



15457 - COS/FUV/G160M/1533 Wavelength Calibration - Dispersion Solution

Cycle: 25, Proposal Category: CAL/COS

(Availability Mode: RESTRICTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) EPSILON-ERI NONE	COS COS/FUV COS/NUV	1	17-May-2018 19:02:23.0	yes

1 Total Orbits Used

ABSTRACT

This program will observe the emission-line star Epsilon Eridani for use in deriving the dispersion solution for the new G160M/1533 central wavelength at LP4. The G160M dispersion solution is a 1st-order polynomial, so the goal is to derive the dispersion coefficient and zero-point of the wavelength solution. The exposure time and orbit request are driven by the number of counts needed in weak FUV emission lines, following program 15365, the wavelength calibration program for the other cenwaves at LP4. We need to achieve at least S/N ~5 (~25 counts) in the peak of the weaker emission lines to allow good cross correlation with the lamp template. Eps Eri is chosen as the target because its spectrum contains many chromospheric emission lines across the FUV bandpass.

OBSERVING DESCRIPTION

The primary goal of this program is to obtain spectra of Eps Eri with G160M/1533 to determine the dispersion coefficient and zeropoint of the dispersion solution, which is assumed to be linear. The observations follow those in program 15365 (LP4 wavelegth calibration, PI=Rachel Plesha).

The following emission lines will be used as fiducials for our correlations, following program 15365. According to the observations taken in that program, the peak count rates and exposure times to obtain 30 counts (25+1 sigma) in those lines are as follows:

G160M FUV A 1681.4 A -> 0.015 counts/s, so 30 counts requires ~2000s

G160M FUV B 1485.7 A -> 0.025 counts/s, so 30 counts requires ~1200s

Since the FUV A line (1681.4) is fainter, that one drives the exposure time. We verified using the latest version of the ETC (26.1, which includes 1533) that these count levels should be met or exceeded for 1533.

Instead of using special commanding, we use the OSM ALIGN command to set the rotation and focus to 1533, as in the 1533 focus sweep program 15452, using the FOCUS and OSM1ROT parameters, which are the relative offsets from 1577 to 1533. This approach works since only 1 FP-POS position (3) is used.

Double BOA NUV ACQ/IMAGE target acquisitions will be performed to ensure the best possible target centering for the zero-point measurement, following Program 15365 (which observed Eps Eri, the same target). We checked that using two ACQ/IMAGES was worthwhile by looking at the size of the TA slews in 15365 Visit 03. In that case, the second ACQ/IMAGE slew was 0.025" in AD and 0.033" in XD, larger than the best precision achievable (0.016" according to Steve Penton), so it is worth keeping the second ACQ/IMAGE, especially given that optimal wavelength precision is needed for this program.

The visit is structured as follows

- 1) BOA+MIRRORB ACQ/IMAGE: 10s (to acquire target, S/N=30)
- 2) BOA+MIRRORB ACQ/IMAGE: 17s (to refine target centering, S/N=60)
- 3) G160M/1577: 0.1 s (to configure 1577, the closest cenwave)
- 4) OSM ALIGN, FOCUS=-538, OSM1ROT=15 (to configure 1533)
- 5) G160M/1533: 1952 s (actual exposure, fills the orbit)
- 6) OSM/ALIGN, FOCUS=0, OSMROT=0 (to return OSM to 1577)

The Visit uses SCHED 70, giving a window beginning June 23. We request the data by the end of June, using a BEFORE July 1 timing requirement.

SPECIAL REQUESTS:

1. Please turn off calibration for the COS/FUV 1533 exposure (01.005)
2. Please disassociate all exposures.

SQL is used to meet the above requests. In case 1 qexposure.control_id is modified. In case 2 qeassociation records are deleted. Please see G. Chapman/M. Reinhart.

Proposal 15457 - Eps Eri G160M/1533 (01) - COS/FUV/G160M/1533 Wavelength Calibration - Dispersion Solution

Thu May 17 23:02:24 GMT 2018

Visit	<p>Proposal 15457, Eps Eri G160M/1533 (01), implementation</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: COS, COS/FUV, COS/NUV</p> <p>Special Requirements: SCHED 70%</p> <p><i>Comments: ** Please schedule before the end of June 2018 if possible. I originally used a BEFORE timing constraint to specify this, but removed it at the request of George Chapman after PIT meeting on 5/17/18. We prefer the data in June 2018 to allow us to complete the analysis this summer and deliver the reference files in time for Cycle 26. **</i></p> <p><i>These Eps Eri observations must achieve at least 25 peak counts (~100 total), and preferably >30 peak counts, in the following faint lines for G160M</i></p> <p><i>G160M FUVB 1681.4</i></p> <p><i>G160M FUVB 1485.7</i></p>
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Diagnostics	<p>(Eps Eri G160M/1533 (01)) Warning (Form): For the best data quality, it is strongly recommended that the maximum number of allowed FP-POS positions is used when observing at a given COS CENWAVE setting. See full description for details.</p>
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Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	EPSILON-ERI	RA: 03 32 55.8450 (53.2326875d)	Proper Motion RA: -975.17 mas/yr	V=3.73	Reference Frame: ICRS
		Alt Name1: HD22049	Dec: -09 27 29.73 (-9.45826d)	Proper Motion Dec: 19.49 mas/yr		
		Alt Name2: GJ144	Equinox: J2000	Parallax: 0.31094"		
				Epoch of Position: 2000		
				Radial Velocity: 16.43 km/sec		
	<p><i>Comments: This from SIMBAD: eps Eri -- Variable of BY Dra type</i></p> <p><i>ICRS coord. (ep=J2000) : 03 32 55.84496 -09 27 29.7312 (Optical) [1.84 1.75 90] A 2007A&A...474..653V</i></p> <p><i>Proper motions mas/yr : -975.17 19.49 [0.21 0.20 0] A 2007A&A...474..653V</i></p> <p><i>Radial velocity : V(km/s) 16.43 [0.09] / z(~) 0.000055 [0.000000] / cz 16.43 [0.09]</i></p> <p><i>Spectral type: K2Vk: C 2006AJ....132..161G</i></p> <p><i>U 5.19 [~] C 2002yCat.2237....0D</i></p> <p><i>B 4.61 [~] C 2002yCat.2237....0D</i></p> <p><i>V 3.73 [~] C 2002yCat.2237....0D</i></p> <p><i>R 3.00 [~] C 2002yCat.2237....0D</i></p> <p><i>I 2.54 [~] C 2002yCat.2237....0D</i></p> <p><i>J 2.23 [~] C 2002yCat.2237....0D</i></p> <p><i>H 1.75 [~] C 2002yCat.2237....0D</i></p> <p><i>K 1.67 [~] C 2002yCat.2237....0D</i></p> <p><i>Category=EXT-STAR</i></p> <p><i>Description=[K V-IV]</i></p> <p><i>Extended=NO</i></p>					

Proposal 15457 - Eps Eri G160M/1533 (01) - COS/FUV/G160M/1533 Wavelength Calibration - Dispersion Solution

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	BOA+MIR RORB ACQ /IMAGE (COS.ta.116 2498)	(1) EPSILON-ERI	COS/NUV, ACQ/IMAGE, BOA	MIRRORB				10 Secs (10 Secs) [==>]	[1]
<i>Comments: ACQ/IMAGE with BOA/MIRRORB, S/N=30 per guideline (exposure time rounded up)</i>									
2	BOA+MIR RORB ACQ /IMAGE (COS.ta.116 2438)	(1) EPSILON-ERI	COS/NUV, ACQ/IMAGE, BOA	MIRRORB				17 Secs (17 Secs) [==>]	[1]
<i>Comments: Second ACQ/IMAGE to refine target centering, using S/N=60 for optimal centroiding.</i>									
3	G160M/157 7 configurati on (COS.sp.805 247)	(1) EPSILON-ERI	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=15 0; LIFETIME-POS=L P4; FLASH=NO; WAVECAL=NO			0.1 Secs (0.1 Secs) [==>]	[1]
<i>Comments: This is a dummy exposure used to configure the G160M/1577 cenwave (the closest cenwave to 1533 currently available in APT). Flash = NO to save time.</i>									
4	ALIGN OS M to set 153 3	NONE	COS, ALIGN/OSM		FOCUS=-538; OSM1ROT=15			0 Secs (0 Secs) [==>]	[1]
<i>Comments: FOCUS=-538 is the relative focus offset from 1577 to 1533, as determined from the 1533 focus sweep analysis (program 15452). OSMROT1=15 is the relative rotation offset from 1577 to 1533, exactly as used in the focus sweep program.</i>									
5	G160M/153 3 (COS.sp.116 2440)	(1) EPSILON-ERI	COS/FUV, TIME-TAG, PSA	G160M 1577 A	FP-POS=3; BUFFER-TIME=42 88; LIFETIME-POS=L P4			1952 Secs (1952 Secs) [==>]	[1]
<i>Comments: This is the 1533 wavelength calibration exposure. Exposure time calculated using ETC version 26.1 buffer time = 2/3 * 6432s = 4288s. The exposure gives S/N > 13 per resel in the 1681 emission line, which translates to >> 30 counts, the requirement ** Please turn off calibration for this exposure using SQL by modifying qexposure.control_id. **</i>									
6	ALIGN OS M to return t o 1577	NONE	COS, ALIGN/OSM		FOCUS=0; OSM1ROT=0			0 Secs (0 Secs) [==>]	[1]
<i>Comments: This command returns the OSM to the 1577 position.</i>									

Exposures

