12418 - New COS Flux Standard

Cycle: 18, Proposal Category: CAL/STIS

(Availability Mode: RESTRICTED)

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) WD-0308-565 NONE WAVE	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	1	02-Nov-2010 21:43:39.0	yes

1 Total Orbits Used

ABSTRACT

DB wds are ideal stars for FUV calibration. Unlike the DA wds which are typically used, DBs do not have strong photospheric Lyman absorption lines and their flatter SEDs provide a more uniform S/N when recorded by the COS UV detectors. This proposal requests the observations needed to derive a calibration-quality model for the DB wd WD0308-566.

OBSERVING DESCRIPTION

To establish WD0308-566 as a COS/STIS calibration standard, which means that we must obtain the observational coverage needed to produce a good model. The modeling requires S/N coverage of the UV and optical. Optical coverage is essential, because the property that makes these stars ideal UV flux standards (a lack of features in the UV), makes it impossible to determine their physical parameters from UV observations alone.

Consequently, we need optical spectra to model the optical He I lines which are sensitive to both temperature and gravity.

CALIBRATION JUSTIFICATION

We would like to adopt the DB wd WD0308-566 as a calibration standard. The FUV continua of 15 - 25kK DB white dwarfs can be ideal for calibration because they are smooth and, due to the absence of atmospheric hydrogen, they lack the strong photospheric Ly alpha seen in DA wds, which makes them superior to DA wds for calibrating the Ly alpha region for two reasons. First, the absence of strong photospheric absorption means that a uniform, high S/N spectrum can be obtained throughout the Ly alpha region. Second, even the best DA models are somewhat uncertain near Ly alpha since the SEDs are strongly affected by the extremely strong Ly alpha Stark wings and it is unclear how well current broadening theory applies to the extremely high pressure environments of wd atmospheres. In addition, the DB wds are considerably cooler than DAs, so their SEDs are flatter in the UV. Given the response of the COS detectors, this results in a more uniform S/N over a given grating setting. LDS749B is a good example of a DB wd standard. Its UV spectrum is relatively featureless, lacks stellar Ly alpha and has a relatively flat UV continuum. Unfortunately, LDS749B is quite faint, so high S/N noise COS observations require long exposure times. WD308-566 is between 10 - 15 times brighter than LDS749B throughout the UV, and would make an ideal COS G130M calibration target for the following reasons:

1. It is faint enough to be observed in TTAG mode (essential for calibration sources) and between 1.25 and 2 times brighter over the G130M range than the brightest DA wd standard (WD1657+343) that can be observed by the G130M in TTAG mode.
2. It lacks stellar Ly alpha and its relatively flat continuum, produces count rates that vary less than a factor of 2 over the G130M range.
3. This increased in brightness could result in enormous time savings for flat field monitoring or additional flux calibrations.
4. It is bright enough to serve as a precision STIS/COS cross-calibration source.
5. It would be a useful calibration target if the new G130M settings are adopted, since the FUV spectra of DA wds contain the confluence of the upper Lyman lines, making their spectra complex and problematic for flux calibration.

WD0308-566 has been monitored for variability in the optical and is stable. It also has low resolution IUE and a FUSE spectra available, so we are certain that it does not have significant atmospheric metal content (like a few DBs) which could make its continuum too busy to be a good calibration source. Therefore, we request 2 orbits to observe WD-308-566: 1 COS orbit to obtain high S/N G130M spectra, and; 1 STIS orbit to obtain the UV data needed to cross-calibrate COS and STIS and the optical data needed to determine the high quality model fit needed to adopt it as a calibration standard.

Visit

Proposal 12418, Visit 01, implementation Wed Nov 03 01:43:45 GMT 2010

Diagnostic Status: Warning

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

Special Requirements: SCHED 80%; BETWEEN 21-NOV-2010:18:56:30 AND 15-JAN-2011:18:56:30

Diagnostics

(Visit 01) Warning (Orbit Planner): MISSING FRINGE FLAT CALIBRATION

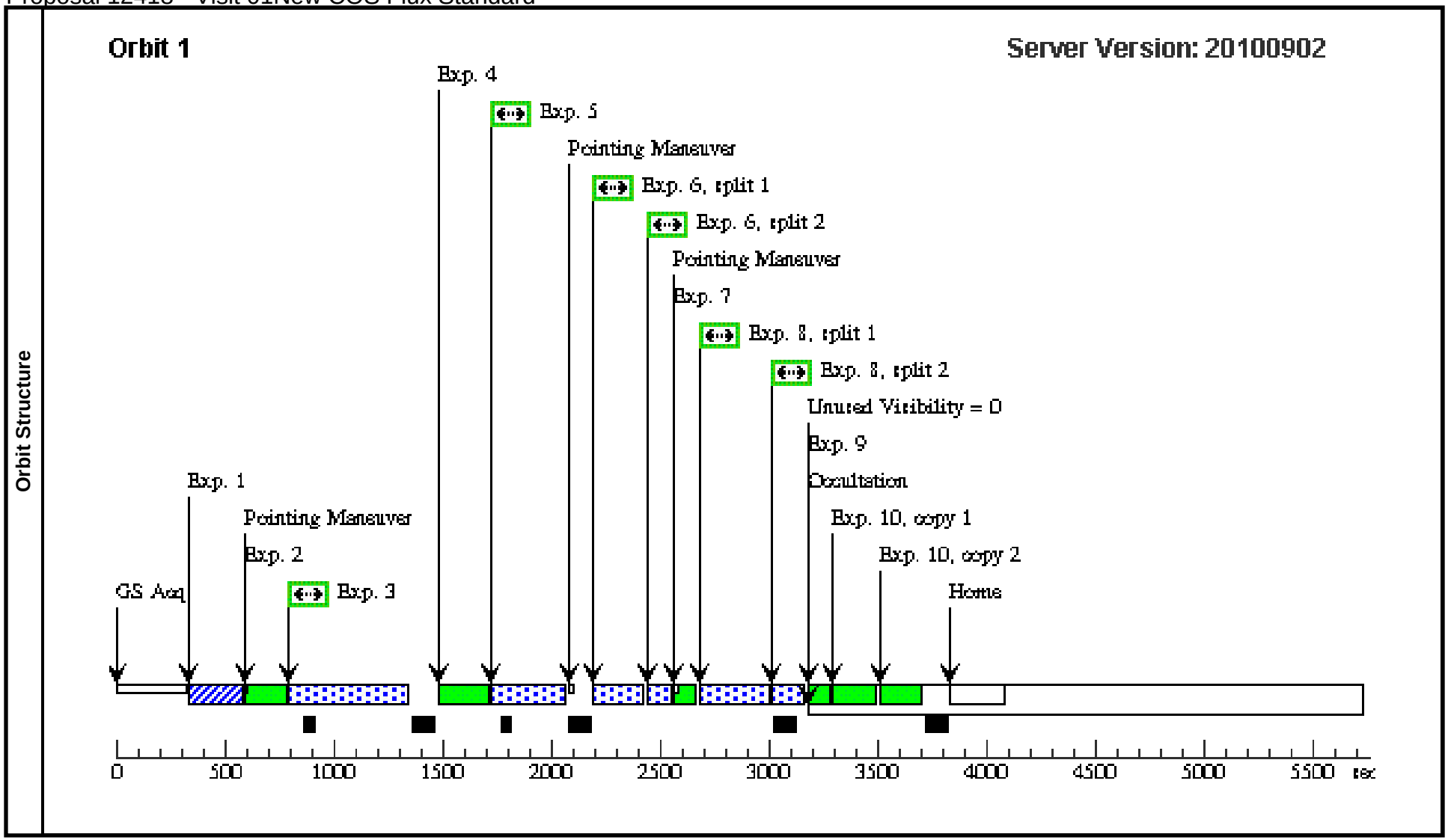
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	WD-0308-565	RA: 03 09 47.9100 (47.4496250d) Dec: -56 23 49.50 (-56.39708d) Equinox: J2000	Proper Motion RA: 0.11arcsec/yr Proper Motion Dec: 0.03arcsec/yr Epoch of Position: 2000 Radial Velocity: -68 km/sec	V=14.07+/-0.02	Reference Frame: ICRS

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

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	ACQ	(1) WD-0308-565	STIS/CCD, ACQ, F28X50LP	MIRROR				5 Secs *[==>]*	*[1]*
2	G140L wave	WAVE	STIS/FUV-MAMA, ACCUM, 52X0.05	G140L 1425 A				*[==>]*	*[1]*
3	G140L	(1) WD-0308-565	STIS/FUV-MAMA, ACCUM, 52X2	G140L 1425 A	WAVECAL=NO			500 Secs *[==>]*	*[1]*
4	G230L wave	WAVE	STIS/NUV-MAMA, ACCUM, 31X0.05NDC	G230L 2376 A				*[==>]*	*[1]*
5	G230L	(1) WD-0308-565	STIS/NUV-MAMA, ACCUM, 52X2	G230L 2376 A				300 Secs *[==>]*	*[1]*
6	G430L	(1) WD-0308-565	STIS/CCD, ACCUM, 52X2E1	G430L 4300 A				148 Secs *[==>(Split 1)]* *[==>(Split 2)]*	*[1]*
7	G430L wave	WAVE	STIS/CCD, ACCUM, 52X0.1	G430L 4300 A				*[==>]*	*[1]*
8	G750L	(1) WD-0308-565	STIS/CCD, ACCUM, 52X2	G750L 7751 A				240 Secs *[==>(Split 1)]* *[==>(Split 2)]*	*[1]*
9	G750L WAVE	WAVE	STIS/CCD, ACCUM, 52X0.1	G750L 7751 A				*[==>]*	*[1]*
10	Fringe flat	NONE	STIS/CCD, ACCUM, 0.3X0.09	G750L 7751 A	LAMP=TUNGSTEN; GAIN=4			120 Secs X 2 *[==>(Copy 1)]* *[==>(Copy 2)]*	*[1]*


Orbit 1
Server Version: 20100902
Orbit Structure
Exp. 4
Exp. 5
Pointing Maneuver
Exp. 6, split 1
Exp. 6, split 2
Pointing Maneuver
Exp. 7
Exp. 8, split 1
Exp. 8, split 2
Unused Visibility = 0
Exp. 9
Occultation
Exp. 10, copy 1
Exp. 10, copy 2
Home
Exp. 1
Pointing Maneuver
Exp. 2
GS Acq
Exp. 3
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec