14476 - A collision reversal in HD 5980

Cycle: 24, 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?*
01	(1) HD-5980 CCDFLAT	STIS/CCD STIS/FUV-MAMA	2	07-Sep-2016 17:28:00.0	yes

2 Total Orbits Used

ABSTRACT

HD 5980 provides a unique laboratory for studying the properties of wind-wind collisions. It contains one of only two binary systems having a WR-star in orbit with a LBV. The latter star has been observed to undergo major changes in its wind structure over the past 35 years, implying changes in the geometry and emitting conditions of the wind-wind collision region. Ten years ago, when the LBV wind was very strong, XMM observations revealed X-ray emission consistent with the shock cone wrapping around the WR component. Since then, the wind strength has significantly declined, implying that the collision shock cone may be inverting its orientation. The objective of this proposal is to obtain X-ray coverage of this never before observed phenomenon. We also request HST/STIS observations to determine the wind velocity of the WR-star. All recent HST

observations of this system have been performed at the opposite orbital phase, when the LBV occults the WR. The WR wind speed is required for the study of the WWC region. We propose to observe HD 5980 in the 1170 - 1730 A spectral interval with STIS using the FUV- MAMA detector with the E140M grating, plus 3 short exposures with the CCD in order to complete the wavelength coverage out to 10000 A. These observations all fit into 2 orbits.

OBSERVING DESCRIPTION

We propose to observe HD 5980 in the 1170 - 1730 A spectral interval with STIS using the FUV- MAMA detector, the E140M grating and the 0.2x0.2 slit. To estimate the exposure times we used our most recent HST spectra obtained in 2013. The Exposure Time Calculator indicates that we will require an exposure of 4600 seconds to achieve S/N~50 per resolution element at 1300 A and S/N>20 in the entire spectral range. The actual exposure time entered into the Orbit Planner is 4597 seconds, split into two exposures, the first of 2569 seconds during the first orbit and the second of 2028 seconds in the second orbit. We are also requesting 3 exposures using the CCD detector and the G230BL, G430L and G750L gratings. This will provide a full spectral energy distribution for the CMFGEN model fits. The requested exposure times are 300 s, 60 s and 60 s, respectively, which will assure S/N~100. The total exposure time+overheads for the CCD spectra is less than 25 min, asuming a 5 min overhead per CCD exposure (HST Primer sec. 6.4.3). The CCD spectra will be obtained during the second orbit. The mixture of MAMA and CCD observations in the same orbit is justified by the short exposure time required for the CCD spectra (HST Primer sec. 6.2.2).

We require that the observation be scheduled to coincide with the eclipse of Star A by Star B, which occurs at orbital phase phase=0.36. The orbital period is 19.2654 days, and the initial epoch for the calculation of the eclipse phase is T0 =JD 2443158.707. The optimum results will be for an observation performed within +/-0.01 in phase of the eclipse date. This gives a tolerance of +/-0.2 days.

Visit

Proposal 14476, Visit 01, implementation Wed Sep 07 21:28:02 GMT 2016

Diagnostic Status: No Diagnostics

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

Special Requirements: BETWEEN 2016.265:11:00:00 AND 2016.265:23:59:59; Period 19.2654 D AND ZERO-PHASE HJD2456991.264

Comments: Required to be scheduled for orbital phase 0.36 +/-0.01; Initial epoch T0 =JD 2443158.707 and Period P=19.2654d

Fixed Targets

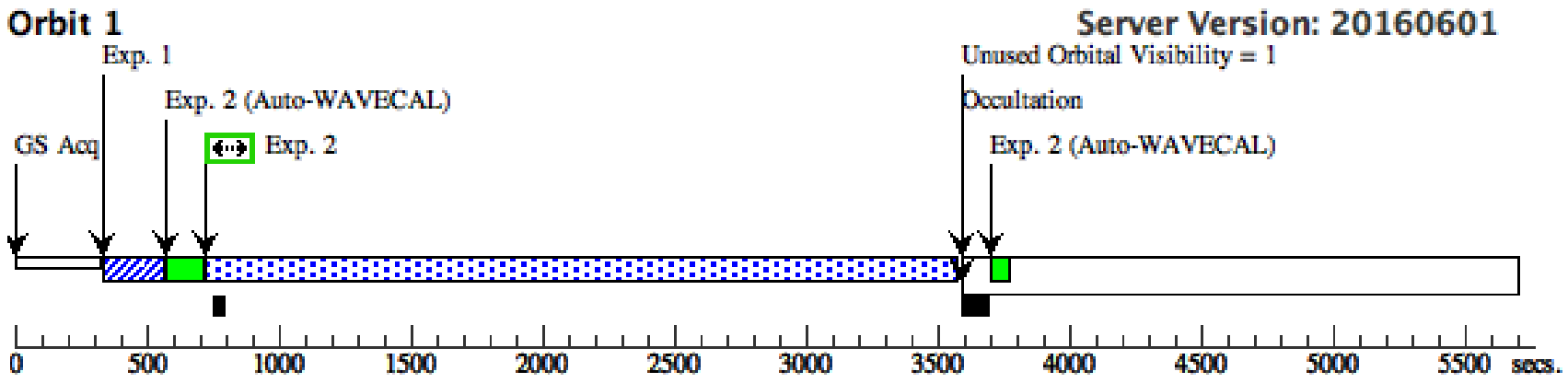
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-5980	RA: 00 59 26.5687 (14.8607029d) Dec: -72 09 53.91 (-72.16498d) Equinox: J2000		V=11.31	Reference Frame: ICRS

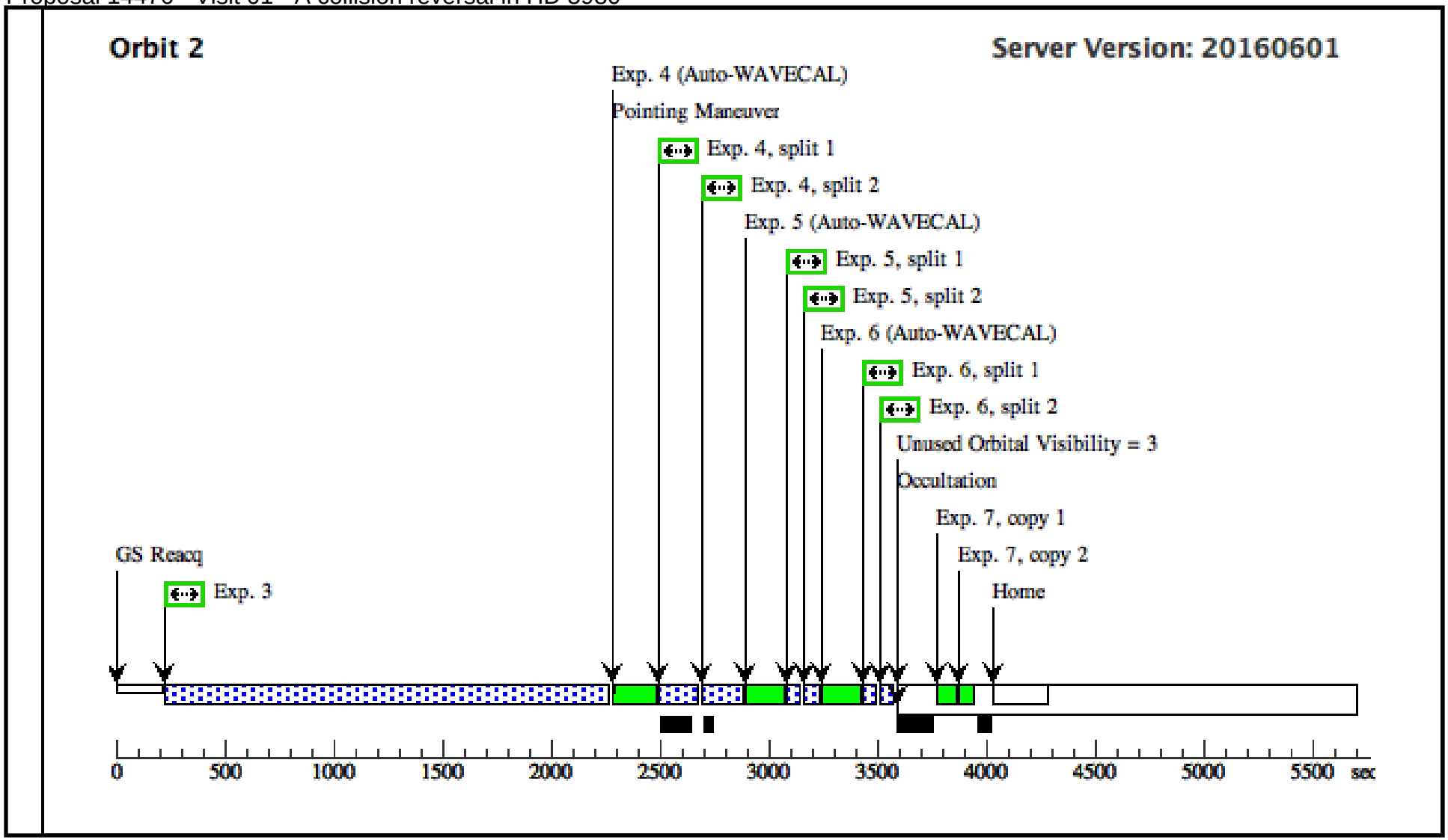
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(829285)	(1) HD-5980	STIS/CCD, ACQ, F28X50LP	MIRROR		PHASE 0.345 TO 0.37		0.6 Secs (0.6 Secs) *[==>]*	 ***[1]***
2	(768346)	(1) HD-5980	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				2837 Secs (2837 Secs) *[==>]*	 ***[1]***
3	(768347)	(1) HD-5980	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				2028 Secs (2028 Secs) *[==>]*	 ***[2]***
4		(1) HD-5980	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A				300 Secs (300 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	 ***[2]***
5		(1) HD-5980	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A				60 Secs (60 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	 ***[2]***
6		(1) HD-5980	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				60 Secs (60 Secs) *[==>(Split 1)]* *[==>(Split 2)]*	 ***[2]***
7		CCDFLAT	STIS/CCD, ACCUM, 0.3X0.09	G750L 7751 A				0.1 Secs X 2 (0.2 Secs) *[==>(Copy 1)]* *[==>(Copy 2)]*	 ***[2]***

Orbit Structure




Orbit 2
Server Version: 20160601
Exp. 4 (Auto-WAVECAL)
Pointing Maneuver
Exp. 4, split 1
Exp. 4, split 2
Exp. 5 (Auto-WAVECAL)
Exp. 5, split 1
Exp. 5, split 2
Exp. 6 (Auto-WAVECAL)
Exp. 6, split 1
Exp. 6, split 2
Unused Orbital Visibility = 3
Occultation
Exp. 7, copy 1
Exp. 7, copy 2
Home
GS Reacq
Exp. 3
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec