16098 - ULLYSES SMC O Stars STIS

Cycle: 27, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
1S	(1) AV332 WAVE	STIS/CCD STIS/FUV-MAMA	1	29-Jun-2020 14:00:25.0	yes
2S	(2) NGC346-MPG-355 WAVE	STIS/CCD STIS/FUV-MAMA	2	29-Jun-2020 14:00:26.0	yes

3 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 16098, AV332-STIS (1S), implementation Mon Jun 29 18:00:27 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: SCHED 100%

Comments: vstatus; 1S; AV332; P/STIS Approved for submission; P/TS 20/04/20; intrev: complete ; P/CP 15/04/20
vcheck; Enter targ name & Inst. & Resp. Sci.; AV332 'SK108' ; STIS; TS
vcheck; ETC numbers entered in APT?; completed (STIS.sp.1416094)
vcheck; Any screening violations?; No - BOT reports 1 unknown star which is the target itself.
vcheck; S/N ETC calcs done & documented?; N/A
vcheck; Field images checked & saved?; Yes - Both GSC2 and 2MASS
vcheck; Selected ACQ strategy?; STIS F28X50LP 0.2s
vcheck; Possible ACQ or Sci spoilers?; No
vcheck; Field BOT clear?; 1 unknown found in GSC2 & resolved ...
Unknown star is the target itself
vcheck; Visual BOT check for stars not in catalog?; OK
vcheck; Orbit packing finalized?; 1 orbit
vcheck; Buffer times optimized?; DONE
vcheck; Verify visit grouping correct; None needed
vcheck; Is visit ready for int. review?; Yes
Allocated STIS orbits = 1

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	AV332	RA: 01 03 25.2309 (15.8551288d)	Radial Velocity: 141 km/sec	V=12.3	Reference Frame: ICRS
	Alt Name1: SMC-AB6	Dec: -72 06 43.88 (-72.11219d)		SpT=WN4+O6.5I:; E(B-V)=0.10; B=12.1; V=12.3; F1160=3.00e-12; F1360=2.00e-12; F1700=1.30e-12; F2200=6.80e-13	
	Alt Name2: SK108	Equinox: J2000			

Comments: AV332 : SK108, SMC AB6, SK 108
Previous name : SMC AB6
Input file: SMC_2020Feb20/input/SMC_all_do1_NewCoords_pids.csv
SIMBAD link (SK 108): https://simbad.u-strasbg.fr/simbad/sim-id?Ident=SK+108&submit=submit+id
SpT = WN4+O6.5I:
COS/G130M/c1096 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux1160 +- 30.0A flux=3e-12 Flam)
COS/G130M/c1291 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux1360 +- 30.0A flux=2e-12 Flam)
COS/G160M/c1611 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux1700 +- 5.0A flux=1.3e-12 Flam)
COS/G185M/c1921 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux1700 +- 5.0A flux=1.3e-12 Flam)
COS/G185M/c1953 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux1700 +- 5.0A flux=1.3e-12 Flam)
COS/G185M/c1986 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux2200 +- 5.0A flux=6.8e-13 Flam)
STIS/E140M/c1425 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux1360 +- 30.0A flux=2e-12 Flam)
STIS/E230M/c1978 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux2200 +- 5.0A flux=6.8e-13 Flam)
STIS/E230M/c2707 : rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux2200 +- 5.0A flux=6.8e-13 Flam)
Coordinate pedigree: Gaia
v sin i = 265
Calculation performed 2020-02-24T18:03:48, v0.4
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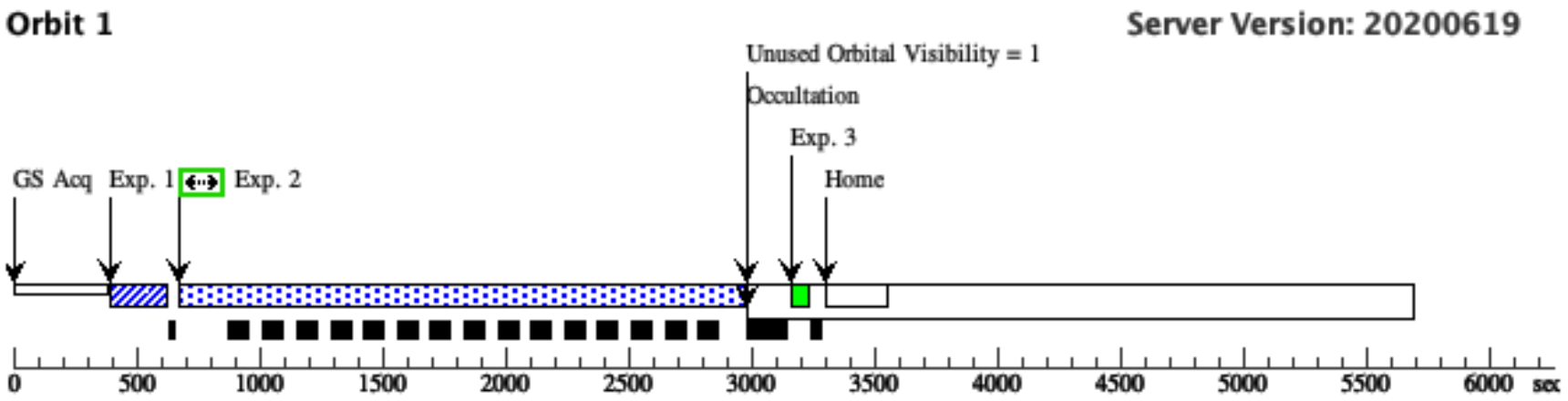
tstatus; AV332; P/STIS Approved for submission; S/NA; P/TS 20/04/20; S/NA DD/MM/YY
tcheck; APT/SIMBAD target names: ; AV332, 'SK108' ...
Default SIMBAD name is RMC 31, aka AzV332, SBC9-56, SMC-AB6
tcheck; Target info verification status?; OK
tcheck; Coordinates & P.M. updated?; No
tcheck; Adopted SED compared to Observations?; OK - SED underestimates flux below 1250A when compared to FUSE spectrum ...
But still a good match to the observations where the STIS E140M matters, so decided to stick with the provided SED.
Category=EXT-STAR
Description=[WOLF RAYET - WN]
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 (STIS.ta.1416085)	(1) AV332	STIS/CCD, ACQ, F28X50LP	MIRROR				0.2 Secs (0.2 Secs) *[==>]*	*[1]*
2	E140M/1425 (STIS.sp.1416094)	(1) AV332	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	WAVECAL=NO; BUFFER-TIME=136			2214 Secs (2214 Secs) *[==>]*	*[1]*
3	E140M/1425 WAVECAL	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				*[==>]*	*[1]*

Comments: rn-max(CMFGEN-WN(model=9, Z=0.004, Teff=80000) (extinction smcbar=0.100), flux1360 +- 30.0A flux=2e-12 Flam); stis,fuvmama,e140m,c1425,0.2x0.2,mjd#59305
From file SMC_2020Feb20/input/SMC_all_do1_NewCoords_pids.csv
Spectral type: WN4+O6.5I: --> WN #9
SED = AV332_STIS_E140M_c1425_sed.fits
For exptime=2306.7 s, spectral region:
1200.0 +- 0.5 A achieves SNR=20.0/resel
global countrate (brightest segment): 11859.3 cts/s/segment
brightest pixel: 0.143 cts/s/pix at 1285.9 A
Calculation performed 2020-02-24T18:04:00, v0.4

Orbit Structure



Visit

Proposal 16098, NGC346-MPG-355-STIS (2S), implementation Mon Jun 29 18:00:27 GMT 2020

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA

Special Requirements: SCHED 100%

Comments: vstatus; 2S; NGC346-MPG-355; P/STIS Approved for submission; P/TS 24/04/20 ; intrev: complete ; P/CP 15/04/20
vcheck; Enter targ name & Inst. & Resp. Sci.; NGC346-MPG-355 ; STIS ; TS
vcheck; ETC numbers entered in APT?; completed (STIS.sp.1431920)
vcheck; Any screening violations?; No
vcheck; S/N ETC calcs done & documented?; N/A
vcheck; Field images checked & saved?; Yes - Both GSC2 and 2MASS
vcheck; Selected ACQ strategy?; STIS F28X50LP 0.1s ...
There is a star with similar brightness about 6 arcsec to the southeast of target (MPG 368). However, the target star is more than magnitude brighter than MPG 368 in V magnitude, so the target stars will be correctly acquired even if the HST pointing error results in pointing between the two stars.
vcheck; Possible ACQ or Sci spoilers?; No - see comment right above
vcheck; Field BOT clear?; No stars found in either GSC2 or GALEX
vcheck; Visual BOT check for stars not in catalog?; OK ...
All bright stars have been identified by their MPG numbers in NGC346-MPG-355_WFC3UVIS-F225W.png
vcheck; Orbit packing finalized?; 2 orbits following Tech Implementation reccomendations.
vcheck; Buffer times optimized?; DONE
vcheck; Verify visit grouping correct; N/A
vcheck; Is visit ready for int. review?; Yes
Allocated STIS orbits = 3

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC346-MPG-355 Alt Name1: MPG-355 Alt Name2: CL-NGC-346-MPG-355	RA: 00 59 0.7611 (14.7531712d) Dec: -72 10 28.19 (-72.17450d) Equinox: J2000		V=12.74 SpT=O2III(f*); E(B-V)=0.10; U=11.5; B=12.6; V=12.7; F1160=8.16e-13; F1360=7.00e-13; F1700=4.50e-13	Reference Frame: ICRS

Comments: NGC346-MPG-355 : [MPG]-355, [MPG]_355, Cl NGC 346 MPG 355*
Previous name : [MPG]-355
Input file: SMC_2020Feb20/input/SMC_all_do1_NewCoords_pids.csv
SIMBAD link (Cl NGC 346 MPG 355): https://simbad.u-strasbg.fr/simbad/sim-id?Ident=Cl*+NGC+346+MPG+355&submit=submit+id*
SpT = O2III(f)*
COS/G130M/c1096 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1160 +- 30.0A flux=8.2e-13 Flam)
COS/G130M/c1291 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1360 +- 30.0A flux=7e-13 Flam)
COS/G160M/c1611 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1700 +- 5.0A flux=4.5e-13 Flam)
COS/G185M/c1921 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1700 +- 5.0A flux=4.5e-13 Flam)
COS/G185M/c1953 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1700 +- 5.0A flux=4.5e-13 Flam)
COS/G185M/c1986 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1700 +- 5.0A flux=4.5e-13 Flam)
STIS/E140M/c1425 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1360 +- 30.0A flux=7e-13 Flam)
STIS/E230M/c1978 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1700 +- 5.0A flux=4.5e-13 Flam)
STIS/E230M/c2707 : rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1700 +- 5.0A flux=4.5e-13 Flam)
Coordinate pedigree: Gaia
v sin i = 110
Calculation performed 2020-02-24T17:55:10, v0.4
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tstatus; NGC346-MPG-355; P/STIS Approved for submission; S/ins not started; P/TS 20/04/20; S/xx DD/MM/YY
tcheck; APT/SIMBAD target names: ; NGC346-MPG-355, 'CL NGC 346 W3'
tcheck; Target info verification status?; OK
tcheck; Coordinates & P.M. updated?; No
tcheck; Adopted SED compared to Observations?; OK ...
Tried overplotting FUSE spectra over the adopted SED, but they have much higher fluxes. Checked the coordinates of the FUSE observations, and they seem to be slightly offset from the target here which means that they must have caught two stars of similar brightness.
Category=EXT-STAR
Description=[GIANT 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 (STIS.ta.1451979)	(2) NGC346-MPG-355	STIS/CCD, ACQ, F28X50LP	MIRROR				0.3 Secs (0.3 Secs) *[==>]*	***[1]***
2	E140M/1425 (STIS.sp.1431920)	(2) NGC346-MPG-355	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	WAVECAL=NO; BUFFER-TIME=523			2215 Secs (2215 Secs) *[==>]*	***[1]***
	Comments: rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1360 +- 30.0A flux=7e-13 Flam); stis,fuvmama,e140m,c1425,0.2x0.2,mjd#59305 *From file SMC_2020Feb20/input/SMC_all_do1_NewCoords_pids.csv* *Spectral type: O2III(f*) --> O2 III* *SED = NGC346-MPG-355_STIS_E140M_c1425_sed.fits* *For exptime=7902.9 s, spectral region:* *1200.0 +- 0.5 A achieves SNR=20.0/resel* *global countrate (brightest segment): 3859.7 cts/s/segment* *brightest pixel: 0.039 cts/s/pix at 1320.4 A* *Calculation performed 2020-02-24T17:55:24, v0.4*								
3	E140M/1425 WAVECAL	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				*[==>]*	***[1]***
4	E140M/1425 (STIS.sp.1431920)	(2) NGC346-MPG-355	STIS/FUV-MAMA, TIME-TAG, 0.2X0.2	E140M 1425 A	WAVECAL=NO; BUFFER-TIME=523			2567 Secs (2567 Secs) *[==>]*	***[2]***
	Comments: rn-max(ck04models(O2III,Teff=29000,metallicity=0.004,logG=3.5) (extinction smcbar=0.100), flux1360 +- 30.0A flux=7e-13 Flam); stis,fuvmama,e140m,c1425,0.2x0.2,mjd#59305 *From file SMC_2020Feb20/input/SMC_all_do1_NewCoords_pids.csv* *Spectral type: O2III(f*) --> O2 III* *SED = NGC346-MPG-355_STIS_E140M_c1425_sed.fits* *For exptime=7902.9 s, spectral region:* *1200.0 +- 0.5 A achieves SNR=20.0/resel* *global countrate (brightest segment): 3859.7 cts/s/segment* *brightest pixel: 0.039 cts/s/pix at 1320.4 A* *Calculation performed 2020-02-24T17:55:24, v0.4*								
5	E140M/1425 WAVECAL	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				*[==>]*	***[2]***

Orbit Structure