11829 - Coronal and Transition Region Heating Due to Magnetic Activity on Metal-Poor Dwarf Stars

Cycle: 17, 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) HD103095	COS/FUV COS/NUV	3	07-Dec-2009 21:01:06.0	yes

3 Total Orbits Used

ABSTRACT

How does low metallicity affect the heating and resultant temperature structure of the chromospheres, transition regions, and coronae of old solar-like dwarf stars? Our ACIS-S observations of 7 Gyr old Arcturus Moving Group (AMG) dwarfs show very little conventional coronal (> 1 MK) plasma and suggest that these stars have insufficient magnetic energy input to power a solar-like corona. However, they do have chomospheres and transition regions similar to the minimum activity Quiet Sun. It this typical or an aberration of the AMG? We propose a 35 ksec ACIS-S observation and HST COS spectroscopy of the nearest (9.2 pc), truely metal-poor ([Fe/H] = -1.4) dwarf star that is known to have definite magnetic dynamo

activity (activity cycles, active region modulation) -- HD103095 -- to investigate this question further.

OBSERVING DESCRIPTION

The metal-poor G8 dwarf HD103095 is to be observed using COS G140L/G160M/G130M during the 3 orbits allocated . HD130095 is visually bright with V = 6.45 and has very accurate coordinates from the Hipparcos Catalogue. However, its proper motion is very large at 7 arcseconds per year. The coordinates given in this Phase II proposal are already corrected for proper motion to 2000.0.

Our observational sequence is:
Acquisition consists of a 3X3 ACQ/SEARCH followed by an ACQ/IMAGE.
The G140L (1230A) spectrum is taken in four pieces at the nominal FP-POS (1->4) positions.
We do FP-POS=1, 2, and 3 in the first orbit and FP-POS=4 in the second orbit to maximize
exposure time at the shorter wavelengths (e.g N V at 1238,1242A).
Then 3 segments of G160M spectra are obtained followed by 2 G130M exposures.

For our acquistion we use BOA+MIRRORB and 15 second exposures. Fragementary STIS and GHRS data exist for HD103095. Using V=6.45 to normalize G8V or K0V models puts the count rate right at the limit of MIRRORA+BOA but using the observed flux at 2700 A to normalize shows that MIRRORB is needed (see COS ETC output COS85797-COS85802. Because of the large proper motion we use a 3X3 NUV ACQ/SEARCH, although we think that the predicted position corrected for proper motion should be good to betetr than 1 arcsecond.

The COS Spectroscopy ETC indicates no problems when fed the existing GALEX GRISM spectra for similar metal poor dwarfs.

2009 DEC 4: G140L FP-POS=4 exposure removed per STScI instructions --- exposure time moved to
existing G130M exposures which cover same short-wavelength emission lines.

Visit

Proposal 11829, Visit 01, pi Tue Dec 08 02:01:12 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: COS/NUV, COS/FUV

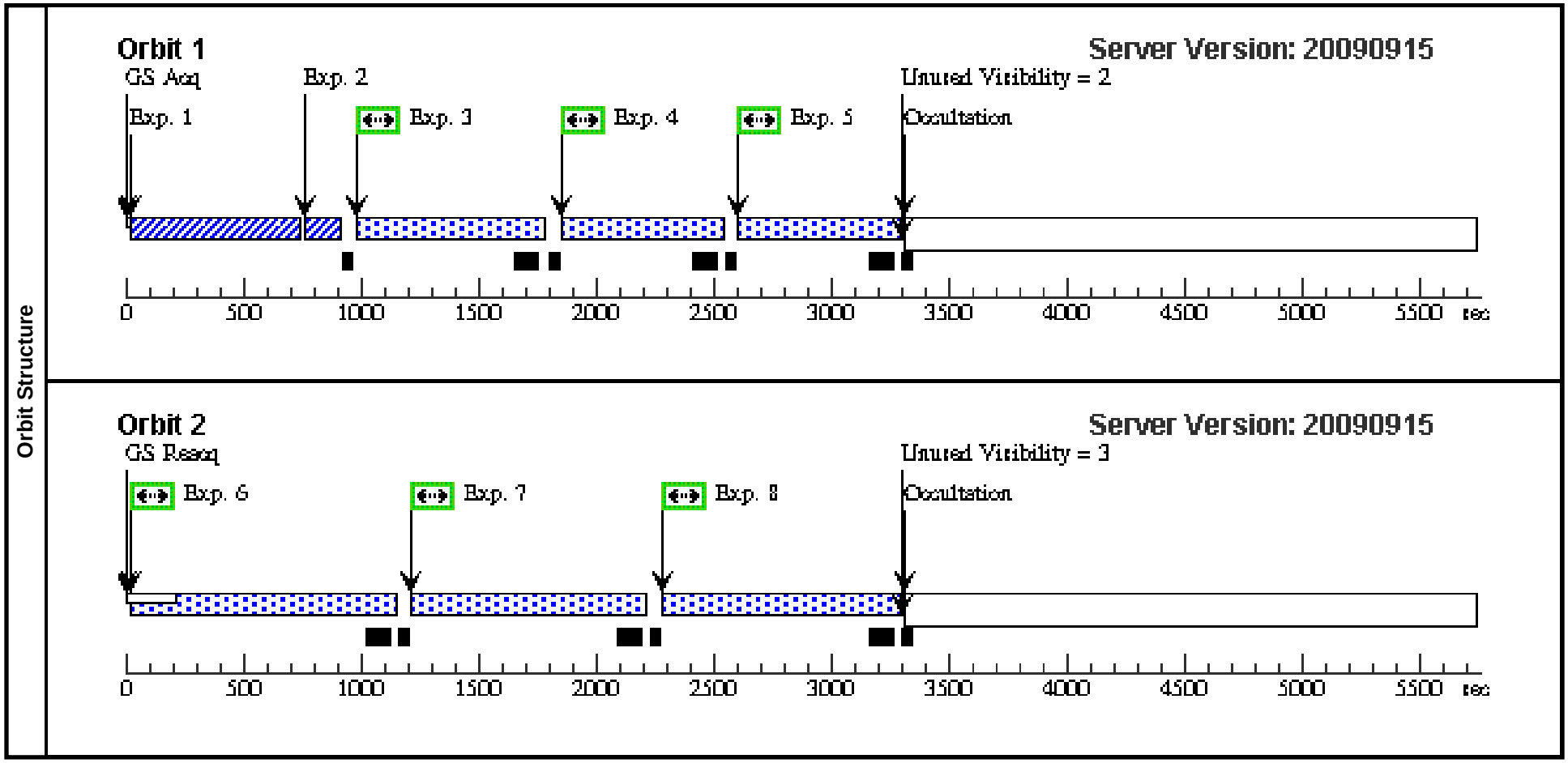
Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD103095	RA: 11 52 58.7690 (178.2448708d) Dec: +37 43 7.24 (37.71868d) Equinox: J2000	Proper Motion RA: 0.337491s/yr Proper Motion Dec: -5.8130"/yr Parallax: 0.1092" Epoch of Position: 2000.0	V=6.45+/-0.01	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) HD103095	COS/NUV, ACQ/SEARCH, BOA	MIRRORB	SCAN-SIZE=3			15 Secs *[==>]*	*[1]*
2		(1) HD103095	COS/NUV, ACQ/IMAGE, BOA	MIRRORB				15 Secs *[==>]*	*[1]*
3		(1) HD103095	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=510; FP-POS=1			620 Secs *[==>]*	*[1]*
4		(1) HD103095	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=525; FP-POS=2			635 Secs *[==>]*	*[1]*
5		(1) HD103095	COS/FUV, TIME-TAG, PSA	G140L 1230 A	BUFFER-TIME=525; FP-POS=3			635 Secs *[==>]*	*[1]*
6		(1) HD103095	COS/FUV, TIME-TAG, PSA	G160M 1577 A	BUFFER-TIME=770			880 Secs *[==>]*	*[2]*
7		(1) HD103095	COS/FUV, TIME-TAG, PSA	G160M 1600 A	BUFFER-TIME=770			880 Secs *[==>]*	*[2]*
8		(1) HD103095	COS/FUV, TIME-TAG, PSA	G160M 1623 A	BUFFER-TIME=775			885 Secs *[==>]*	*[2]*
9		(1) HD103095	COS/FUV, TIME-TAG, PSA	G130M 1309 A	BUFFER-TIME=1310			1420 Secs *[==>]*	*[3]*
10		(1) HD103095	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=1310			1420 Secs *[==>]*	*[3]*


Orbit Structure
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GS Acq
Exp. 2
Unused Visibility = 2
Exp. 1
Exp. 3
Exp. 4
Exp. 5
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090915
GS Reacq
Unused Visibility = 3
Exp. 6
Exp. 7
Exp. 8
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Orbit Structure (continued)