14340 - Accurate masses and distances of the binary Cepheids S Mus and SU Cyg

Cycle: 23, Proposal Category: GO

(UV Initiative)

(Availability Mode: AVAILABLE)

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?*
11	(4) S-MUS WAVE	STIS/CCD STIS/FUV-MAMA	1	11-Jul-2015 21:03:20.0	yes
12	(4) S-MUS WAVE	STIS/CCD STIS/FUV-MAMA	1	11-Jul-2015 21:03:23.0	yes
13	(4) S-MUS WAVE	STIS/CCD STIS/FUV-MAMA	1	11-Jul-2015 21:03:26.0	yes
14	(4) S-MUS WAVE	STIS/CCD STIS/FUV-MAMA	1	11-Jul-2015 21:03:28.0	yes
21	(6) SU-CYG WAVE	STIS/CCD STIS/FUV-MAMA	1	11-Jul-2015 21:03:30.0	yes

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
22	(6) SU-CYG WAVE	STIS/CCD STIS/FUV-MAMA	1	11-Jul-2015 21:03:32.0	yes
23	(6) SU-CYG WAVE	STIS/CCD STIS/FUV-MAMA	1	11-Jul-2015 21:03:34.0	yes
24	(6) SU-CYG WAVE	STIS/CCD STIS/FUV-MAMA	1	11-Jul-2015 21:03:36.0	yes

8 Total Orbits Used

ABSTRACT

We propose to study the main-sequence companion of the classical Cepheids S Mus and SU Cyg. Binary Cepheids lead to a better understanding of their age and evolution. Our primary goal with this proposal is to measure the radial velocity (RV) of the blue companions at several orbital epochs during two years. Most of the companions are B main-sequence stars, hidden by the brightness of the Cepheids for wavelengths longer than 0.5 microns. That is why all Galactic binary Cepheids are single-line spectroscopic binaries, so far. In UV, the spectrum of the companions dominate over the Cepheids, making UV spectroscopy clearly the best way to obtain the RV of the companions. We will then combine the RVs of both components with our accurate astrometric measurements obtained from our complementary interferometric program on binary Cepheids. The unique combination of interferometry and spectroscopy for this kind of stars will provide a independent estimate of the mass and the distance of these standard candles. This is particularly important to constrain Cepheid models and make progress on the Cepheid mass-discrepancy problem. Independent distance measurements are also necessary to the calibration of fundamental Cepheid relations (period-luminosity, period-mass, ...), and check the future GAIA parallax estimates.

OBSERVING DESCRIPTION

Each of the requested STIS visits will consist of an imaging target acquisition exposure with the F25ND3 and a dispersed light peakup with the G230LB into the 0.2x0.09 aperture followed by wavelength calibration and science exposures using the STIS E140H setting. An extra wavelength calibration exposure will be taken at the end of the orbit in the occultation to give the best possible wavelength zero point.

Visit

Proposal 14340, Visit 11, implementation Sun Jul 12 01:03:38 GMT 2015

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 22-NOV-2015:00:00:00 AND 22-DEC-2015:00:00:00

Fixed Targets

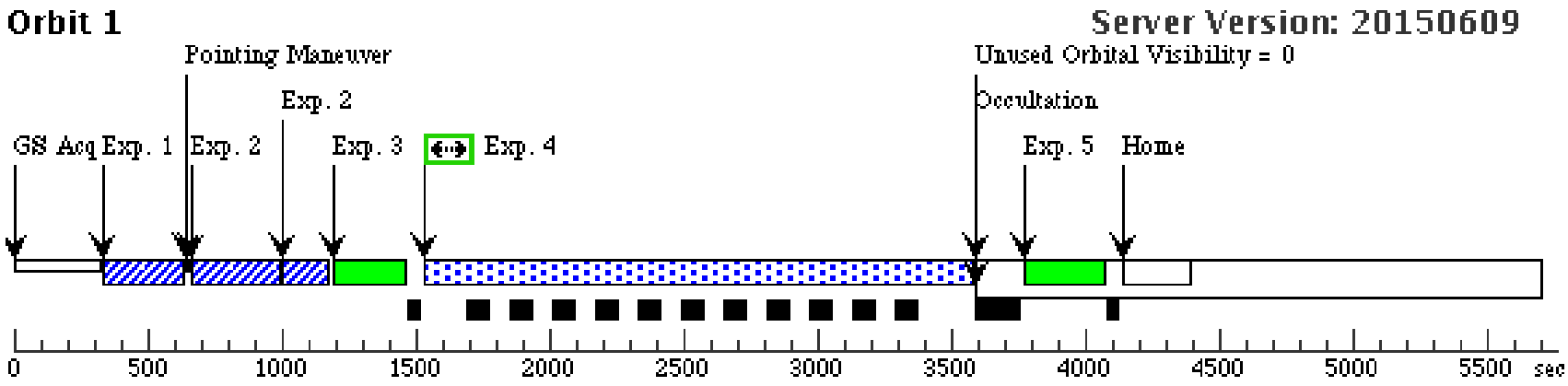
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	S-MUS	RA: 12 12 47.0183 (183.1959096d) Dec: -70 09 6.44 (-70.15179d) Equinox: J2000	Proper Motion RA: -7.79 mas/yr Proper Motion Dec: -0.60 mas/yr Parallax: 0.00199" Epoch of Position: 2000	V=6.17 B3.5V companion	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

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.615 207)	(4) S-MUS	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-In t in Visit 11	1.0 Secs (1 Secs) *[==>]*	*[1]*
2	ACQ/PEAK (STIS.sp.61 5210)	(4) S-MUS	STIS/CCD, ACQ/PEAK, 0.2X0.09	G230LB 2375 A			Sequence 1-5 Non-In t in Visit 11	5.0 Secs (5 Secs) *[==>]*	*[1]*
Comments: expect 952,000 e- from source in 5 sec exposure									
3	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 11	100 Secs (100 Secs) *[==>]*	*[1]*
4	E140H 1234 S Mus (STIS.sp.61 5212)	(4) S-MUS	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1234 A	BUFFER-TIME=16 0; WAVECAL=NO		Sequence 1-5 Non-In t in Visit 11	1900 Secs (2033 Secs) *[==>2033.0 Secs]*	*[1]*
Comments: Predicted global count rate of 8411 c/s requires buffer time < 2e6/8400 = 237 c/s.									
5	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 11	250 Secs (250 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14340, Visit 12, implementation Sun Jul 12 01:03:38 GMT 2015

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 11 BY 90 D TO 120 D

Fixed Targets

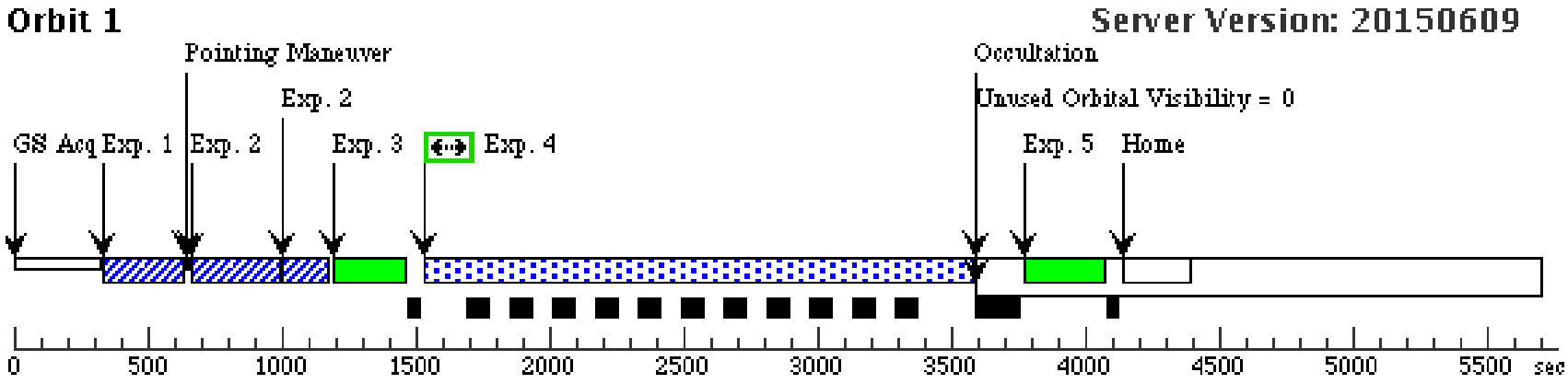
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	S-MUS	RA: 12 12 47.0183 (183.1959096d) Dec: -70 09 6.44 (-70.15179d) Equinox: J2000	Proper Motion RA: -7.79 mas/yr Proper Motion Dec: -0.60 mas/yr Parallax: 0.00199" Epoch of Position: 2000	V=6.17 B3.5V companion	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

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.615 207)	(4) S-MUS	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-In t in Visit 12	1.0 Secs (1 Secs) *[==>]*	*[1]*
2	ACQ/PEAK (STIS.sp.61 5210)	(4) S-MUS	STIS/CCD, ACQ/PEAK, 0.2X0.09	G230LB 2375 A			Sequence 1-5 Non-In t in Visit 12	5.0 Secs (5 Secs) *[==>]*	*[1]*
Comments: expect 952,000 e- from source in 5 sec exposure									
3	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 12	100 Secs (100 Secs) *[==>]*	*[1]*
4	E140H 1234 S Mus (STIS.sp.61 5212)	(4) S-MUS	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1234 A	BUFFER-TIME=16 0; WAVECAL=NO		Sequence 1-5 Non-In t in Visit 12	2050 Secs (2033 Secs) *[==>2033.0 Secs]*	*[1]*
Comments: Predicted global count rate of 8411 c/s requires buffer time < 2e6/8400 = 237 c/s.									
5	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 12	250 Secs (250 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14340, Visit 13, implementation Sun Jul 12 01:03:38 GMT 2015

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 12 BY 60 D TO 120 D

Fixed Targets

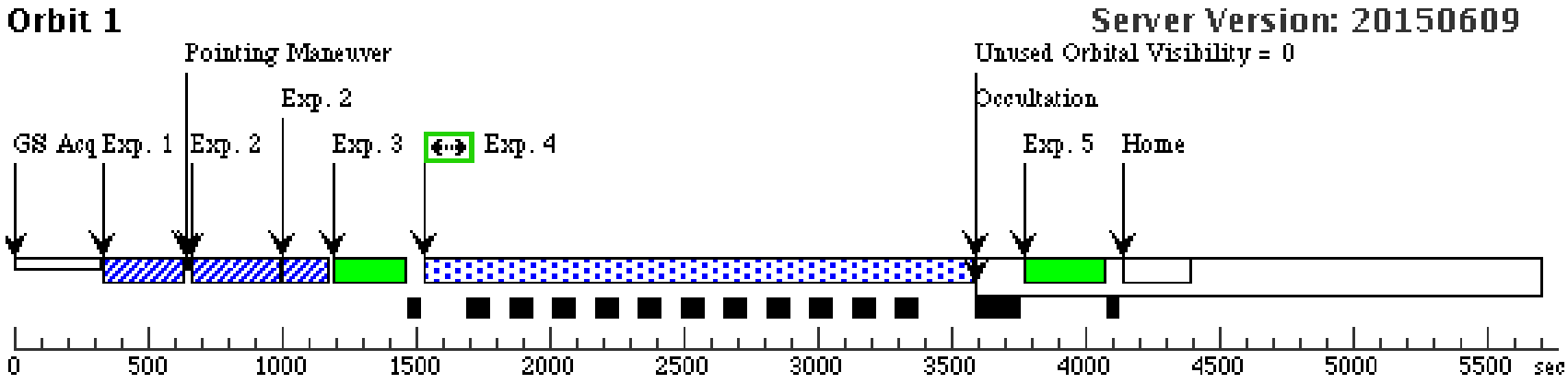
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	S-MUS	RA: 12 12 47.0183 (183.1959096d) Dec: -70 09 6.44 (-70.15179d) Equinox: J2000	Proper Motion RA: -7.79 mas/yr Proper Motion Dec: -0.60 mas/yr Parallax: 0.00199" Epoch of Position: 2000	V=6.17 B3.5V companion	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

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.615 207)	(4) S-MUS	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-In t in Visit 13	1.0 Secs (1 Secs) *[==>]*	*[1]*
2	ACQ/PEAK (STIS.sp.61 5210)	(4) S-MUS	STIS/CCD, ACQ/PEAK, 0.2X0.09	G230LB 2375 A			Sequence 1-5 Non-In t in Visit 13	5.0 Secs (5 Secs) *[==>]*	*[1]*
Comments: expect 952,000 e- from source in 5 sec exposure									
3	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 13	100 Secs (100 Secs) *[==>]*	*[1]*
4	E140H 1234 S Mus (STIS.sp.61 5212)	(4) S-MUS	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1234 A	BUFFER-TIME=16 0; WAVECAL=NO		Sequence 1-5 Non-In t in Visit 13	2050 Secs (2033 Secs) *[==>2033.0 Secs]*	*[1]*
Comments: Predicted global count rate of 8411 c/s requires buffer time < 2e6/8400 = 237 c/s.									
5	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 13	250 Secs (250 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14340, Visit 14, implementation Sun Jul 12 01:03:38 GMT 2015

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 13 BY 90 D TO 140 D

Fixed Targets

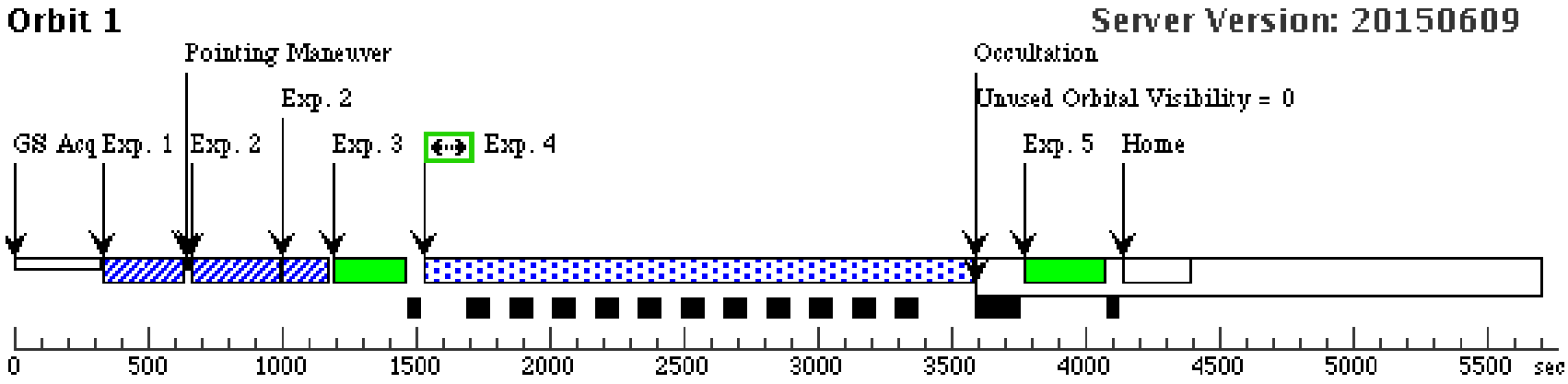
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	S-MUS	RA: 12 12 47.0183 (183.1959096d) Dec: -70 09 6.44 (-70.15179d) Equinox: J2000	Proper Motion RA: -7.79 mas/yr Proper Motion Dec: -0.60 mas/yr Parallax: 0.00199" Epoch of Position: 2000	V=6.17 B3.5V companion	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

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.615 207)	(4) S-MUS	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-In t in Visit 14	1.0 Secs (1 Secs) *[==>]*	*[1]*
2	ACQ/PEAK (STIS.sp.61 5210)	(4) S-MUS	STIS/CCD, ACQ/PEAK, 0.2X0.09	G230LB 2375 A			Sequence 1-5 Non-In t in Visit 14	5.0 Secs (5 Secs) *[==>]*	*[1]*
Comments: expect 952,000 e- from source in 5 sec exposure									
3	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 14	100 Secs (100 Secs) *[==>]*	*[1]*
4	E140H 1234 S Mus (STIS.sp.61 5212)	(4) S-MUS	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1234 A	BUFFER-TIME=16 0; WAVECAL=NO		Sequence 1-5 Non-In t in Visit 14	2050 Secs (2033 Secs) *[==>2033.0 Secs]*	*[1]*
Comments: Predicted global count rate of 8411 c/s requires buffer time < 2e6/8400 = 237 c/s.									
5	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 14	250 Secs (250 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14340, Visit 21, implementation Sun Jul 12 01:03:38 GMT 2015

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 01-NOV-2015:00:00:00 AND 22-DEC-2015:00:00:00

Fixed Targets

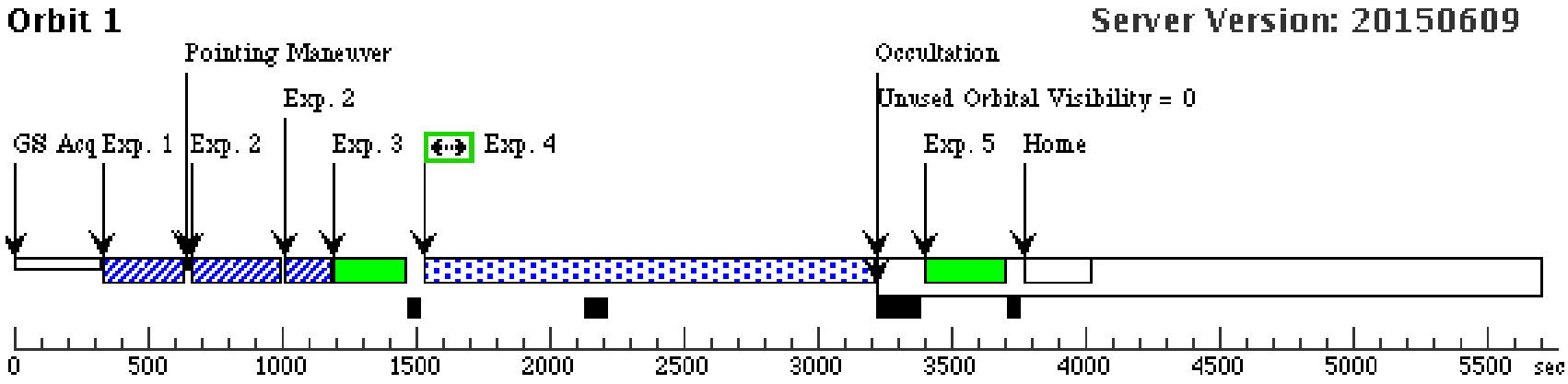
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	SU-CYG	RA: 19 44 48.7343 (296.2030596d) Dec: +29 15 52.88 (29.26469d) Equinox: J2000	Proper Motion RA: 0.26 mas/yr Proper Motion Dec: -3.86 mas/yr Parallax: 0.00127" Epoch of Position: 2000	V=6.44 B8V companion	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

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.615 219)	(6) SU-CYG	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-In t in Visit 21	1.5 Secs (1.5 Secs) *[==>]*	*[1]*
2	ACQ/PEAK (STIS.sp.61 5221)	(6) SU-CYG	STIS/CCD, ACQ/PEAK, 0.2X0.09	G230LB 2375 A			Sequence 1-5 Non-In t in Visit 21	5 Secs (5 Secs) *[==>]*	*[1]*
Comments: 631,428 e- from source in 5 s exposure									
3	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 21	100 Secs (100 Secs) *[==>]*	*[1]*
4	E140H 1234 SU Cyg (STIS.sp.61 5222)	(6) SU-CYG	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1234 A	BUFFER-TIME=60 0; WAVECAL=NO		Sequence 1-5 Non-In t in Visit 21	1676 Secs (1664 Secs) *[==>1664.0 Secs]*	*[1]*
Comments: Global count rate of 2171 c/s requires buffer time < 2e6/2171 or 921 c/s. Use 600 to give a substantial margin									
5	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 21	250 Secs (250 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14340, Visit 22, implementation Sun Jul 12 01:03:39 GMT 2015

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 21 BY 80 D TO 120 D

Fixed Targets

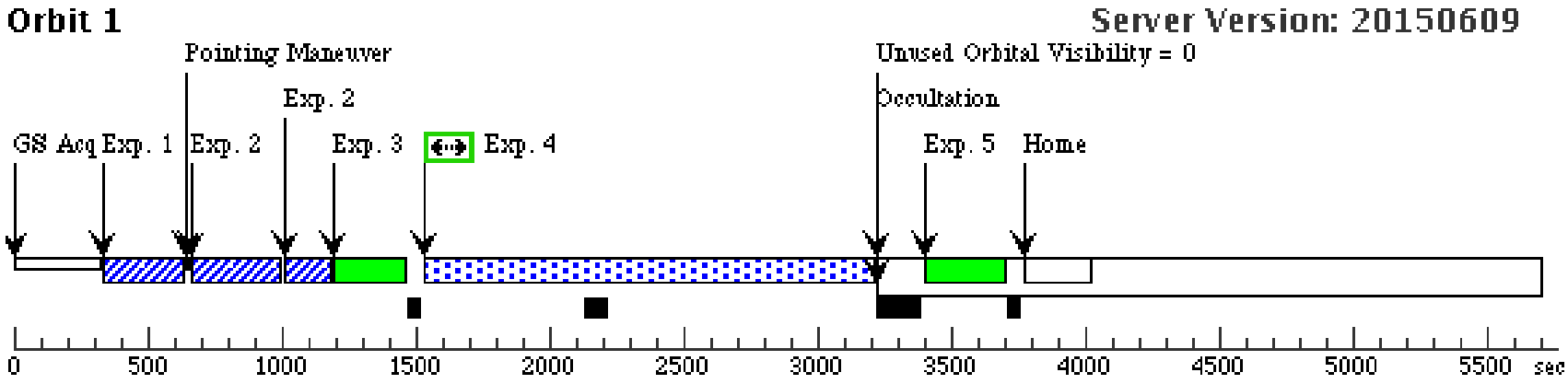
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	SU-CYG	RA: 19 44 48.7343 (296.2030596d) Dec: +29 15 52.88 (29.26469d) Equinox: J2000	Proper Motion RA: 0.26 mas/yr Proper Motion Dec: -3.86 mas/yr Parallax: 0.00127" Epoch of Position: 2000	V=6.44 B8V companion	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

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.615 219)	(6) SU-CYG	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-In t in Visit 22	1.5 Secs (1.5 Secs) *[==>]*	*[1]*
2	ACQ/PEAK (STIS.sp.61 5221)	(6) SU-CYG	STIS/CCD, ACQ/PEAK, 0.2X0.09	G230LB 2375 A			Sequence 1-5 Non-In t in Visit 22	5 Secs (5 Secs) *[==>]*	*[1]*
Comments: 631,428 e- from source in 5 s exposure									
3	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 22	100 Secs (100 Secs) *[==>]*	*[1]*
4	E140H 1234 SU Cyg (STIS.sp.61 5222)	(6) SU-CYG	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1234 A	BUFFER-TIME=60 0; WAVECAL=NO		Sequence 1-5 Non-In t in Visit 22	1630 Secs (1664 Secs) *[==>1664.0 Secs]*	*[1]*
Comments: Global count rate of 2171 c/s requires buffer time < 2e6/2171 or 921 c/s. Use 600 to give a substantial margin									
5	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 22	250 Secs (250 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14340, Visit 23, implementation Sun Jul 12 01:03:39 GMT 2015

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 22 BY 80 D TO 120 D

Fixed Targets

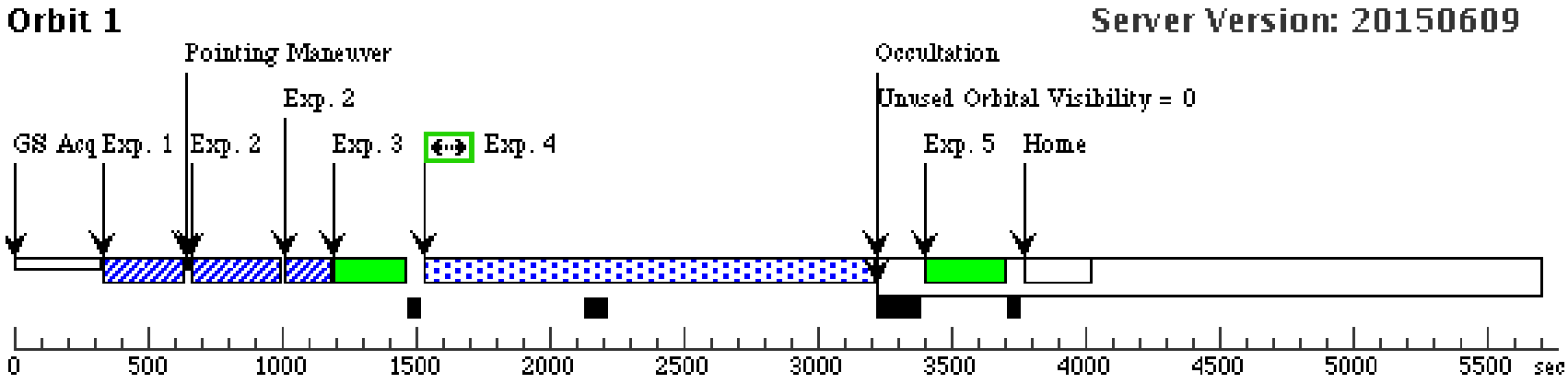
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	SU-CYG	RA: 19 44 48.7343 (296.2030596d) Dec: +29 15 52.88 (29.26469d) Equinox: J2000	Proper Motion RA: 0.26 mas/yr Proper Motion Dec: -3.86 mas/yr Parallax: 0.00127" Epoch of Position: 2000	V=6.44 B8V companion	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

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.615 219)	(6) SU-CYG	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-In t in Visit 23	1.5 Secs (1.5 Secs) *[==>]*	*[1]*
2	ACQ/PEAK (STIS.sp.61 5221)	(6) SU-CYG	STIS/CCD, ACQ/PEAK, 0.2X0.09	G230LB 2375 A			Sequence 1-5 Non-In t in Visit 23	5 Secs (5 Secs) *[==>]*	*[1]*
Comments: 631,428 e- from source in 5 s exposure									
3	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 23	100 Secs (100 Secs) *[==>]*	*[1]*
4	E140H 1234 SU Cyg (STIS.sp.61 5222)	(6) SU-CYG	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1234 A	BUFFER-TIME=60 0; WAVECAL=NO		Sequence 1-5 Non-In t in Visit 23	1630 Secs (1664 Secs) *[==>1664.0 Secs]*	*[1]*
Comments: Global count rate of 2171 c/s requires buffer time < 2e6/2171 or 921 c/s. Use 600 to give a substantial margin									
5	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 23	250 Secs (250 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14340, Visit 24, implementation Sun Jul 12 01:03:39 GMT 2015

Diagnostic Status: No Diagnostics

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

Special Requirements: AFTER 23 BY 80 D TO 140 D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(6)	SU-CYG	RA: 19 44 48.7343 (296.2030596d) Dec: +29 15 52.88 (29.26469d) Equinox: J2000	Proper Motion RA: 0.26 mas/yr Proper Motion Dec: -3.86 mas/yr Parallax: 0.00127" Epoch of Position: 2000	V=6.44 B8V companion	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

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.615 219)	(6) SU-CYG	STIS/CCD, ACQ, F25ND3	MIRROR			Sequence 1-5 Non-In t in Visit 24	1.5 Secs (1.5 Secs) *[==>]*	*[1]*
2	ACQ/PEAK (STIS.sp.61 5221)	(6) SU-CYG	STIS/CCD, ACQ/PEAK, 0.2X0.09	G230LB 2375 A			Sequence 1-5 Non-In t in Visit 24	5 Secs (5 Secs) *[==>]*	*[1]*
Comments: 631,428 e- from source in 5 s exposure									
3	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 24	100 Secs (100 Secs) *[==>]*	*[1]*
4	E140H 1234 SU Cyg (STIS.sp.61 5222)	(6) SU-CYG	STIS/FUV-MAMA, TIME-TAG, 0.2X0.09	E140H 1234 A	BUFFER-TIME=60 0; WAVECAL=NO		Sequence 1-5 Non-In t in Visit 24	1676 Secs (1664 Secs) *[==>1664.0 Secs]*	*[1]*
Comments: Global count rate of 2171 c/s requires buffer time < 2e6/2171 or 921 c/s. Use 600 to give a substantial margin									
5	E140H 1234 WAVE	WAVE	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1234 A			Sequence 1-5 Non-In t in Visit 24	250 Secs (250 Secs) *[==>]*	*[1]*

Orbit Structure