.fits, lmc-ob-i 39-38, Z=0.500 solar, Teff=39000, log_lum=5.54, log_g=3.80, log_mdodot=-7.00) (extinction lmcavg=0.060), flux1160 +- 2.0A flux=5.3e-13 Flam); cos.fuv.g130m.c1096.psa.mjd#59670; fp-pos=None, segment=None) From file ULLYSES_Cycle29_MassiveStar_ProgramInput_v5.csv Spectral type: O5 Inf+p SED = N11-ELS-20_COS_G130M_c1096_sed.fits For exptime=3251.1 s, spectral region: 1080.0 +- 0.5 A achieves SNR=20.0/resel global countrate (brightest segment): 5515.4 cts/s/segment brightest pixel: 0.108 cts/s/pix at 1220.0 A Calculation performed 2021-10-25T00:58:11, v0.9</i>									

<i>Expected S/N ~20 at 1180 A using the combined FPPOS. The exposure time was calculated using a new model with an extinction=0.18. This change much better reflects the existing STIS data and U, B photometry.</i>									

Exposures

Proposal 16817 - N11-ELS-020-COS (1C) - ULLYSES LMC O5 Supergiants - COS

5	G130M/109 (1)N11-ELS-020 6-4 (COS.sp.174 4865)	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=23 0; FP-POS=4	1212 Secs (1212 Secs) [==>]	[2]
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Comments: rn(PoWR-OB-new(PoWR_39000_3.80_m7.00_Z0.50.fits, lmc-ob-i 39-38, Z=0.500 solar, Teff=39000, log_lum=5.54, log_g=3.80, log_mdod=-7.00) (extinction lmcavg=0.060), flux1160 +/- 2.0A flux=5.3e-13 Flam); cos.fuv.g130m.c1096.psa.mjd#59670; fp-pos=None, segment=None)
 From file ULLYSES_Cycle29_MassiveStar_ProgramInput_v5.csv
 Spectral type: O5 Inf+p
 SED = N11-ELS-20_COS_G130M_c1096_sed.fits
 For exptime=3251.1 s, spectral region:
 1080.0 +/- 0.5 A achieves SNR=20.0/resel
 global countrate (brightest segment): 5515.4 cts/s/segment
 brightest pixel: 0.108 cts/s/pix at 1220.0 A
 Calculation performed 2021-10-25T00:58:11, v0.9

 Expected S/N ~20 at 1180 A using the combined FPPOS. The exposure time was calculated using a new model with an extinction=0.18. This change much better reflects the existing STIS data and U, B photometry.

Orbit Structure

