13358 - Trans-iron group elements in the hot white dwarf RE 0503-289

Cycle: 21, 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) RE0503-289	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	3	04-Jun-2013 23:49:11.0	yes

3 Total Orbits Used

ABSTRACT

We propose STIS-UV spectroscopy of the rather peculiar, hot helium-rich white dwarf RE 0503-289. In FUSE spectra we have recently discovered as much as ten trans-iron group elements (atomic numbers between 31-54), a phenomenon that has never been observed before in any WD. Abundance analyses of Kr, Xe, and Ge show that they are strongly overabundant (450 to 3800 times solar). We suspect that this is related to the evolutionary history of the WD. RE 0503-289 is a transition object between the PG1159 and DO spectral classes, which represent a (pre-) WD sequence of stars that suffered a late He-shell flash. As a consequence of flash-induced envelope convection, the WD exposes the H-He intershell layer of the progenitor AGB star that is enriched with trans-Fe elements resulting from s-process nucleosynthesis. The proposed UV observations shall support a precise abundance analysis of all other elements detected so far, but we mainly aim at the detection and analysis of hitherto undetected

heavy elements. We want to address the question whether the observed abundance pattern is affected by diffusion or if it represents the original composition of the s-processed material. In the latter case, detailed tests of nucleosynthesis models are possible.

OBSERVING DESCRIPTION

We will perform short-slit (0.2"x0.2") medium-dispersion UV spectroscopy of RE0503-289 in the STIS/FUV-MAMA and NUV-MAMA configurations with gratings E140M and E230M (two wavelength settings), respectively, in order to cover the wavelength range 1150-3100 A. This provides the spectral resolution (~30,000) needed for the quantitative analysis of narrow metal lines. STIS ETC was used to estimate exposure times necessary to achieve the required S/N ~ 20-40.

Visit

Proposal 13358, Visit 01 Wed Jun 05 03:49:20 GMT 2013

Diagnostic Status: No Diagnostics

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

Special Requirements: (none)

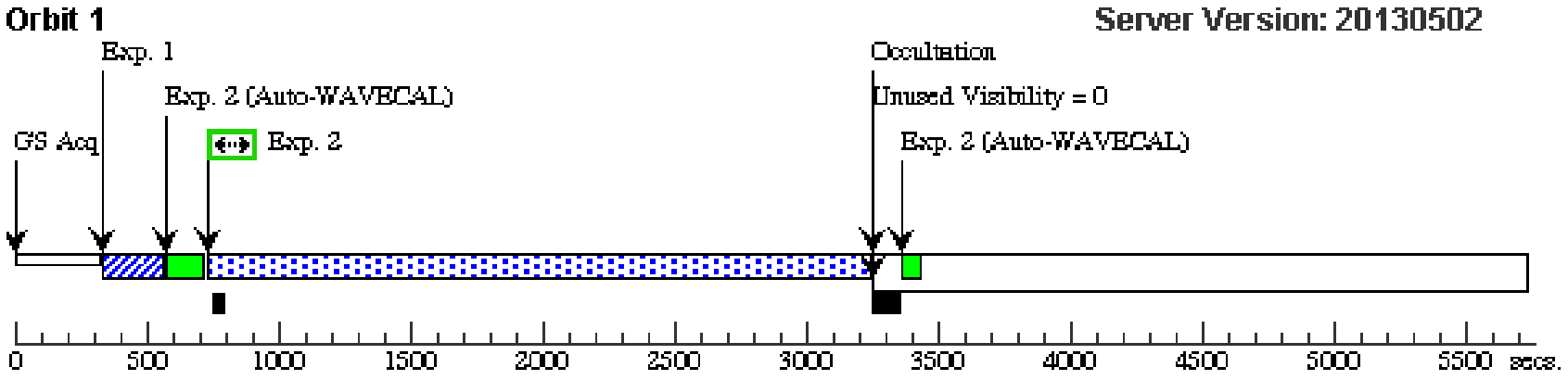
Fixed Targets

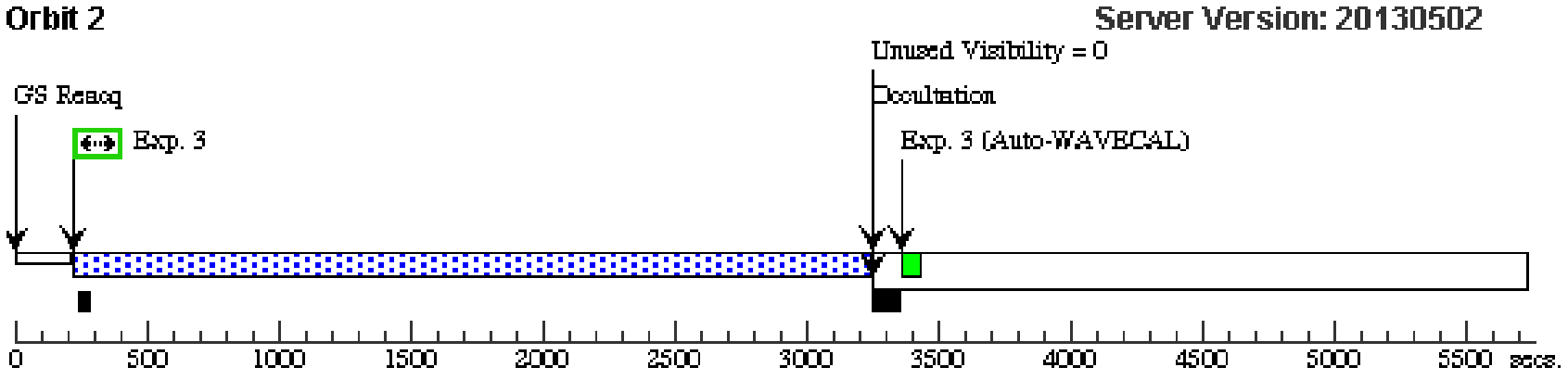
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	RE0503-289	RA: 05 03 55.5130 (75.9813042d) Dec: -28 54 34.57 (-28.90960d) Equinox: J2000		V=13.9+/-0.1 1.8E-12 erg/(cm2 s A) at 1360 A	Reference Frame: ICRS

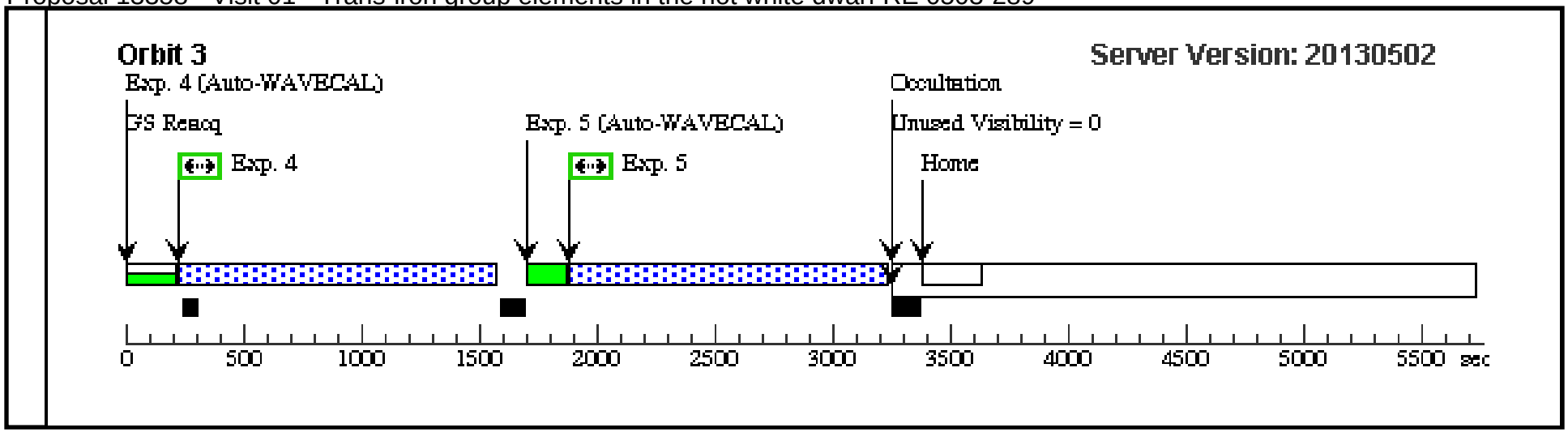
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	(507771)	(1) RE0503-289	STIS/CCD, ACQ, F28X50LP	MIRROR	ACQTYPE=POINT			1.0 Secs (1 Secs)	
								[==>]	***[1]***
2	(485117)	(1) RE0503-289	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				2493 Secs (2493 Secs)	
								[==>]	***[1]***
3	(485117)	(1) RE0503-289	STIS/FUV-MAMA, ACCUM, 0.2X0.2	E140M 1425 A				3001 Secs (3001 Secs)	
								[==>]	***[2]***
4	(485116)	(1) RE0503-289	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 1978 A				1338 Secs (1338 Secs)	
								[==>]	***[3]***
5	(485115)	(1) RE0503-289	STIS/NUV-MAMA, ACCUM, 0.2X0.2	E230M 2707 A				1338 Secs (1338 Secs)	
								[==>]	***[3]***

Orbit Structure



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GS Reacq
Exp. 4
Exp. 5 (Auto-WAVECAL)
Exp. 5
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sec