16808 - ULLYSES SMC O3 Dwarfs - COS

Cycle: 29, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	***Institution***	***E-Mail***
Dr. Julia Christine Roman-Duval (PI) (Contact)	**Space Telescope Science Institute**	**duval@stsci.edu**
Dr. Kenneth Sembach (CoI)	Space Telescope Science Institute	sembach@stsci.edu
Dr. TalaWanda R. Monroe (CoI) (Contact)	Space Telescope Science Institute	tmonroe@stsci.edu
Joanna Taylor (CoI)	Space Telescope Science Institute	jotaylor@stsci.edu
Dr. Travis C Fischer (CoI) (ESA Member)	Space Telescope Science Institute - ESA	tfischer@stsci.edu
Dr. William J. Fischer (CoI)	Space Telescope Science Institute	wfischer@stsci.edu
Dr. Alexander W. Fullerton (CoI) (Contact)	Space Telescope Science Institute	fullerton@stsci.edu
Dr. Alessandra Aloisi (CoI)	Space Telescope Science Institute	aloisi@stsci.edu
Christopher Britt (CoI)	Space Telescope Science Institute	cbritt@stsci.edu
Dr. Thomas M. Brown (CoI)	Space Telescope Science Institute	tbrown@stsci.edu
Ivo Busko (CoI)	Space Telescope Science Institute	busko@stsci.edu
Dr. Joleen Carlberg (CoI)	Space Telescope Science Institute	jcarlberg@stsci.edu
Dr. Gisella De Rosa (CoI)	Space Telescope Science Institute	gderosa@stsci.edu
Elaine M Frazer (CoI)	Space Telescope Science Institute	efrazer@stsci.edu
Dr. Svea S Hernandez (CoI)	Space Telescope Science Institute - ESA - JWST	sveash@stsci.edu
Dr. Alec S. Hirschauer (CoI)	Space Telescope Science Institute	ahirschauer@stsci.edu
Dr. Bethan Lesley James (CoI)	Space Telescope Science Institute - ESA - JWST	bjames@stsci.edu
Robert Jedrzejewski (CoI)	Space Telescope Science Institute	rij@stsci.edu
Sean Lockwood (CoI)	Space Telescope Science Institute	lockwood@stsci.edu
Dr. Cristina Oliveira (CoI)	Space Telescope Science Institute	oliveira@stsci.edu
Rachel Plesha (CoI)	Space Telescope Science Institute	rplesha@stsci.edu
Dr. Charles R. Proffitt (CoI)	Space Telescope Science Institute	proffitt@stsci.edu

Name	***Institution***	***E-Mail***
Dr. I. Neill Reid (CoI)	Space Telescope Science Institute	inr@stsci.edu
Dr. Adric R. Riedel (CoI)	Space Telescope Science Institute	riedel@stsci.edu
Allyssa Riley (CoI)	Space Telescope Science Institute	ariley@stsci.edu
Dr. David J. Sahnow (CoI)	Space Telescope Science Institute	sahnow@stsci.edu
Dr. Ravi Sankrit (CoI) (Contact)	Space Telescope Science Institute	rsankrit@stsci.edu
Dr. Richard Shaw (CoI)	Space Telescope Science Institute	shaw@stsci.edu
Dr. Linda J. Smith (CoI)	Space Telescope Science Institute	lsmith@stsci.edu
Dr. Sangmo Tony Sohn (CoI)	Space Telescope Science Institute	tsohn@stsci.edu
Dr. Debopam Som (CoI)	Space Telescope Science Institute	dsom@stsci.edu
Dr. Leonardo Ubeda (CoI)	Space Telescope Science Institute	lubeda@stsci.edu
Dr. Daniel E. Welty (CoI)	Space Telescope Science Institute	dwelty@stsci.edu

VISITS

Visit	***Targets used in Visit***	***Configurations used in Visit***	***Orbits Used***	***Last Orbit Planner Run***	***OP Current with Visit?***
1C	(1) SK183	COS/FUV COS/NUV	1	28-Feb-2022 14:00:43.0	yes

1 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 A
COS/G130M/c1291: 30 / six-pixel resel at 1150 A
COS/G160M/c1611: 30 / six-pixel resel at 1590 A
COS/G185M/c1953: 30 / three-pixel resel at 1860 A
COS/G185M/c1986: 30 / three-pixel resel at 1980 A
STIS/E140M/c1425: 20 / two-pixel resel at 1200 A
STIS/E230M/c1978: 20 / two-pixel resel at 1800 A
STIS/E230M/c2707: 20 / two-pixel resel at 2800 A
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 16808, SK183-COS (1C) Mon Feb 28 19:00:43 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV, COS/NUV

Special Requirements: SCHED 100%

Comments: vstatus; 1C; SK183; P/COS approved for submission; P/RS 18/02/22 ; intrev: complete ; P/AF 24/02/22
vcheck; Enter targ name & Inst. & Resp. Sci.; SK183 ; COS ; RS
vcheck; ETC numbers entered in APT?; yes
vcheck; Any screening violations?; no ...
warning for variable sources which is not relevant here
vcheck; S/N ETC calcs done & documented?; yes
vcheck; Field images checked & saved?; yes
vcheck; Selected ACQ strategy?; yes ...
NUV Imaging ACQ MIRROR A BOA the exposure time was calculated for the normalized spectrum and with S/N increased to 45 in order to ensure sufficient time for acquisition
vcheck; Possible ACQ or Sci spoilers?; no
vcheck; Field BOT clear?; yes ...
GALEX throws warning for BOA in the science exposure but that is due to extended diffuse gas from nearby cluster of stars while O5V is assumed
vcheck; Visual BOT check for stars not in catalog?; ok ...
two bright stars beyond the PSA radius for BOA acquisition are B1.5IV and B2V (Ramachandran et al 2019) with V=15.41 and 15.85 (Massey et al 2002)
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 = 1

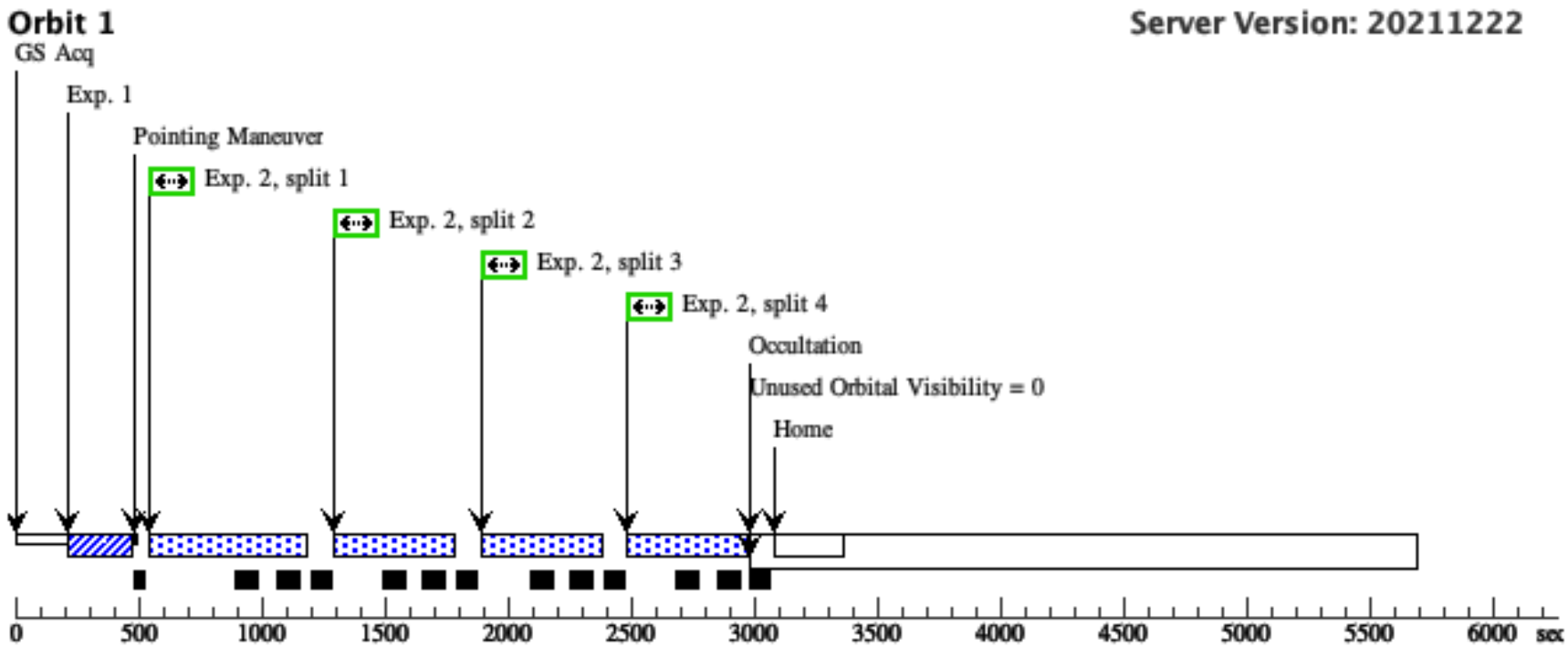
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SK183 Alt Name1: SMCSGS-FS-231	RA: 01 29 24.5483 (22.3522846d) Dec: -73 33 16.34 (-73.55454d) Equinox: J2000	Proper Motion RA: 0.896 mas/yr Proper Motion Dec: -1.351 mas/yr Parallax: 0" Epoch of Position: 2000	V=13.82 SpT=O3 V((f*))z; E(B-V)=0.05; U=12.51; B=13.59; V=13.82; F1160=1.030e-12; F1360=5.720e-13; F1700=3.650e-13	Reference Frame: ICRS

Comments: SK183 : SMCSGS-FS-231, SK 183
Previous name : [SMCSGS-FS]-231
Input file: ULLYSES_Cycle29_MassiveStar_ProgramInput_v5.csv
SpT = O3 V((f))z*
Note: Some exptime deducted due to outside program(s).
COS/G130M/c1096 : rn(PoWR-OB-new(PoWR_46000_4.00_m6.74_Z0.14.fits, smc-ob-i 46-40, Z=0.140 solar, Teff=46000, log_lum=5.78, log_g=4.00, log_mdot=-6.74) (extinction smcbar=0.050), flux1160 +-2.0A flux=1e-12 Flam)
Coordinate pedigree: Gaia DR2
Calculation performed 2021-10-25T00:54:31, v0.9
---
tstatus; SK183; P/COS ready for internal review; S/ins not started; P/RS 18/02/22; S/xx DD/MM/YY
tcheck; APT/SIMBAD target names: ; SK183 'SK 183'
tcheck; Target info verification status?; ok
tcheck; Coordinates & P.M. verified, epoch checked?; yes
tcheck; Adopted SED compared to Observations?; yes ...
one IUE SWP observation closely matches PoWR SED SK183_COS_G130M_c1096_sed.fits but STIS and two other SWP observations match each other but are about 20% lower than the model SED ...
therefore we scale the original SED by 0.8 which we name SK183_new_c1096_scaleflux_0pt8_sed.fits and use that for confirming signal to noise ...
The original model was used for BOT clearance (cos.sp.1682711).
Category=STAR
Description=[MAIN SEQUENCE O, OF]
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.1717345)	(1) SK183	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				10.0 Secs (10 Secs) *[==>]*	*[1]*
	Comments: Exposure time calculated for S/N=45 in case target is slightly fainter than expected.								
2	G130M/1096 (COS.sp.1717346)	(1) SK183	COS/FUV, TIME-TAG, PSA	G130M 1096 A	BUFFER-TIME=162.0; FP-POS=ALL			434 Secs (1736 Secs) *[==>(Split 1)]* *[==>(Split 2)]* *[==>(Split 3)]* *[==>(Split 4)]*	*[1]*

Comments: rn(PoWR-OB-new(PoWR_46000_4.00_m6.74_Z0.14.fits, smc-ob-i 46-40, Z=0.140 solar, Teff=46000, log_lum=5.78, log_g=4.00, log_mdot=-6.74) (extinction smcbar=0.050), flux1160 +- 2.0A flux=1e-12 Flam); cos,fuv,g130m,c1096,psa,mjd#59670; fp-pos=None, segment=None)
From file ULLYSES_Cycle29_MassiveStar_ProgramInput_v5.csv
Spectral type: O3 V((f))z*
SED = SK183_COS_G130M_c1096_sed.fits
For exptime=1708.8 s, spectral region:
1080.0 +- 0.5 A achieves SNR=20.0/resel
global countrate (brightest segment): 10975.8 cts/s/segment
brightest pixel: 0.208 cts/s/pix at 1225.5 A
Calculation performed 2021-10-25T00:54:37, v0.9

Orbit Structure