13707 - Mapping the Extreme Horizontal Branch instability strip in omega Centauri

Cycle: 22, Proposal Category: GO

(UV Initiative)

(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) OMEGA-CEN-132712-473229	COS/FUV	2	17-Jun-2015 08:21:35.0	yes
02	(2) OMEGA-CEN-132715-473051	COS/FUV	2	17-Jun-2015 08:21:37.0	yes

4 Total Orbits Used

ABSTRACT

We request far-UV spectroscopy for the hottest and the coolest members of the recently discovered class of rapid subdwarf O pulsators on the Extreme Horizontal Branch (EHB) in omega Centauri. Our main aim is to derive reliable temperature estimates and thus map the location of the omega Cen EHB instability strip in the Teff-log g plane. Current estimates based on optical spectroscopy suggest the pulsators to be clustered around

50,000 K, which is distinctly cooler than the red edge of the predicted instability strip. We suspect that this discrepancy is due, at least in part, to the known problem of the temperatures being significantly underestimated from optical spectroscopy (compared to the more realistic values from FUV spectroscopy) for very hot stars. Given the successful pulsational modeling of the cooler (~31,000 K) rapid subdwarf B pulsators found among the Galactic field population, the inability to reproduce the omega Cen pulsators would point towards fundamental differences between the two EHB populations. On the other hand, if we are able to reconcile the predicted and observed instability regions for the omega Cen pulsators, this will open them up to exploitation via asteroseismology. Asteroseismology has proven to be a very powerful tool for determining the internal stellar structure in the subdwarf B pulsators, providing valuable constraints on competing evolutionary scenarios. In light of the currently raging debate as to the origin of EHB stars particularly in Globular Clusters, the prospect of applying asteroseismology to EHB stars in a Globular Cluster for the first time is highly enticing.

Visit

Proposal 13707, V1 (01), implementation Wed Jun 17 12:21:39 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: (none)

Comments: FUV spectroscopy of V1

Fixed Targets

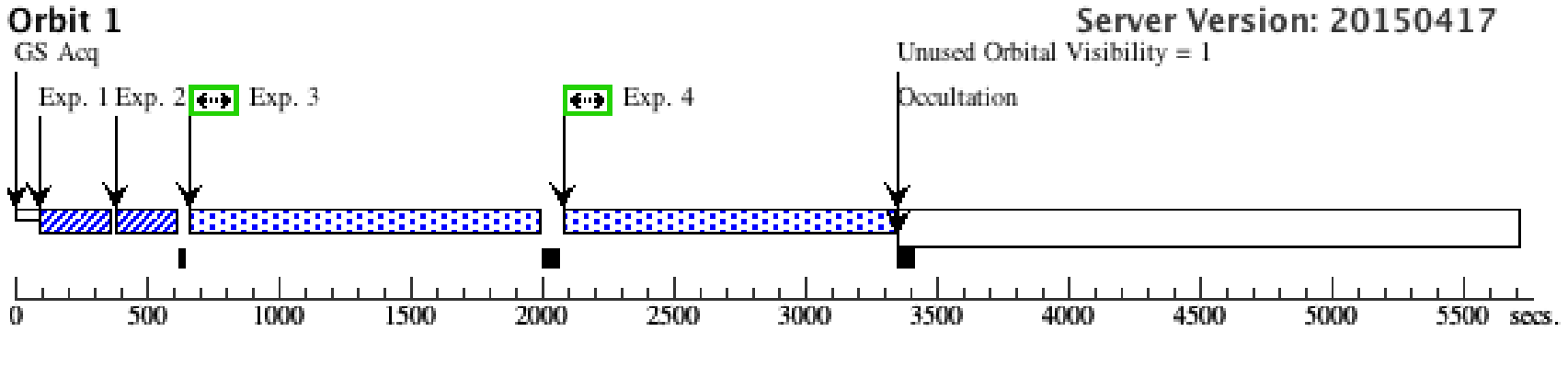
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	OMEGA-CEN-132712-473229 Alt Name1: OMEGA-CEN-V1	RA: 13 27 11.7665 (201.7990271d) Dec: -47 32 28.97 (-47.54138d) Equinox: J2000	Radial Velocity: 230 km/sec	V=18.459+/-0.005 U=16.81, spectral type sdO	Reference Frame: ICRS

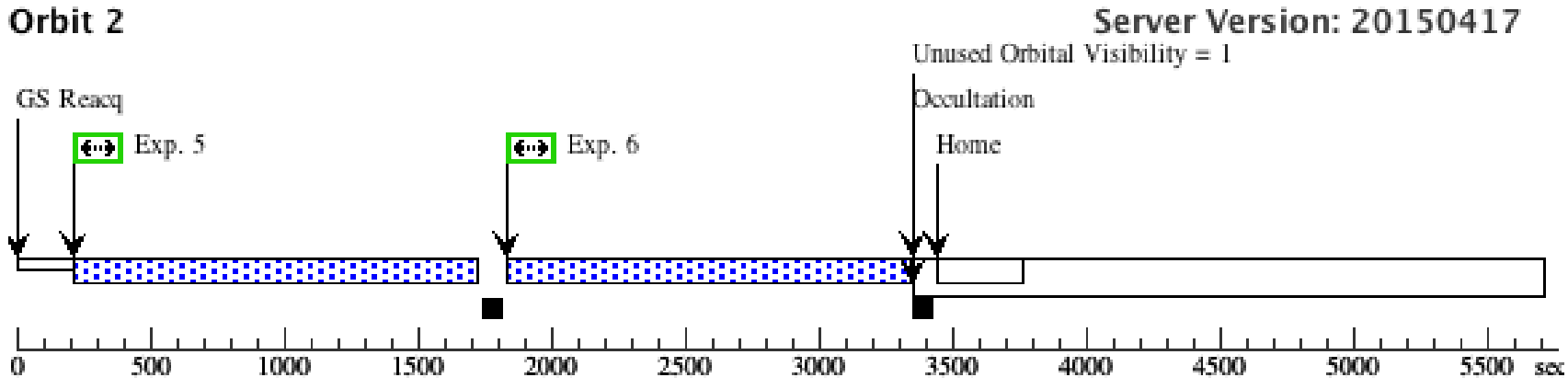
Comments: The target star should be the brightest object in the FOV in the FUV

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	acquisition1 (COS.sa.616736)	(1) OMEGA-CEN-132712-473229	COS/FUV, ACQ/PEAKXD, PSA	G140L 1105 A		GS ACQ SCENARIO BASE1B3		6.5 Secs (6.5 Secs) *[==>]*	***[1]***
2	acquisition2 (COS.sa.616739)	(1) OMEGA-CEN-132712-473229	COS/FUV, ACQ/PEAKD, PSA	G140L 1105 A	NUM-POS=5; STEP-SIZE=0.9; CENTER=FLUX-WT-FLR			15.5 Secs (15.5 Secs) *[==>]*	***[1]***
3	science1 (COS.sp.616744)	(1) OMEGA-CEN-132712-473229	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=2400; FP-POS=1			1209 Secs (1209 Secs) *[==>]*	***[1]***
4	science2 (COS.sp.616744)	(1) OMEGA-CEN-132712-473229	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=2400; FP-POS=2			1209 Secs (1209 Secs) *[==>]*	***[1]***
5	science3 (COS.sp.616744)	(1) OMEGA-CEN-132712-473229	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=2400; FP-POS=3			1459 Secs (1459 Secs) *[==>]*	***[2]***
6	science4 (COS.sp.616744)	(1) OMEGA-CEN-132712-473229	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=2400; FP-POS=4			1459 Secs (1459 Secs) *[==>]*	***[2]***

Orbit Structure





Visit

Proposal 13707, V5 (02), scheduling Wed Jun 17 12:21:39 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/FUV

Special Requirements: (none)

Comments: FUV spectroscopy of V5

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	OMEGA-CEN-132715-473051 Alt Name1: OMEGA-CEN-V5	RA: 13 27 14.9632 (201.8123467d) Dec: -47 30 50.85 (-47.51412d) Equinox: J2000	Radial Velocity: 230 km/sec	V=18.386+/-0.003 U=16.96, spectral type sdO	Reference Frame: ICRS

Comments: The target star should be the brightest object in the FOV in the FUV. There is another star with ~90% of the FUV flux of V5 about 6" to the North-East of V5, but that should fall outside of the COS field and not influence the observations.

Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	acquisition1 (COS.sa.616736)	(2) OMEGA-CEN-1 32715-473051	COS/FUV, ACQ/PEAKXD, PSA	G140L 1105 A				6.5 Secs (6.5 Secs) *[==>]*	*[1]*
2	acquisition2 (COS.sa.616739)	(2) OMEGA-CEN-1 32715-473051	COS/FUV, ACQ/PEAKD, PSA	G140L 1105 A	NUM-POS=5; STEP-SIZE=0.9; CENTER=FLUX-WT-FLR			15.5 Secs (15.5 Secs) *[==>]*	*[1]*
3	science1 (COS.sp.616744)	(2) OMEGA-CEN-1 32715-473051	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=2400; FP-POS=1			1209 Secs (1209 Secs) *[==>]*	*[1]*
4	science2 (COS.sp.616744)	(2) OMEGA-CEN-1 32715-473051	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=2400; FP-POS=2			1209 Secs (1209 Secs) *[==>]*	*[1]*
5	science3 (COS.sp.616744)	(2) OMEGA-CEN-1 32715-473051	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=2400; FP-POS=3			1459 Secs (1459 Secs) *[==>]*	*[2]*
6	science4 (COS.sp.616744)	(2) OMEGA-CEN-1 32715-473051	COS/FUV, TIME-TAG, PSA	G140L 1105 A	BUFFER-TIME=2400; FP-POS=4			1459 Secs (1459 Secs) *[==>]*	*[2]*

Orbit Structure