



14672 - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Poor Dwarfs

Cycle: 24, Proposal Category: GO

(UV Initiative)

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Ruth C. Peterson (PI) (Contact)	SETI Institute	peter@uclick.org
Dr. Monique Spite (CoI) (ESA Member)	Observatoire de Paris - Section de Meudon	monique.spite@obspm.fr
Dr. Beatriz Barbuy (CoI)	Universidade de Sao Paulo	barbuy@astro.iag.usp.br

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>
A1	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	2	15-Feb-2017 21:04:57.0	yes
A2	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:04:59.0	yes
02	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:00.0	yes
A3	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:02.0	yes
A4	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:03.0	yes

<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>
A5	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:04.0	yes
A6	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:06.0	yes
A7	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:07.0	yes
A8	(1) HD-19445	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:09.0	yes
B1	(2) HD-140283	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:10.0	yes
B2	(2) HD-140283	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:12.0	yes
B3	(2) HD-140283	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:13.0	yes
B4	(2) HD-140283	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:14.0	yes
B5	(2) HD-140283	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:16.0	yes
B6	(2) HD-140283	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:17.0	yes
B7	(2) HD-140283	STIS/CCD STIS/NUV-MAMA	3	15-Feb-2017 21:05:18.0	yes

47 Total Orbits Used

ABSTRACT

The assembly sequence of our Galactic halo is encoded in spectra of its surviving low-metallicity turnoff stars. While the investigation of the heaviest elements ($Z > 55$) reveals they were produced in two independent time scales by rapid- and slow neutron capture (r- and s-process), the light trans-ironic elements with atomic number Z from 32 to 52 show striking abundance patterns that are open to a range of interpretation. Part of the mystery

may be due to the need to determine their abundances in dwarfs from ultraviolet spectra, which are heavily contaminated by stronger lines whose identity is often unknown. We will provide clarification of their empirical behavior by adding high-resolution spectra near 2000Å for two cool stars of low metallicity, 1/400 and 1/100 solar, and analyzing them together with similar spectra of other low-metallicity turnoff stars using all the latest tools. This includes incorporating newly-identified Fe I lines as they are found, comparing theoretical spectra for each star with high-resolution observations over all available optical and ultraviolet wavelengths, and comparing the results from two independent synthetic-spectrum approaches. This analysis should clarify current systematic errors in modeling and in line transition probabilities (gf-values). In so doing it will provide reliable abundances for a range of trans-Fe elements in extremely metal-poor stars, for quantitative comparison with a half-dozen viable models of their production. The results will shed light on the nature and time scales of production of these elusive elements, and their incorporation into stars that are relics of the earliest phase of our Galaxy.

OBSERVING DESCRIPTION

Our targets are two very metal-poor turnoff stars, HD 140283 and HD 19445. Both targets have been observed previously, safely, by STIS; and have sufficient STIS and IUE spectra to define accurate SEDs (for use with the STIS spectroscopic ETC). Each has a metallicity $<1/100$ solar. Our model parameters T_{eff} , $\log g$, $[\text{Fe}/\text{H}]$ are 5700K, 3.6, -2.6 for HD 140283, and 6050, 4.5, -2.0 for HD 19445. HD 19445 is thus a true dwarf, while HD 140283 is a post-turnoff star. At the temperatures, luminosities, and ages of such halo turnoff stars, no flaring or other strong luminosity variation is expected, and indeed none has been observed in either star.

The TAC has emphasized that the UV observations are necessary to probe two processes, νp and weak r , that are thought to be important for elements between Z of 32 and 52 [such as Mo, Ru at $Z=42, 44$], with Ge [$Z=32$] being a good discriminant for the processes involved, and As [$Z=33$] valuable due to its single stable isotope. As detailed in the proposal, to derive reliable light-element abundance ratios we will provide analyses, and address their systematics. Our analysis will include the hotter, weaker-lined star HD 84937, with T_{eff} , $\log g$, $[\text{Fe}/\text{H}] = 6300\text{K}, 4.0, -2.25$, and the stronger-lined star HD 94028, with 6050K, 4.3, -1.40, now that GO-14161 has obtained complete E230H coverage over 1880Å - 3140Å for both stars. It is critical to analyze all four stars together. Their modest but significant diversity in temperature and metallicity will help disentangle line blending and confirm trans-Fe gf values, as well as establish trends in trans-Fe ratios with metallicity and with other abundance excesses, notably those produced by the r -process, the rapid capture of neutrons believed to occur in Type II supernovae. The four stars may also represent different halo populations. HD 140283 has a near-solar $[\text{Mo}/\text{Fe}]$ ratio and a very low $[\text{Ge}/\text{Fe}]$ ratio, but is a rare low r -process star, like HD 122563 (the green star in Fig. 1 of the proposal). Both HD 84937 and HD 19445 have a near-solar $[\text{Ge}/\text{Fe}]$ ratio and are moderately enhanced in heavy r -process elements, while HD 94028 has the highest $[\text{Mo}/\text{Fe}]$ known among old stars with mild r -process enhancements. Intercomparing their light trans-Fe

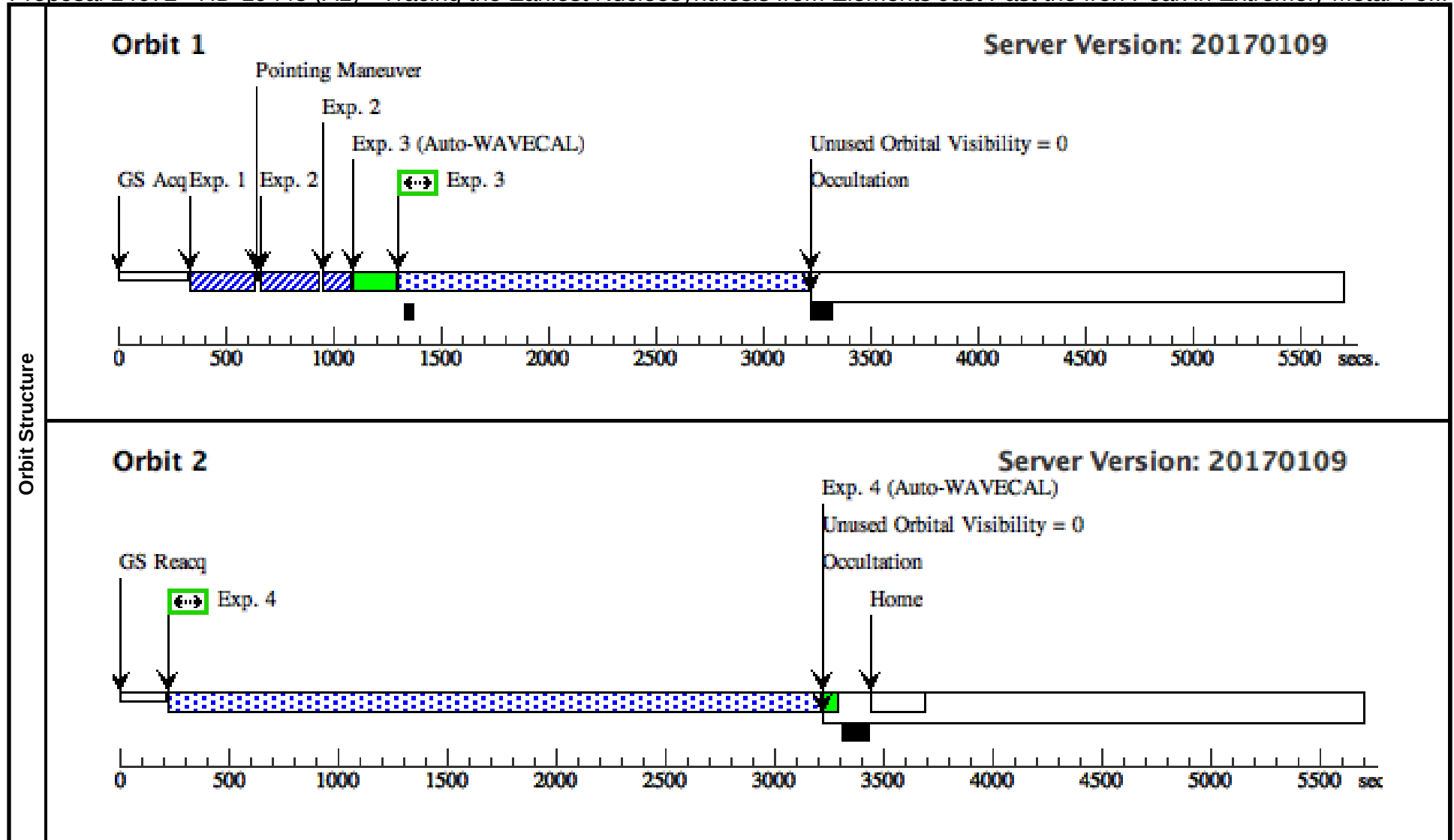
abundance ratios should reveal any potential dependence of their own production process(es) on r-process production and on overall metallicity, at levels corresponding to the Galaxy's oldest surviving individual stars and stars in globular clusters.

To detect the weak lines of trans-Fe elements, we will obtain E230H spectra at and below 2100Å, using the standard slit width of 0.2" x 0.09" as was done for HD 84937 and HD 94028. For HD 19445, we adopt the standard c2013 grating setting, covering 1880Å - 2145Å. This will be the first E230H spectrum obtained for this star. For HD 140283, for which existing E230H spectra already cover 1950Å - 3140Å, we have received PC approval for the minor adjustment in wavelength caused by adopting the E230H i1963 setting, covering 1830Å - 2095Å. Using E230H values and stellar turnoff line widths in the Cayrel (1988) formulae (3) and (5), we find at S/N/resel = 60, a line 8% deep is a 4-sigma detection. The S/N level and weakness of the lines in this region, seen in Fig. 3 of our submitted proposal, led us to propose S/N=60 for HD 140283, and S/N=55 for HD 19445, both at 2000Å. With IUE fluxes of 6.6E-13 at 2000Å from LWR02380LL, and 3.0E-13 at 1850Å from SWP02665, ETC runs #822431 and #822448 provide an exposure time of 56.8 ks for HD 140283, yielding S/N=60 at 2000Å, >75 redward of 2050Å, and 26.4 at 1850Å. For HD 19445, with flux 5E-13 at 2000Å (LWP17069LL) and 2.4E-13 at 1880Å (SWP37935LL), ETC runs #794658 and #824119 for 58.7 ks yield S/N=55 at 2000Å, >90 redward of 2080Å, and 23 at 1880Å.

In Phase II we have cast these exposures into visits of at most three orbits, as requested to ease the burden on scheduling. We target HD 19445 in one 2-orbit visit plus seven 3-orbit visits, for a total exposure time 59.8ks, and target HD 140283 in seven 3-orbit visits (54.7ks). Target acquisitions, modeled on those of GO-14161, initially are by the CCD, with the MIRROR and ND3 filter; exposure times are set to yield more than adequate counts. The peak-ups onto the slit are performed in dispersed light with the low-res optical grating, G430L, and the CCD; the minimal (0.2 s) exposure times yield roughly a million, or more, total counts; but avoid saturation of the spectral segment. The short 3-orbit sequences, each with a single grating setting, make throughput losses due to slight pointing drifts less likely, and allow breathing effects to be recognized more easily. As was done for the GO-14161 observations, we waive the proprietary period.

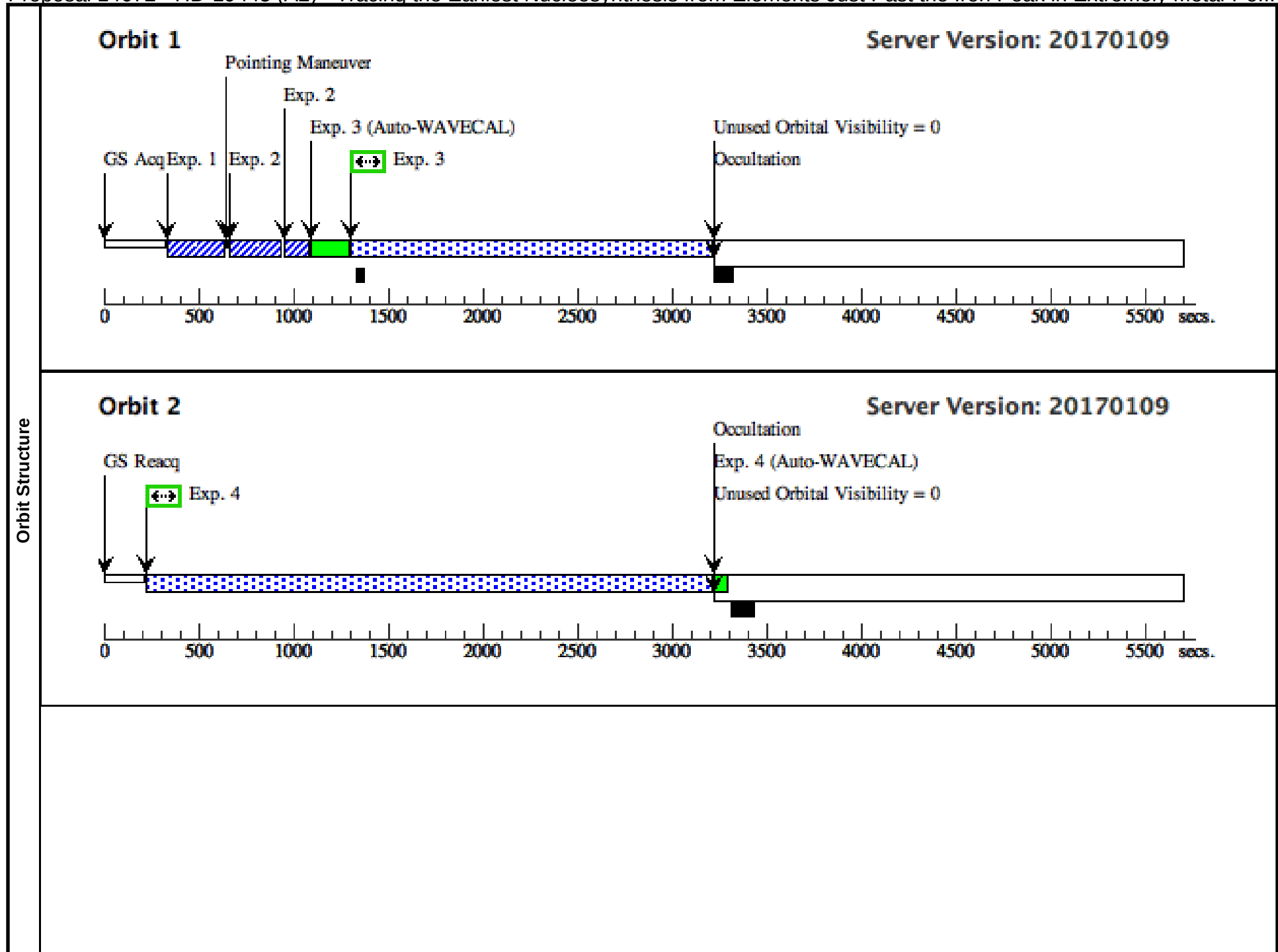
Proposal 14672 - HD-19445 (A1) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

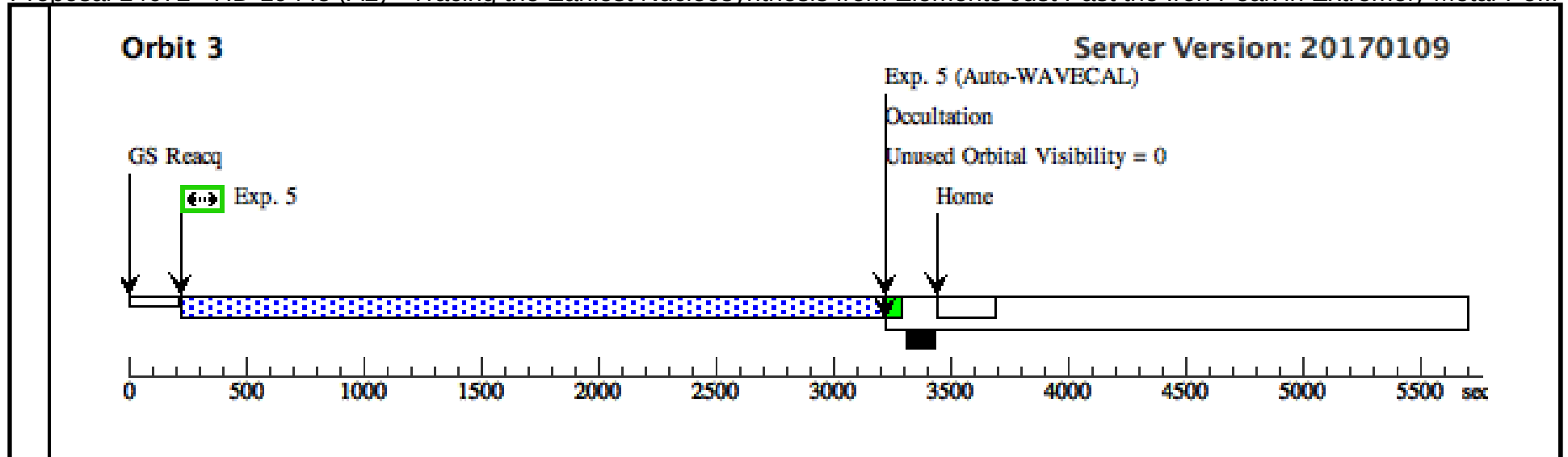
Visit	Proposal 14672, HD-19445 (A1), scheduled								Thu Feb 16 02:05:19 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000	Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016		V=8.06		Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates corrected to epoch 2016									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)	
									[==>]	[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2013 A				1891 Secs (1891 Secs)	
									[==>]	[1]
4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2013 A				2977 Secs (2977 Secs)		
								[==>]	[2]	



Proposal 14672 - HD-19445 (A2) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

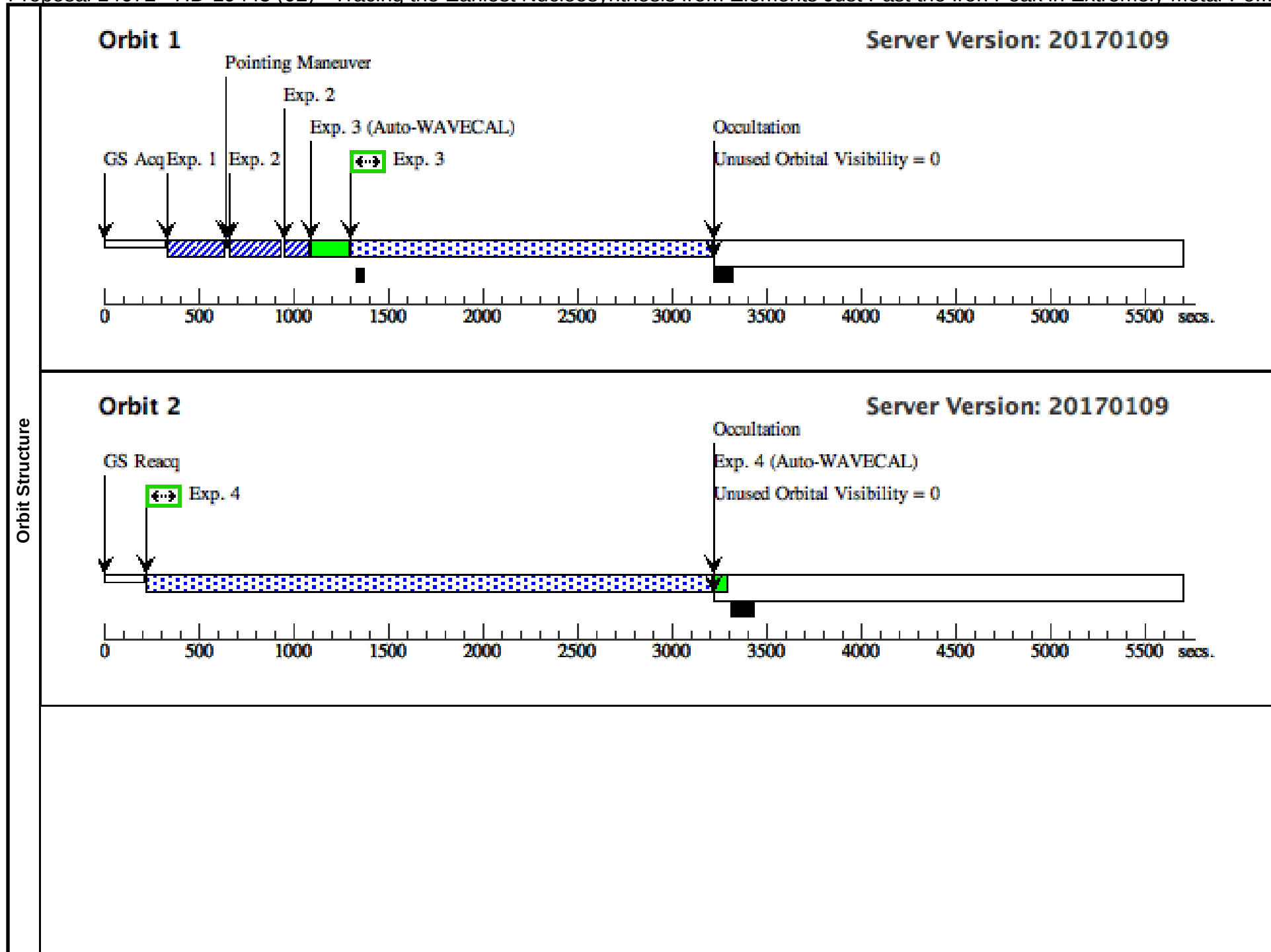
Visit	Proposal 14672, HD-19445 (A2), failed										Thu Feb 16 02:05:20 GMT 2017
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD										
	Special Requirements: (none)										
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000		Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016		V=8.06		Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	Coordinates corrected to epoch 2016										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)		
									[==>]		[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)		
									[==>]		[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2013 A				1891 Secs (1891 Secs)		
									[==>]		[1]
	4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2013 A				2977 Secs (2977 Secs)		
									[==>]		[2]
	5	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2013 A				2977 Secs (2977 Secs)		
								[==>]		[3]	

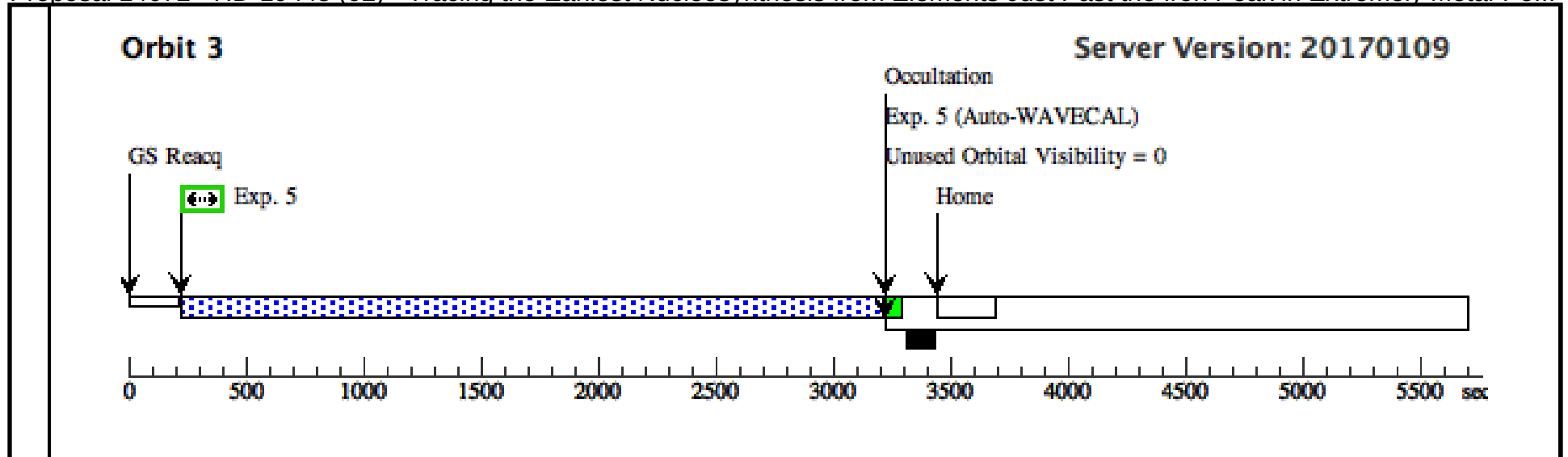




Proposal 14672 - HD-19445 (02) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

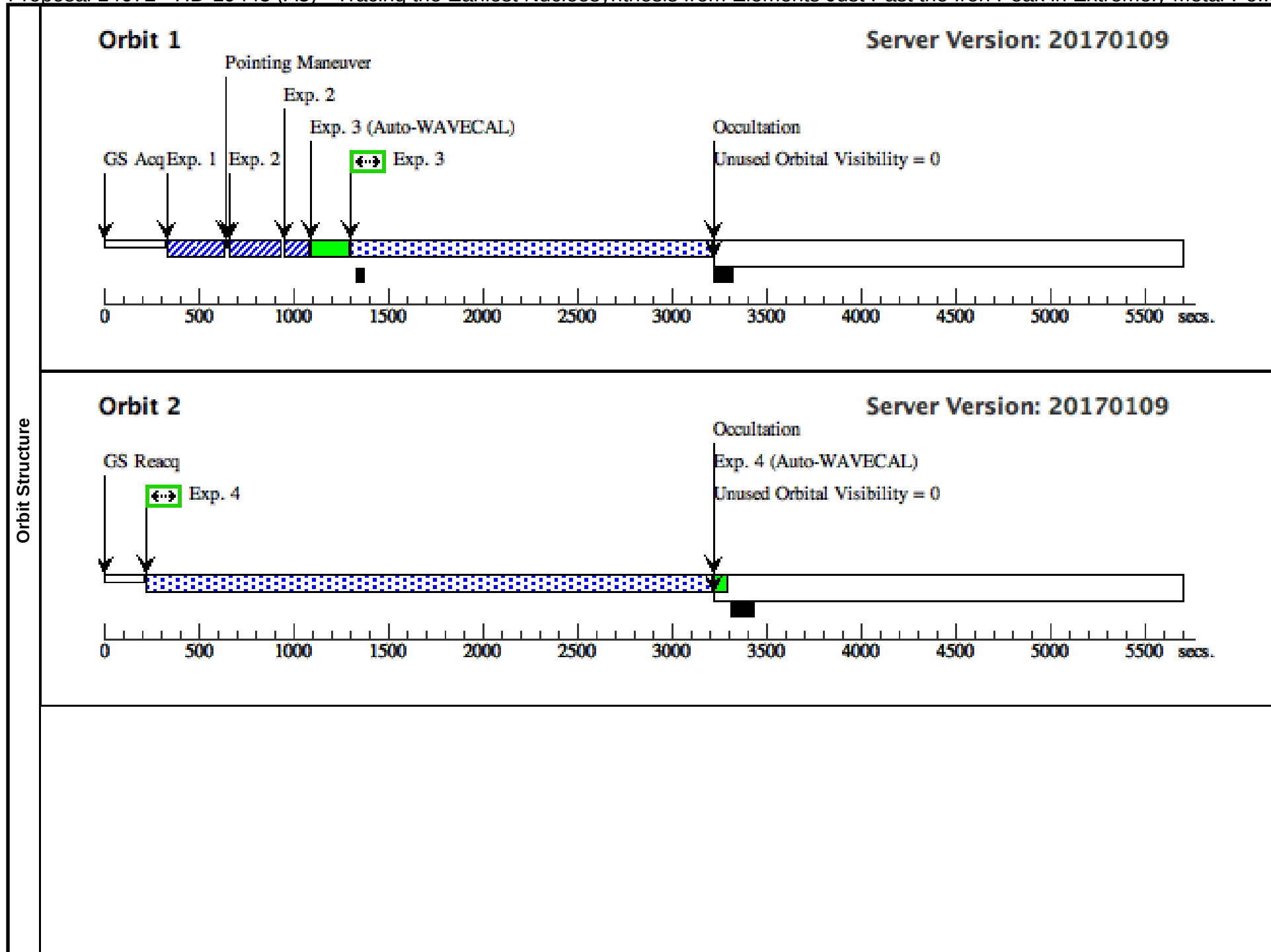
Visit	Proposal 14672, HD-19445 (02)										Thu Feb 16 02:05:20 GMT 2017
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD										
	Special Requirements: (none)										
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000		Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016		V=8.06		Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	Coordinates corrected to epoch 2016										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)		
									[==>]		[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)		
									[==>]		[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2013 A				1891 Secs (1891 Secs)		
									[==>]		[1]
	4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2013 A				2977 Secs (2977 Secs)		
									[==>]		[2]
	5	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 2013 A				2977 Secs (2977 Secs)		
								[==>]		[3]	

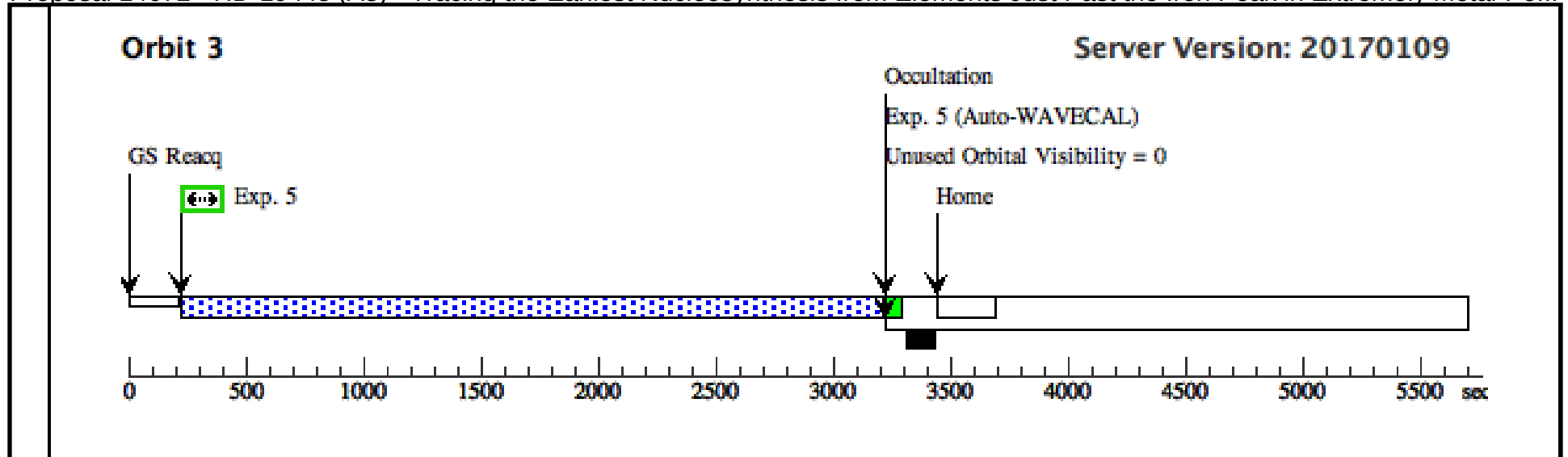




Proposal 14672 - HD-19445 (A3) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

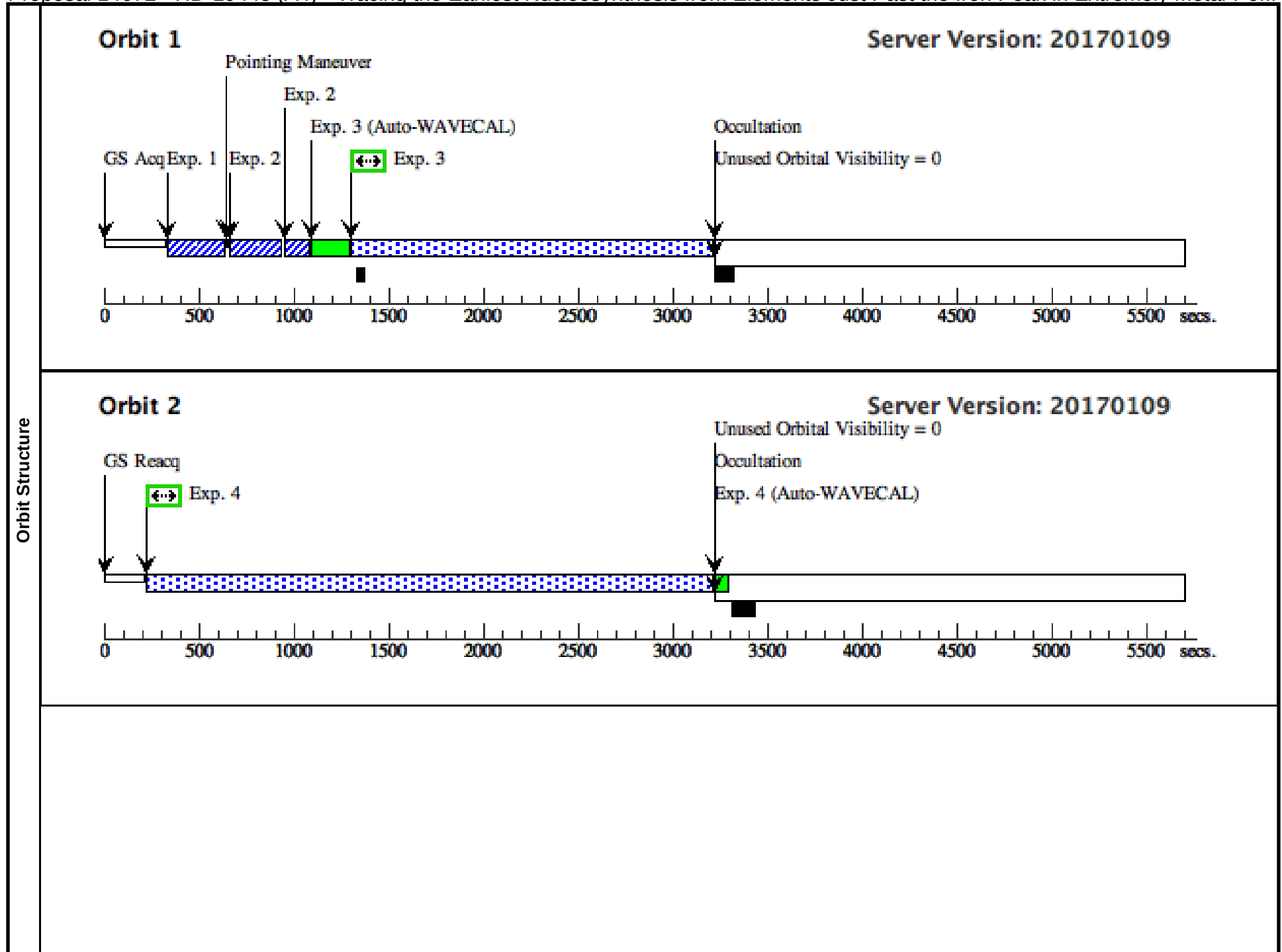
Visit	Proposal 14672, HD-19445 (A3), scheduling										Thu Feb 16 02:05:20 GMT 2017
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD										
	Special Requirements: (none)										
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000		Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016		V=8.06		Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	Coordinates corrected to epoch 2016										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)		
									[==>]		[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L				0.2 Secs (0.2 Secs)		
					4300 A				[==>]		[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				1891 Secs (1891 Secs)		
					2013 A				[==>]		[1]
	4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)		
					2013 A				[==>]		[2]
	5	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)		
				2013 A				[==>]		[3]	

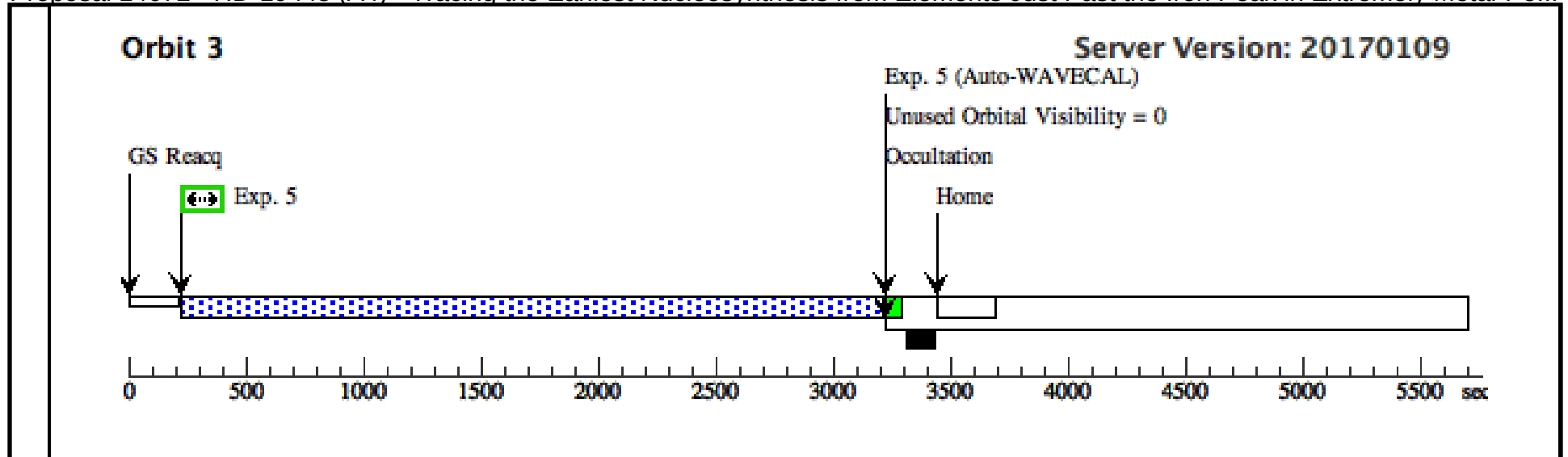




Proposal 14672 - HD-19445 (A4) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

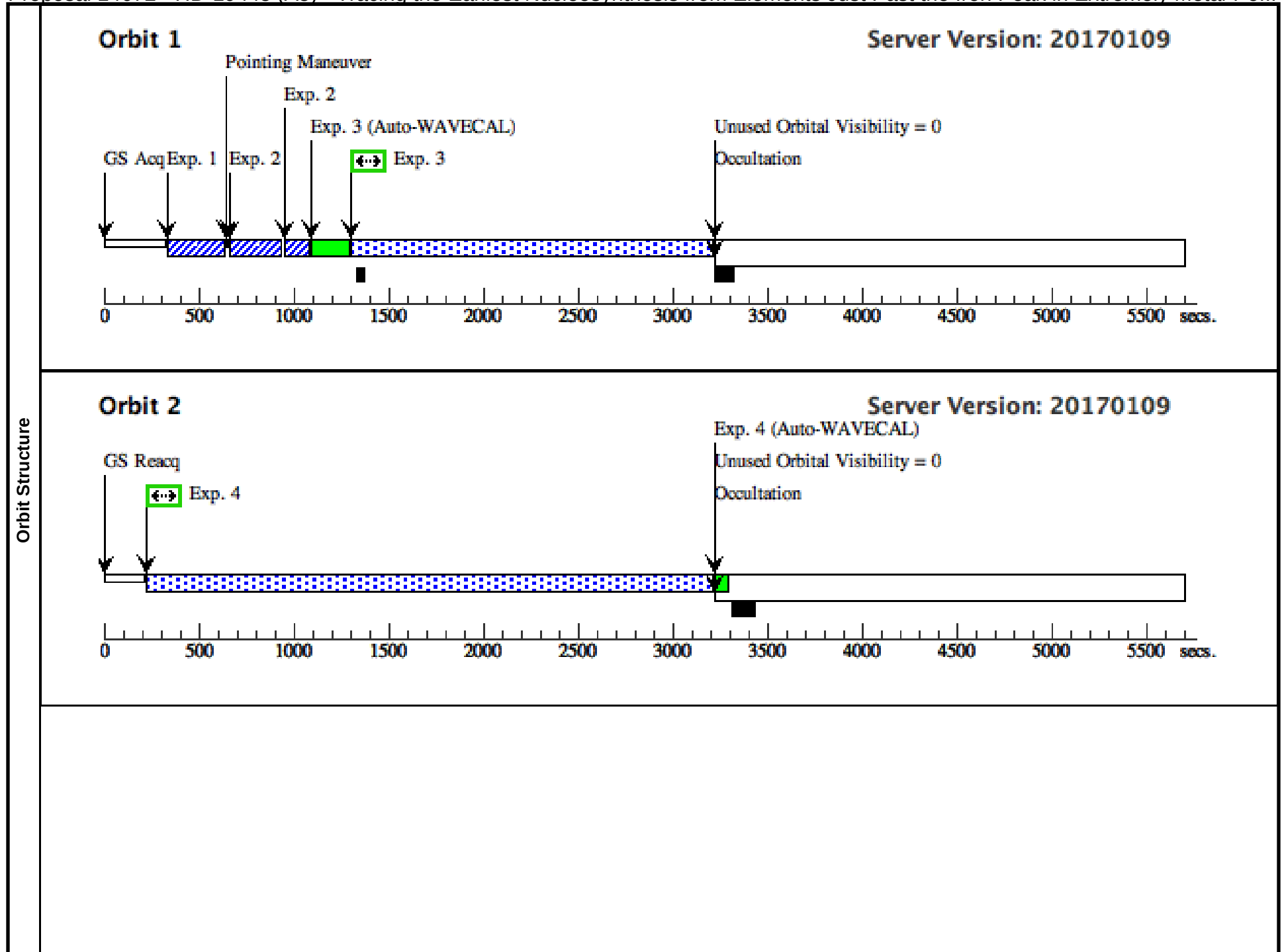
Visit	Proposal 14672, HD-19445 (A4), scheduling										Thu Feb 16 02:05:20 GMT 2017
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD										
	Special Requirements: (none)										
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000		Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016		V=8.06		Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.										
	Coordinates corrected to epoch 2016										
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)		
									[==>]		[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L				0.2 Secs (0.2 Secs)		
					4300 A				[==>]		[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				1891 Secs (1891 Secs)		
					2013 A				[==>]		[1]
	4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)		
					2013 A				[==>]		[2]
	5	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)		
				2013 A				[==>]		[3]	

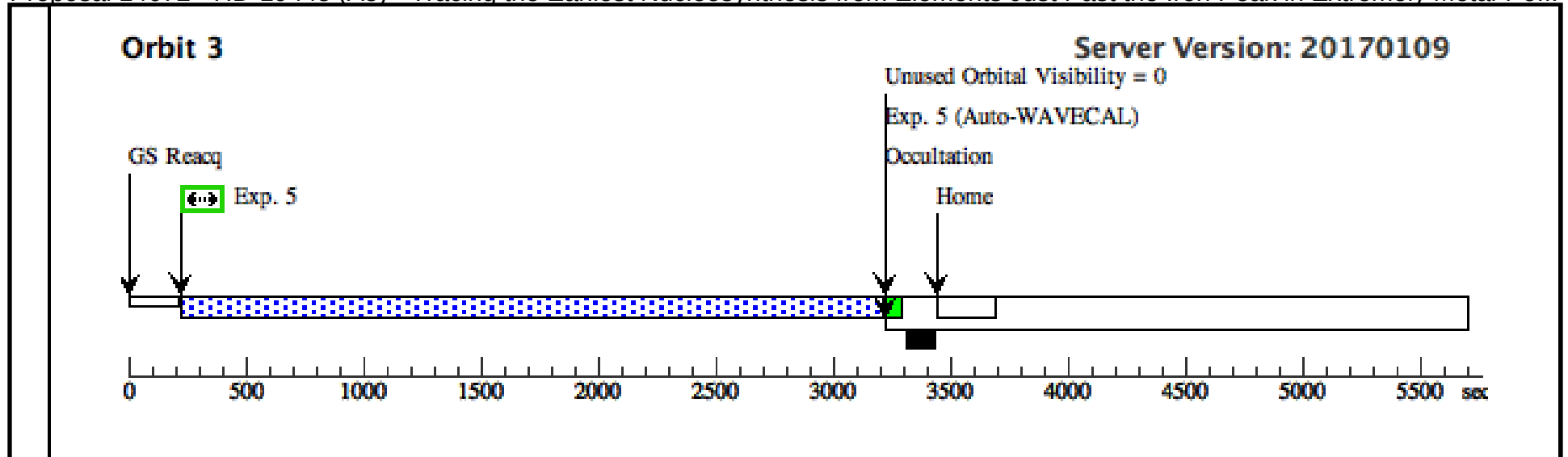




Proposal 14672 - HD-19445 (A5) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

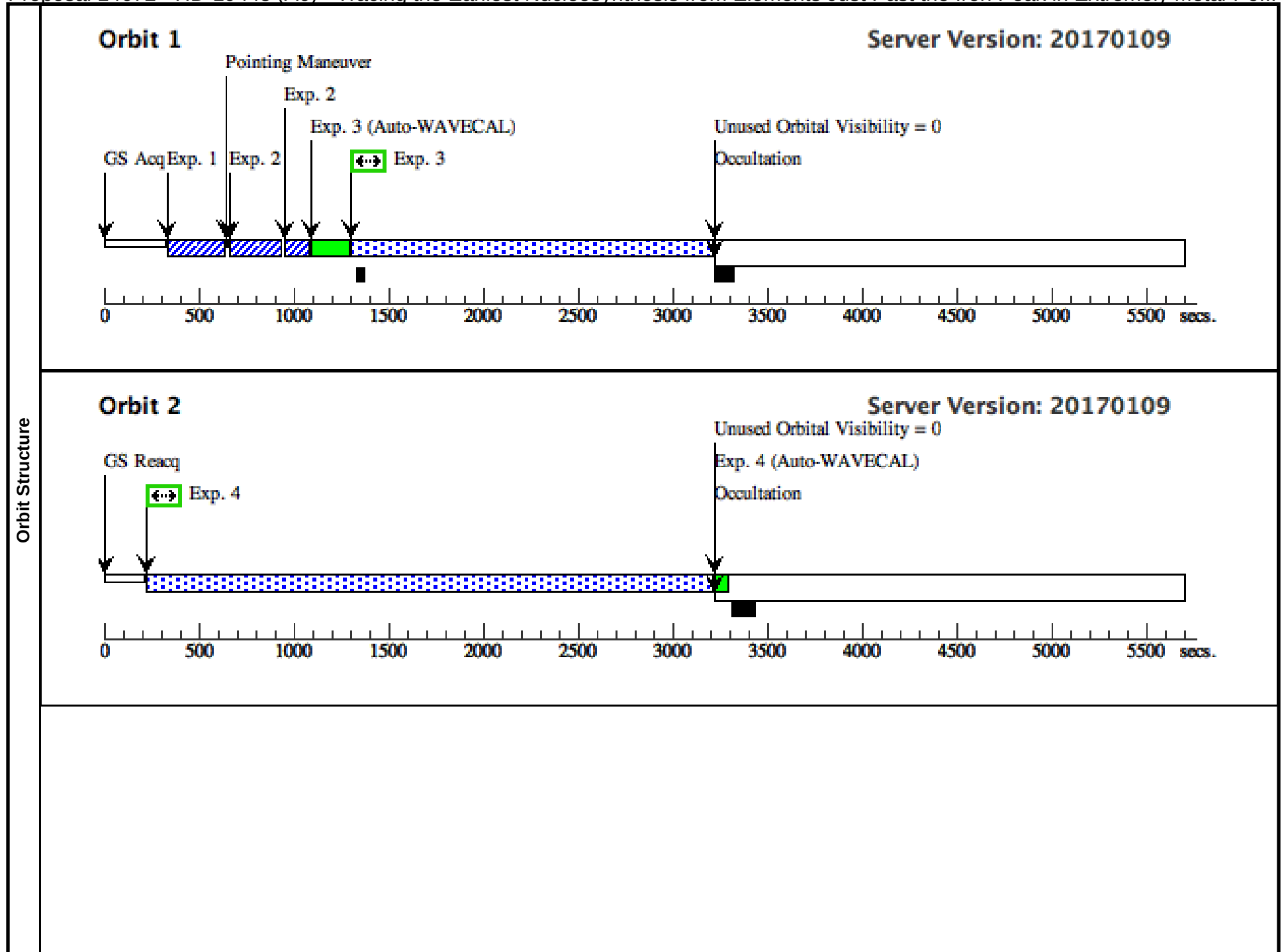
Visit	Proposal 14672, HD-19445 (A5), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000	Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016		V=8.06		Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates corrected to epoch 2016									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L				0.2 Secs (0.2 Secs)	
					4300 A				[==>]	[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				1891 Secs (1891 Secs)	
					2013 A				[==>]	[1]
	4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)	
					2013 A				[==>]	[2]
	5	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)	
				2013 A				[==>]	[3]	

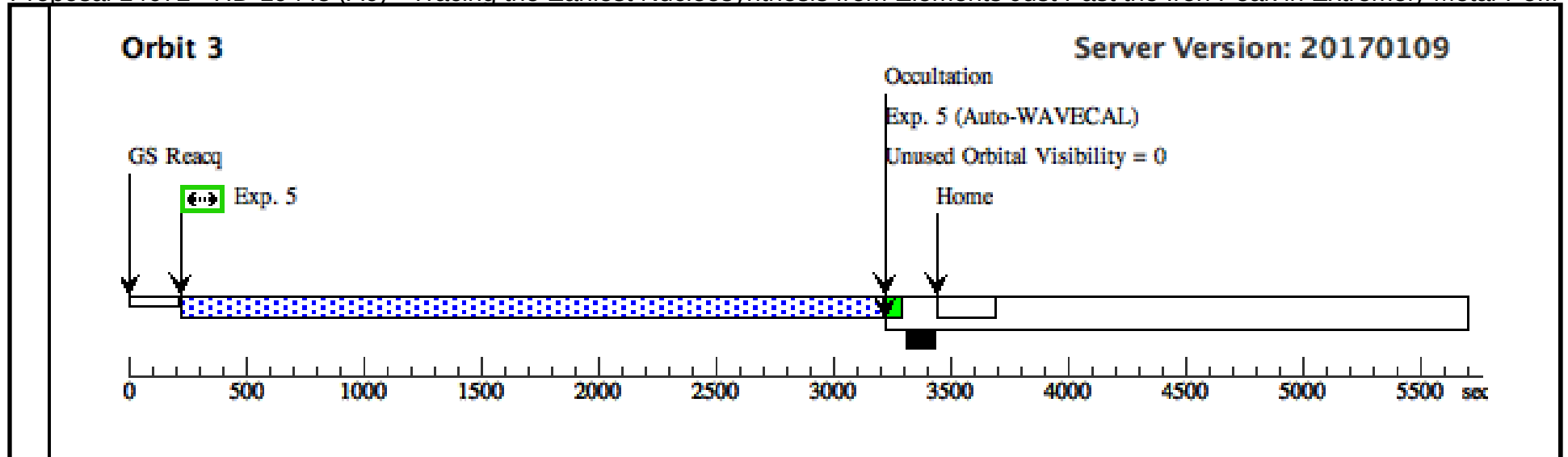




Proposal 14672 - HD-19445 (A6) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

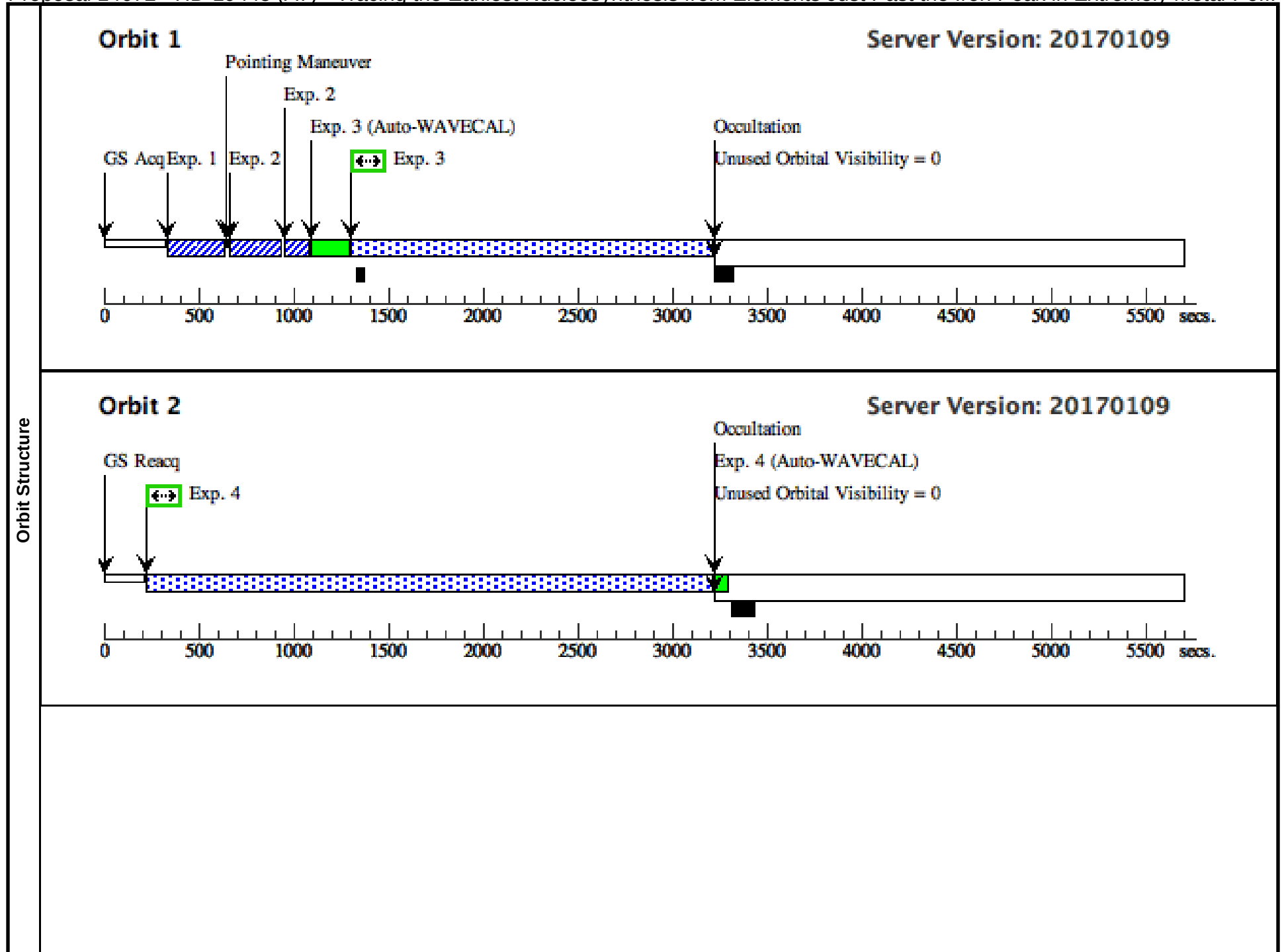
Visit	Proposal 14672, HD-19445 (A6), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000	Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016		V=8.06		Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates corrected to epoch 2016									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L				0.2 Secs (0.2 Secs)	
					4300 A				[==>]	[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				1891 Secs (1891 Secs)	
					2013 A				[==>]	[1]
	4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)	
					2013 A				[==>]	[2]
	5	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)	
				2013 A				[==>]	[3]	

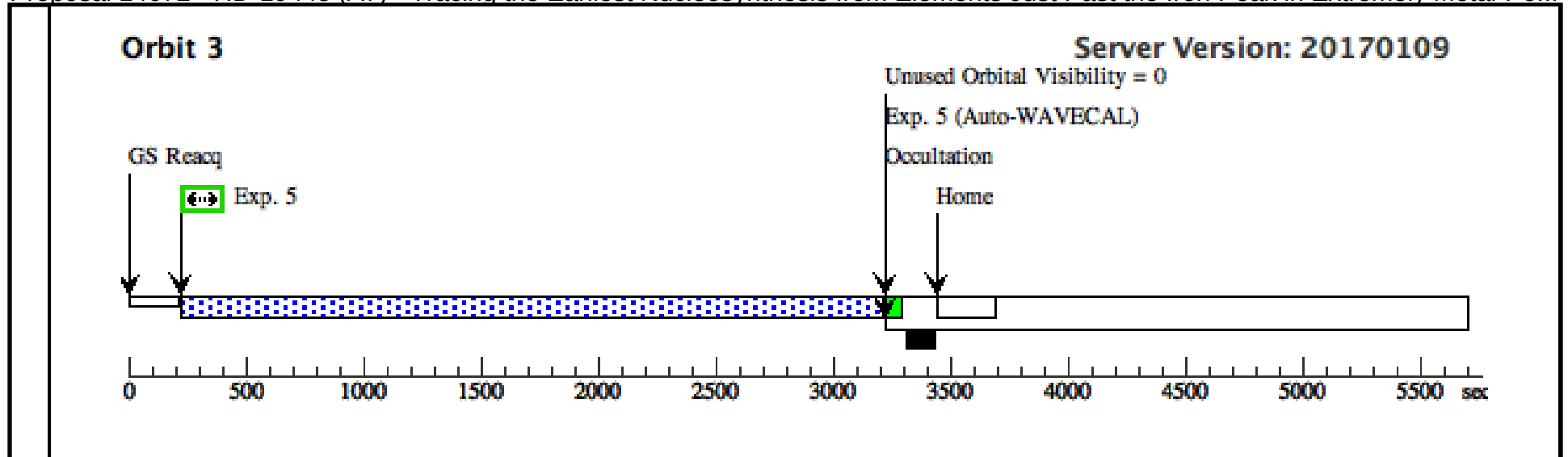




Proposal 14672 - HD-19445 (A7) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

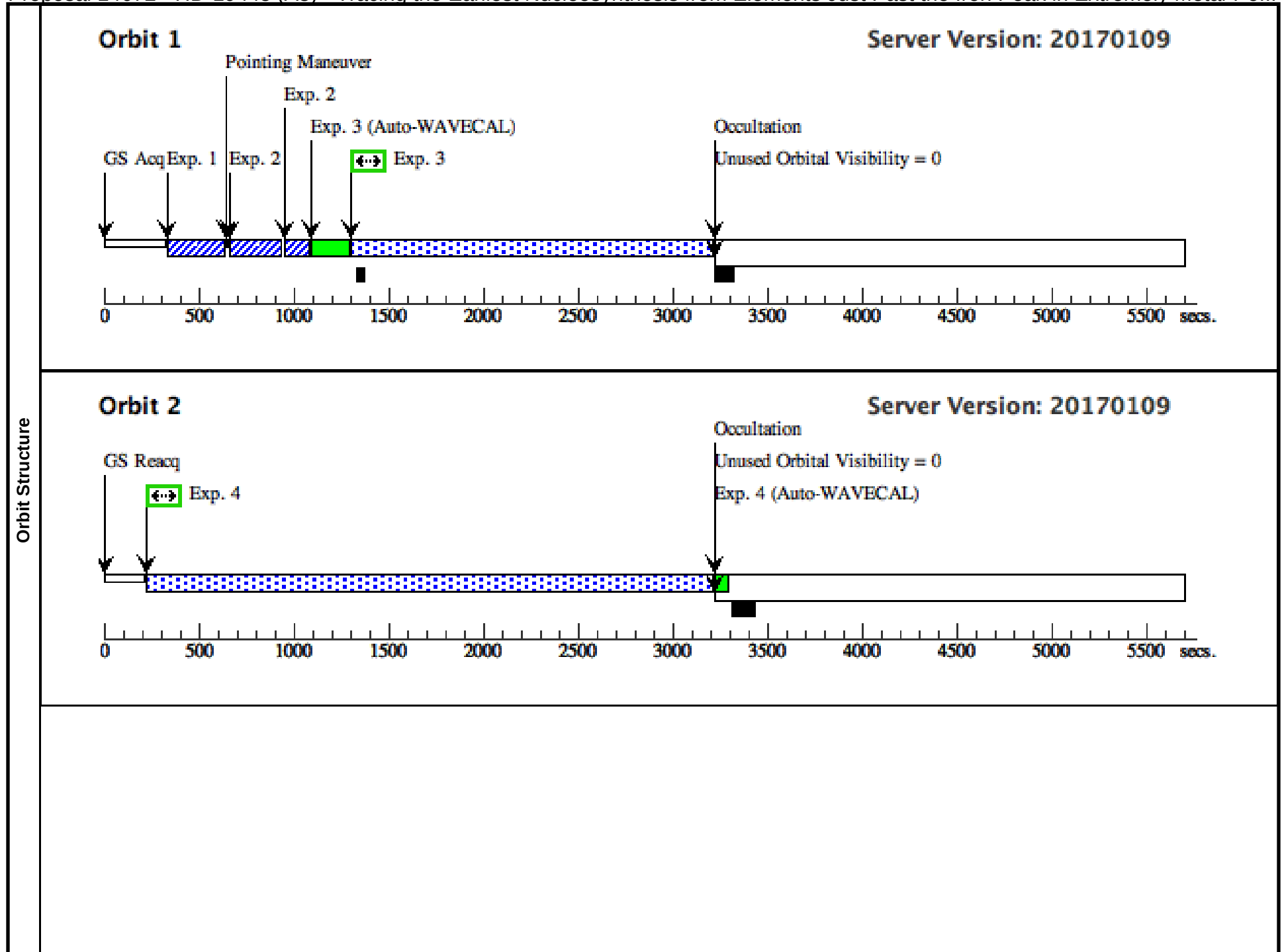
Visit	Proposal 14672, HD-19445 (A7), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000	Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016	V=8.06	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates corrected to epoch 2016									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L				0.2 Secs (0.2 Secs)	
					4300 A				[==>]	[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				1891 Secs (1891 Secs)	
					2013 A				[==>]	[1]
	4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)	
					2013 A				[==>]	[2]
	5	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)	
				2013 A				[==>]	[3]	

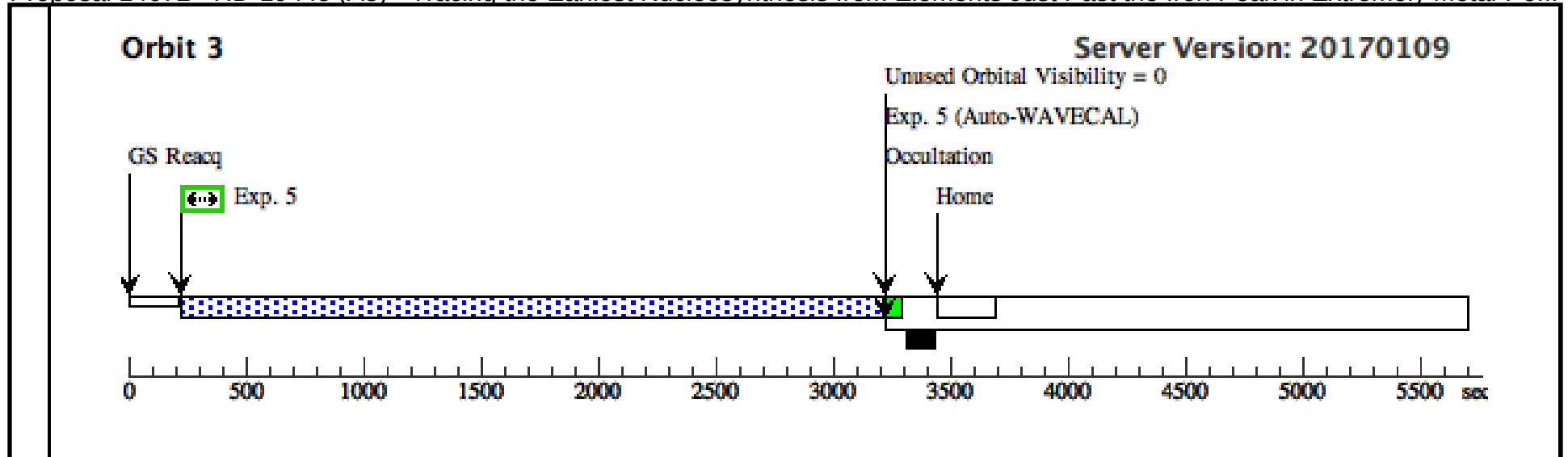




Proposal 14672 - HD-19445 (A8) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-Po...

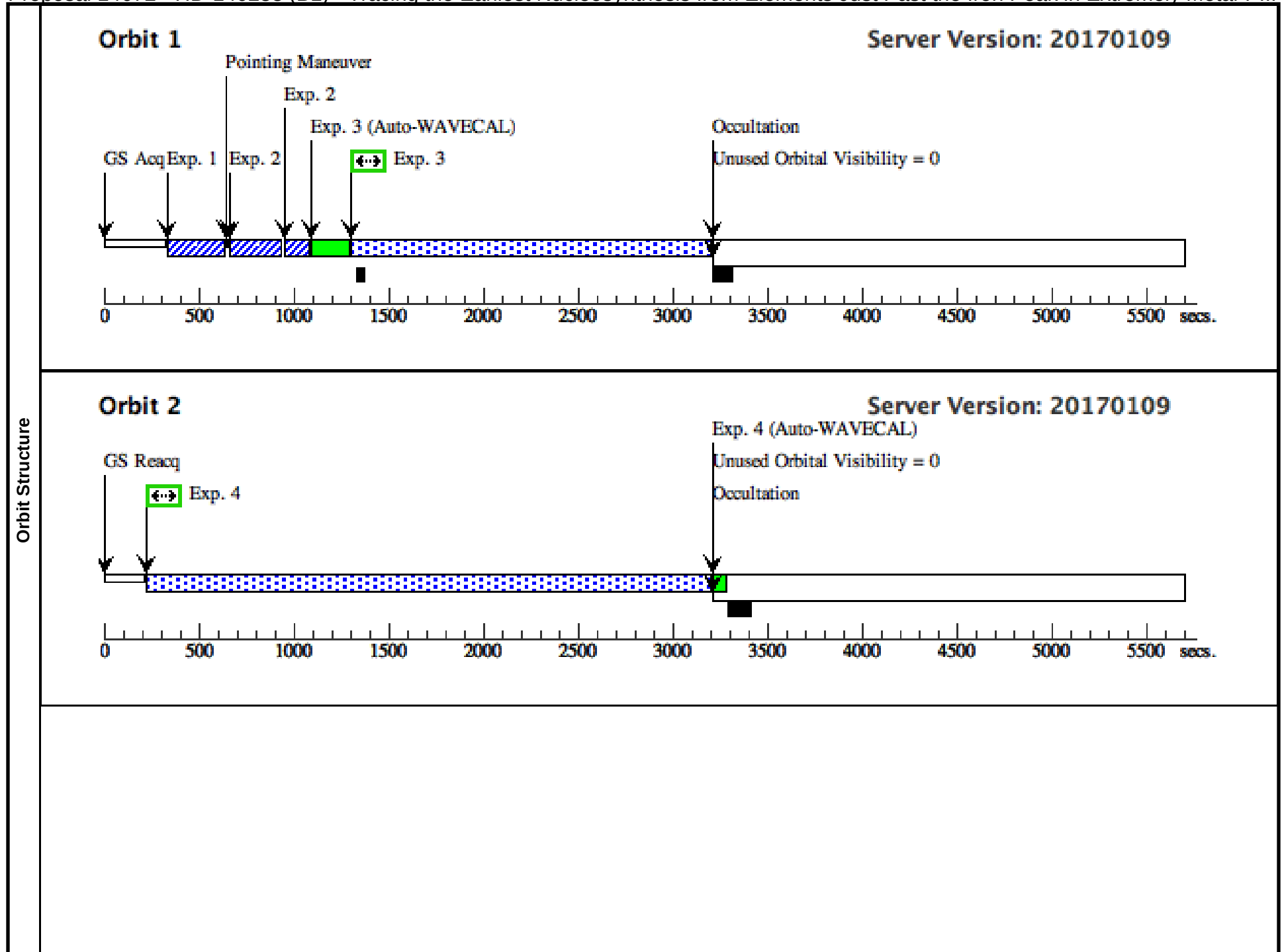
Visit	Proposal 14672, HD-19445 (A8), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	HD-19445	RA: 03 08 25.3444 (47.1056017d) Dec: +26 19 38.12 (26.32726d) Equinox: J2000	Proper Motion RA: -207.97 mas/yr Proper Motion Dec: -830.01 mas/yr Parallax: .025" Epoch of Position: 2016		V=8.06		Reference Frame: ICRS		
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates corrected to epoch 2016									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 070)	(1) HD-19445	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	2	(STIS.sp.82 3079)	(1) HD-19445	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L				0.2 Secs (0.2 Secs)	
					4300 A				[==>]	[1]
	3	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				1891 Secs (1891 Secs)	
					2013 A				[==>]	[1]
	4	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)	
					2013 A				[==>]	[2]
	5	(STIS.sp.79 4658)	(1) HD-19445	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H				2977 Secs (2977 Secs)	
				2013 A				[==>]	[3]	

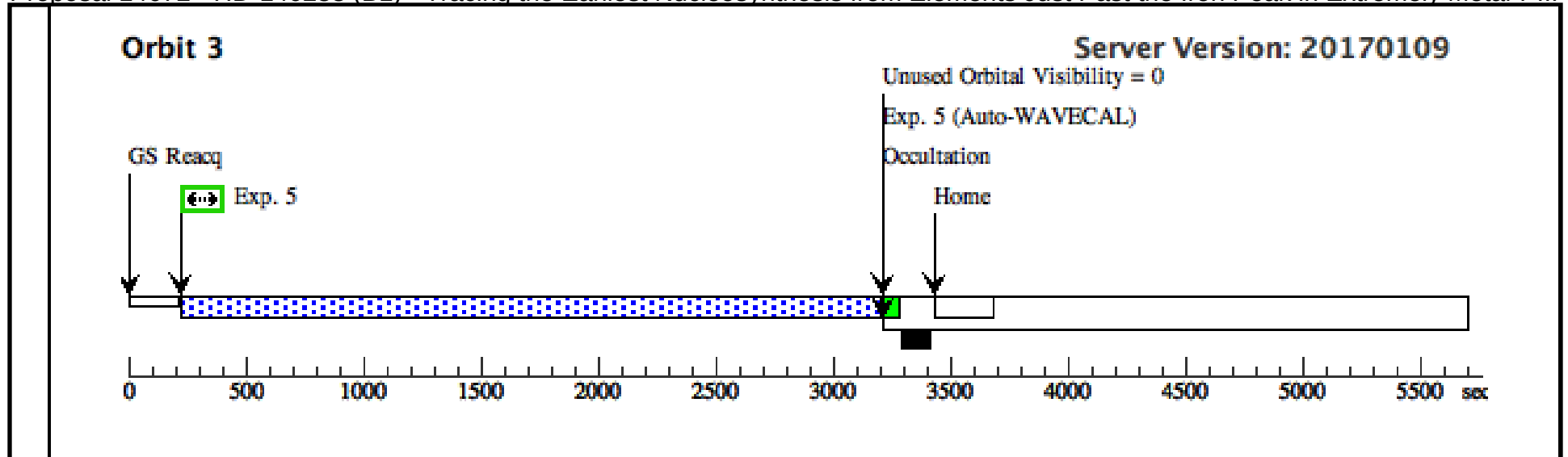




Proposal 14672 - HD-140283 (B1) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-P...

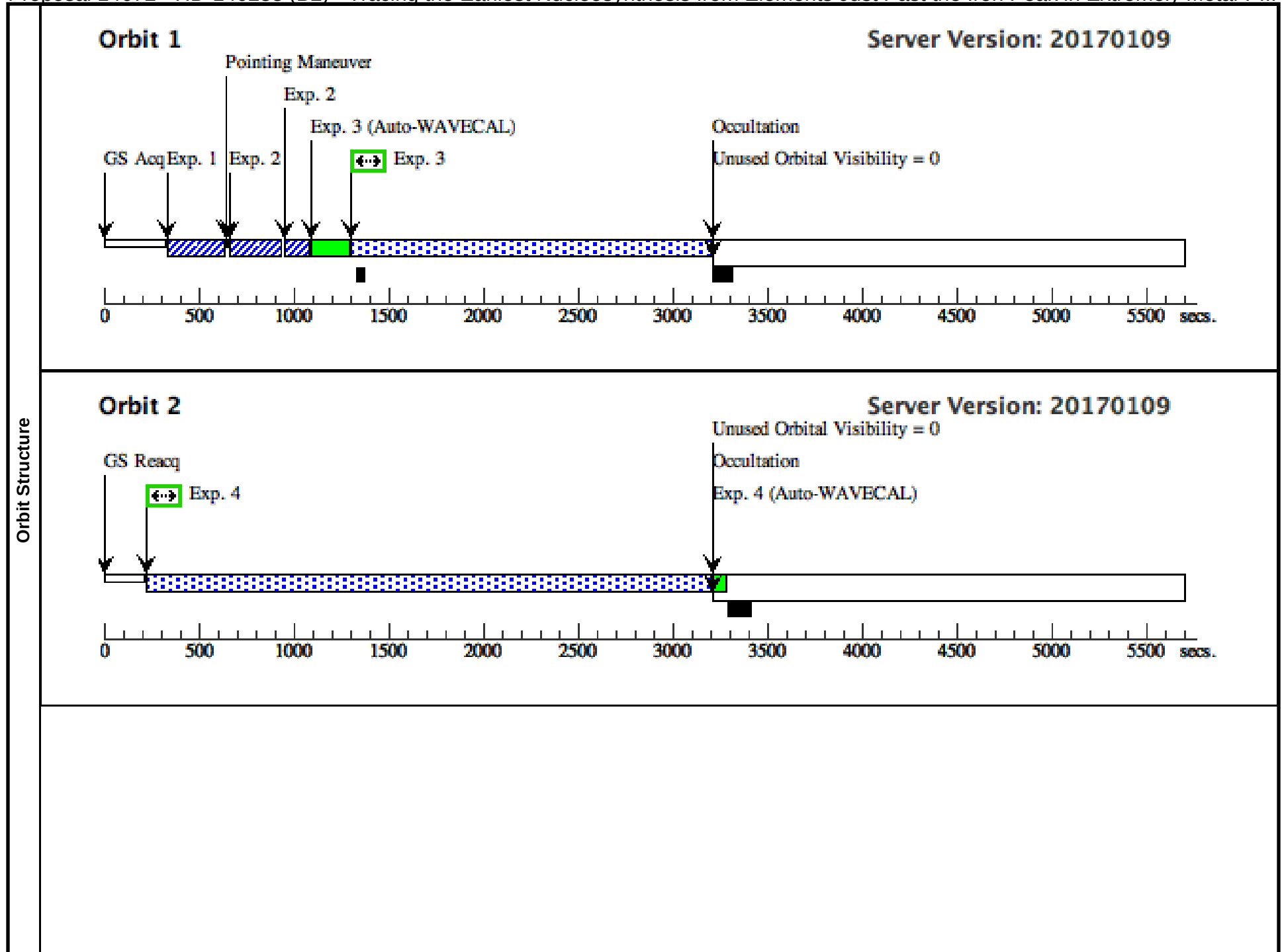
Visit	Proposal 14672, HD-140283 (B1), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	HD-140283	RA: 15 43 1.8857 (235.7578571d) Dec: -10 56 5.47 (-10.93485d) Equinox: J2000	Proper Motion RA: -1114.9 mas/yr Proper Motion Dec: -304.4 mas/yr Parallax: .017" Epoch of Position: 2016	V=7.212	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates revised for epoch 2016 by T Ayres and adopted for GO-14161									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 069)	(2) HD-140283	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.ta.715510 ETC run									
	2	(STIS.sp.82 3075)	(2) HD-140283	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715522 ETC run									
	3	(STIS.sp.82 2431)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				1880 Secs (1880 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715614 ETC run									
4	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)		
								[==>]	[2]	
5	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)		
								[==>]	[3]	

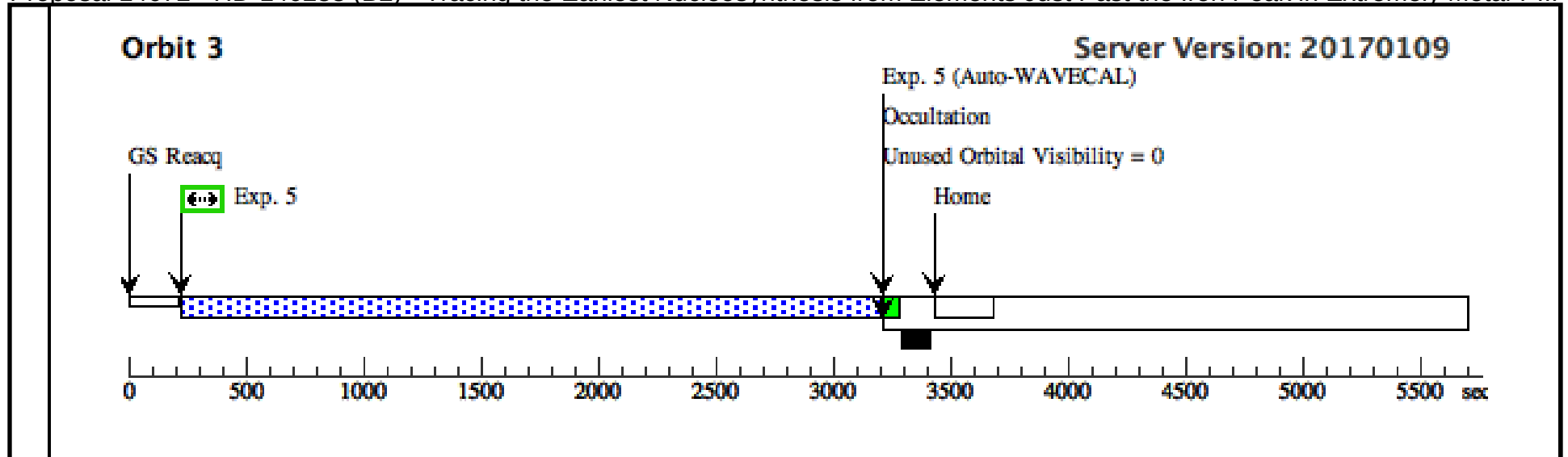




Proposal 14672 - HD-140283 (B2) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-P...

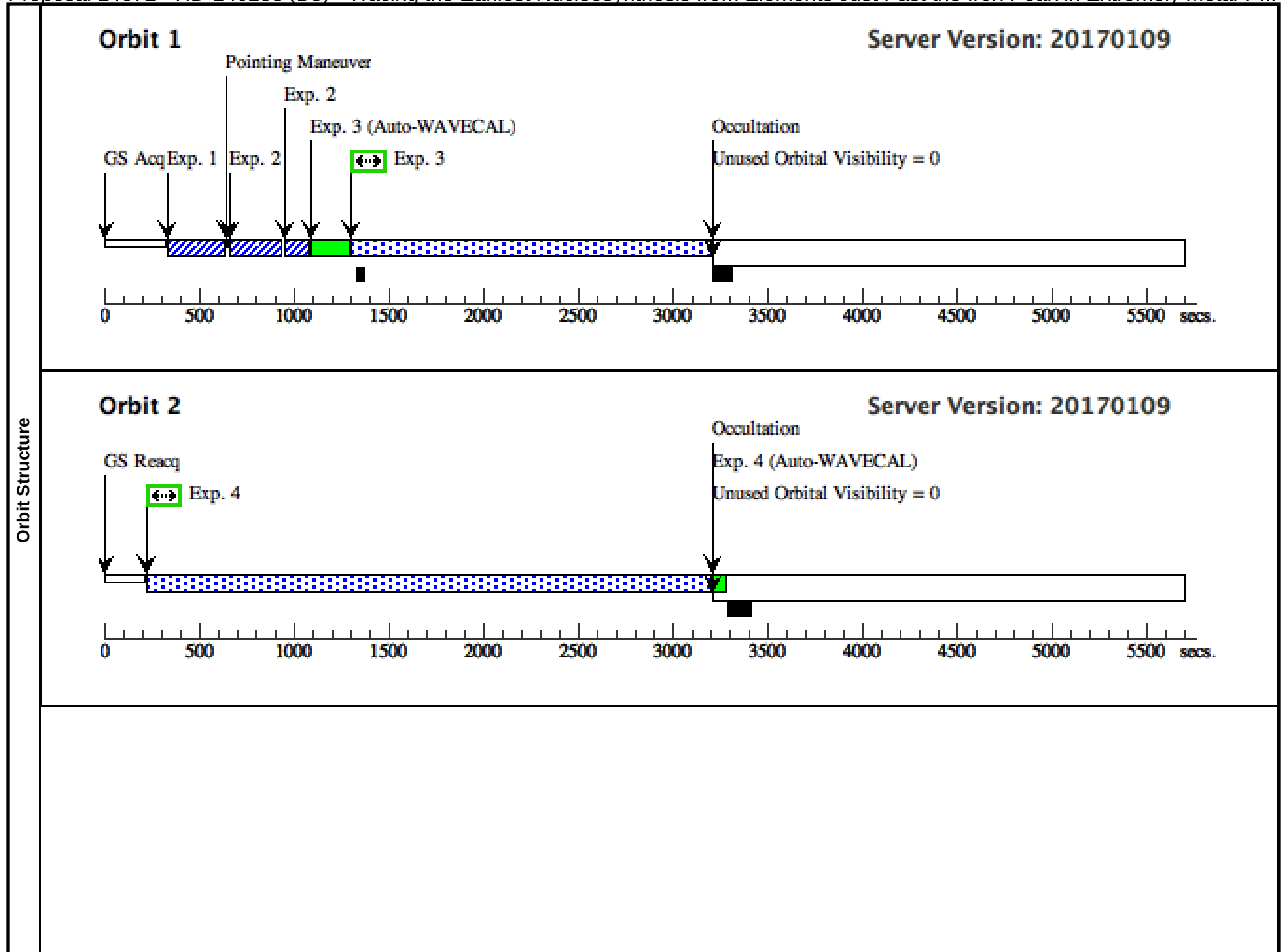
Visit	Proposal 14672, HD-140283 (B2), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	HD-140283	RA: 15 43 1.8857 (235.7578571d) Dec: -10 56 5.47 (-10.93485d) Equinox: J2000	Proper Motion RA: -1114.9 mas/yr Proper Motion Dec: -304.4 mas/yr Parallax: .017" Epoch of Position: 2016	V=7.212	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates revised for epoch 2016 by T Ayres and adopted for GO-14161									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 069)	(2) HD-140283	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.ta.715510 ETC run									
	2	(STIS.sp.82 3075)	(2) HD-140283	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715522 ETC run									
	3	(STIS.sp.82 2431)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				1880 Secs (1880 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715614 ETC run									
4	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)		
								[==>]	[2]	
5	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)		
								[==>]	[3]	

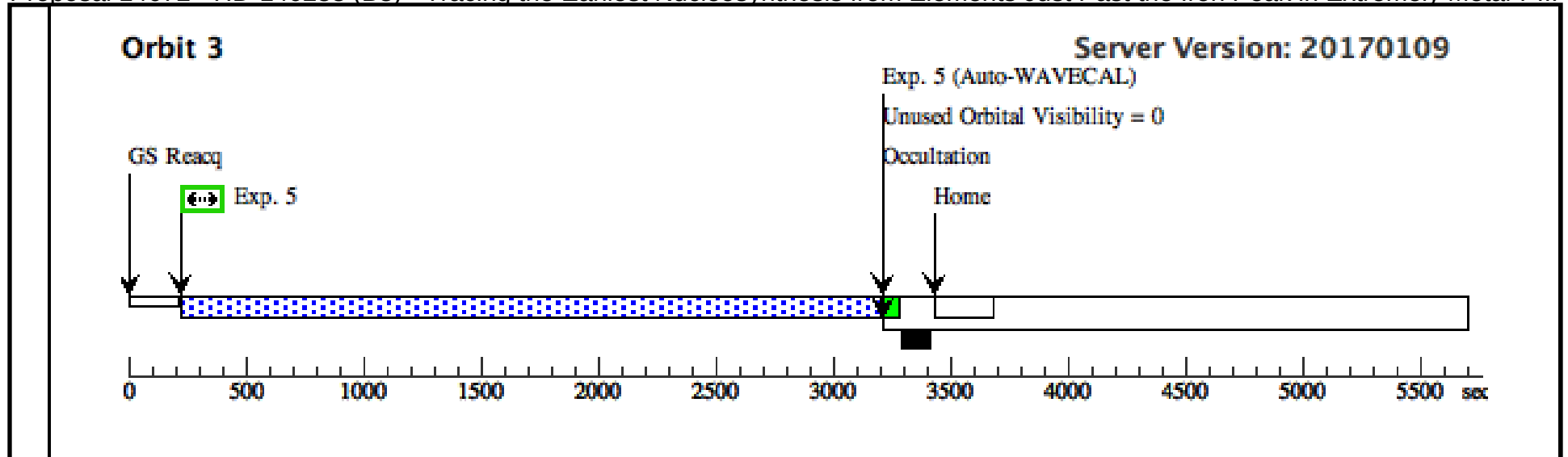




Proposal 14672 - HD-140283 (B3) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-P...

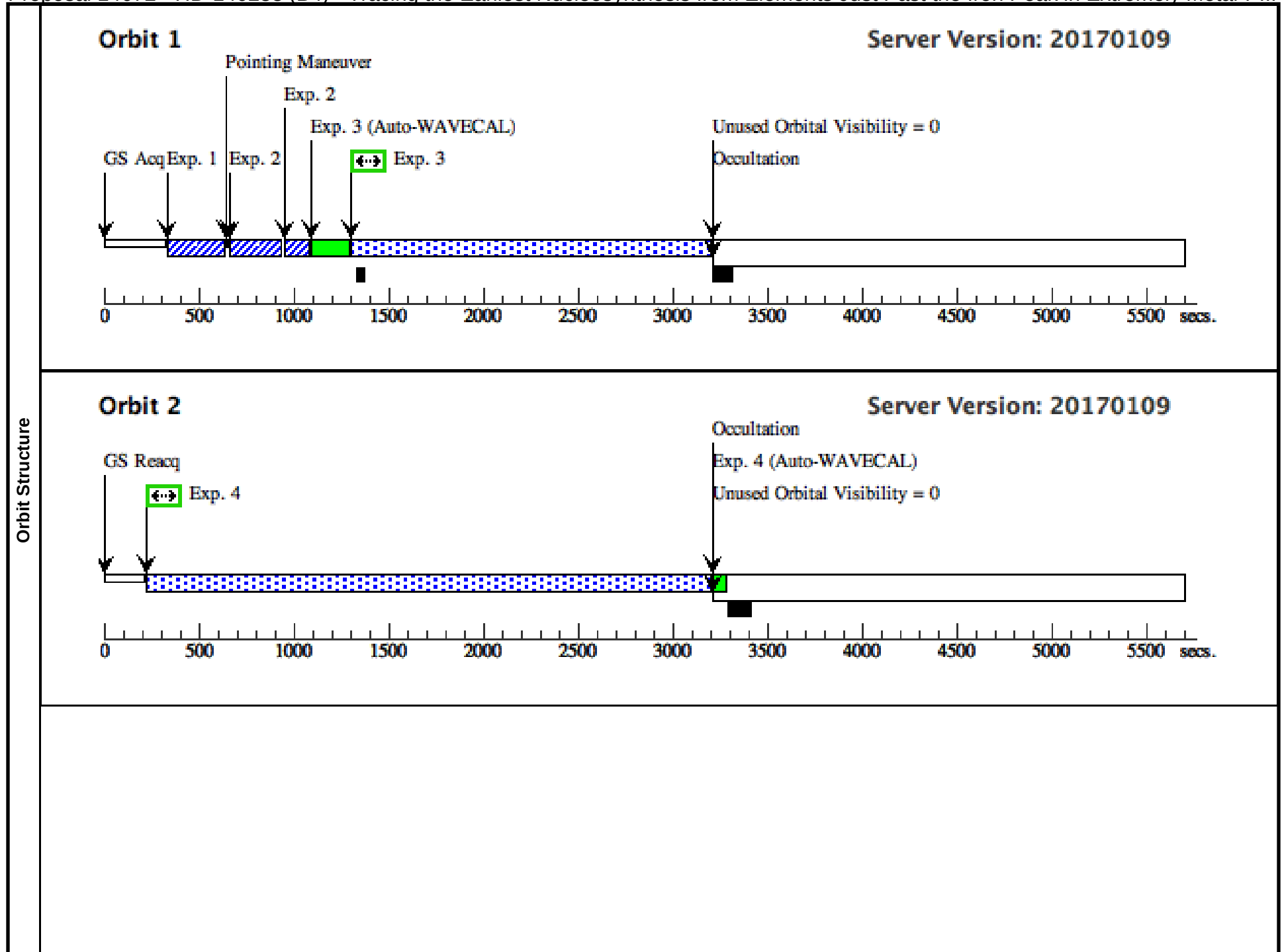
Visit	Proposal 14672, HD-140283 (B3), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	HD-140283	RA: 15 43 1.8857 (235.7578571d) Dec: -10 56 5.47 (-10.93485d) Equinox: J2000	Proper Motion RA: -1114.9 mas/yr Proper Motion Dec: -304.4 mas/yr Parallax: .017" Epoch of Position: 2016	V=7.212	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates revised for epoch 2016 by T Ayres and adopted for GO-14161									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 069)	(2) HD-140283	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.ta.715510 ETC run									
	2	(STIS.sp.82 3075)	(2) HD-140283	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715522 ETC run									
	3	(STIS.sp.82 2431)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				1880 Secs (1880 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715614 ETC run									
	4	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)	
									[==>]	[2]
	5	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)	
									[==>]	[3]

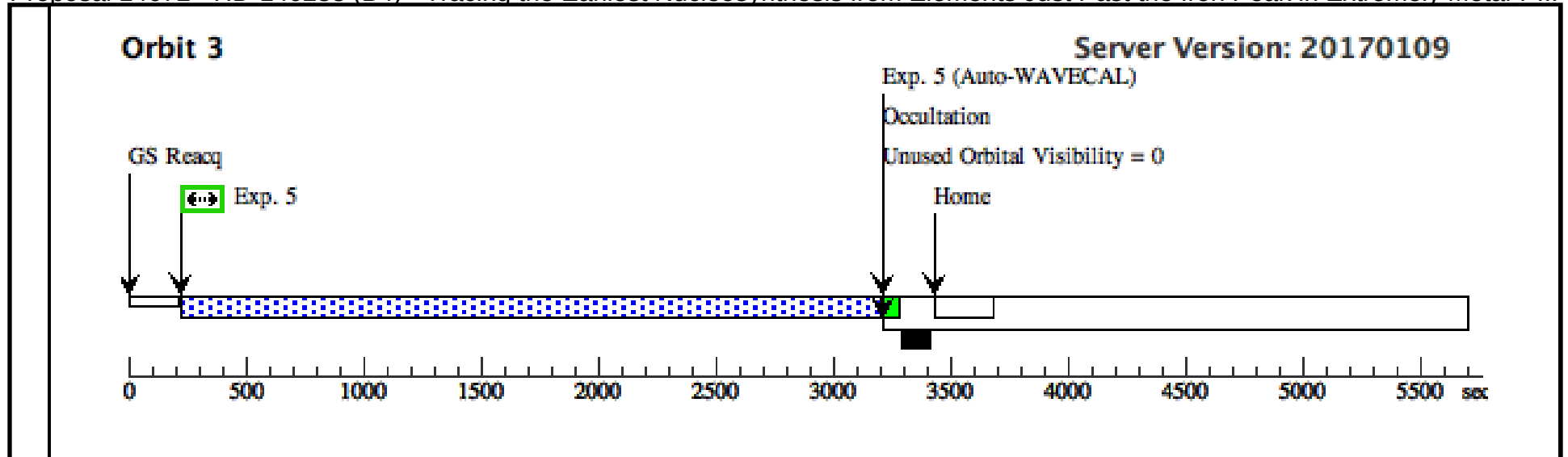




Proposal 14672 - HD-140283 (B4) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-P...

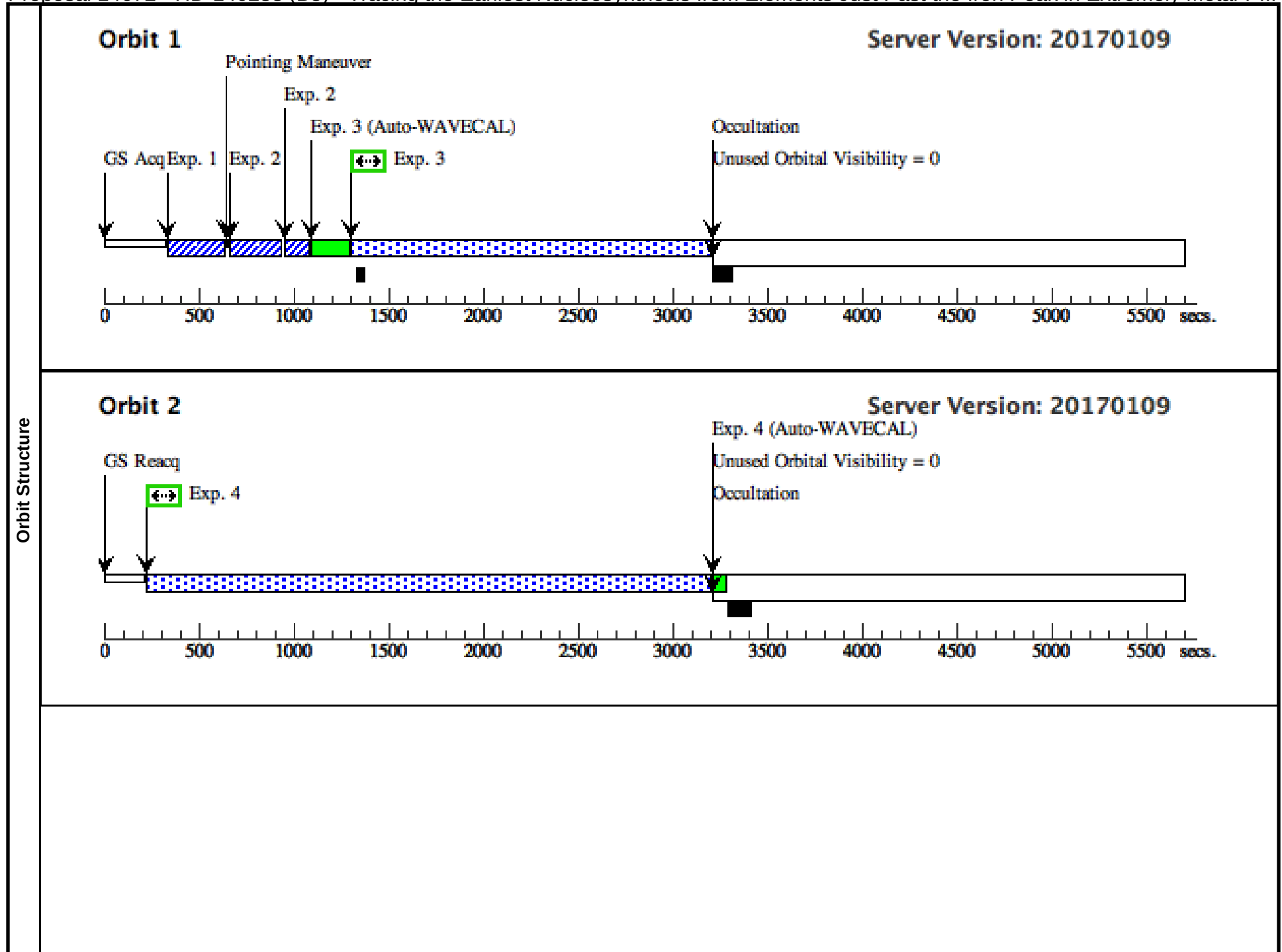
Visit	Proposal 14672, HD-140283 (B4), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	HD-140283	RA: 15 43 1.8857 (235.7578571d) Dec: -10 56 5.47 (-10.93485d) Equinox: J2000	Proper Motion RA: -1114.9 mas/yr Proper Motion Dec: -304.4 mas/yr Parallax: .017" Epoch of Position: 2016	V=7.212	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates revised for epoch 2016 by T Ayres and adopted for GO-14161									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 069)	(2) HD-140283	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.ta.715510 ETC run									
	2	(STIS.sp.82 3075)	(2) HD-140283	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715522 ETC run									
	3	(STIS.sp.82 2431)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				1880 Secs (1880 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715614 ETC run									
4	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)		
								[==>]	[2]	
5	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)		
								[==>]	[3]	

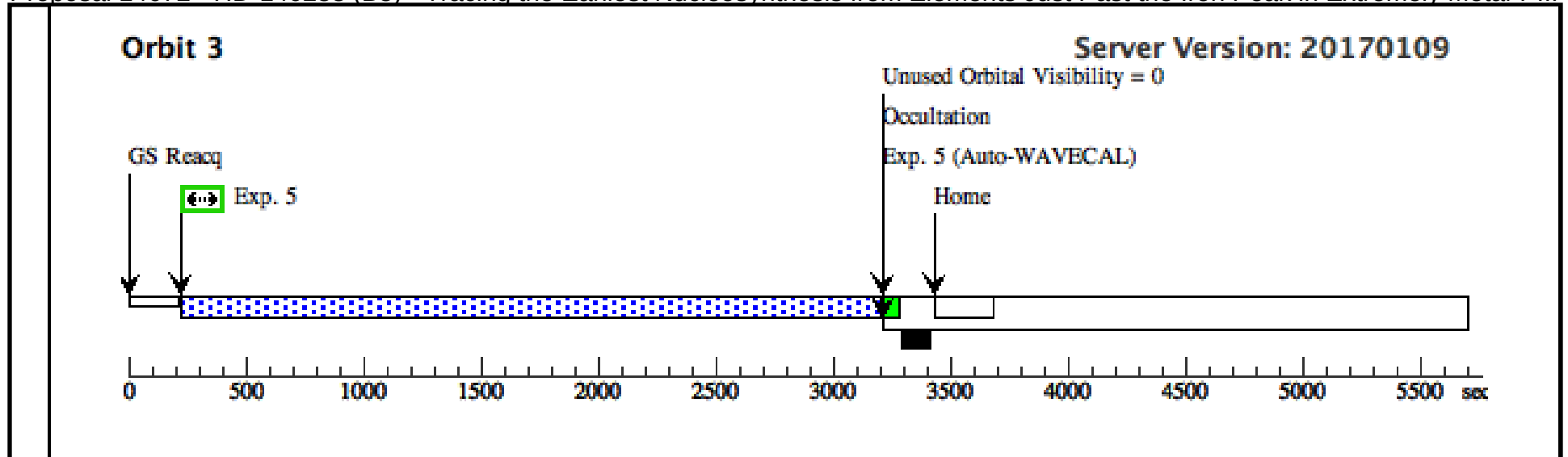




Proposal 14672 - HD-140283 (B5) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-P...

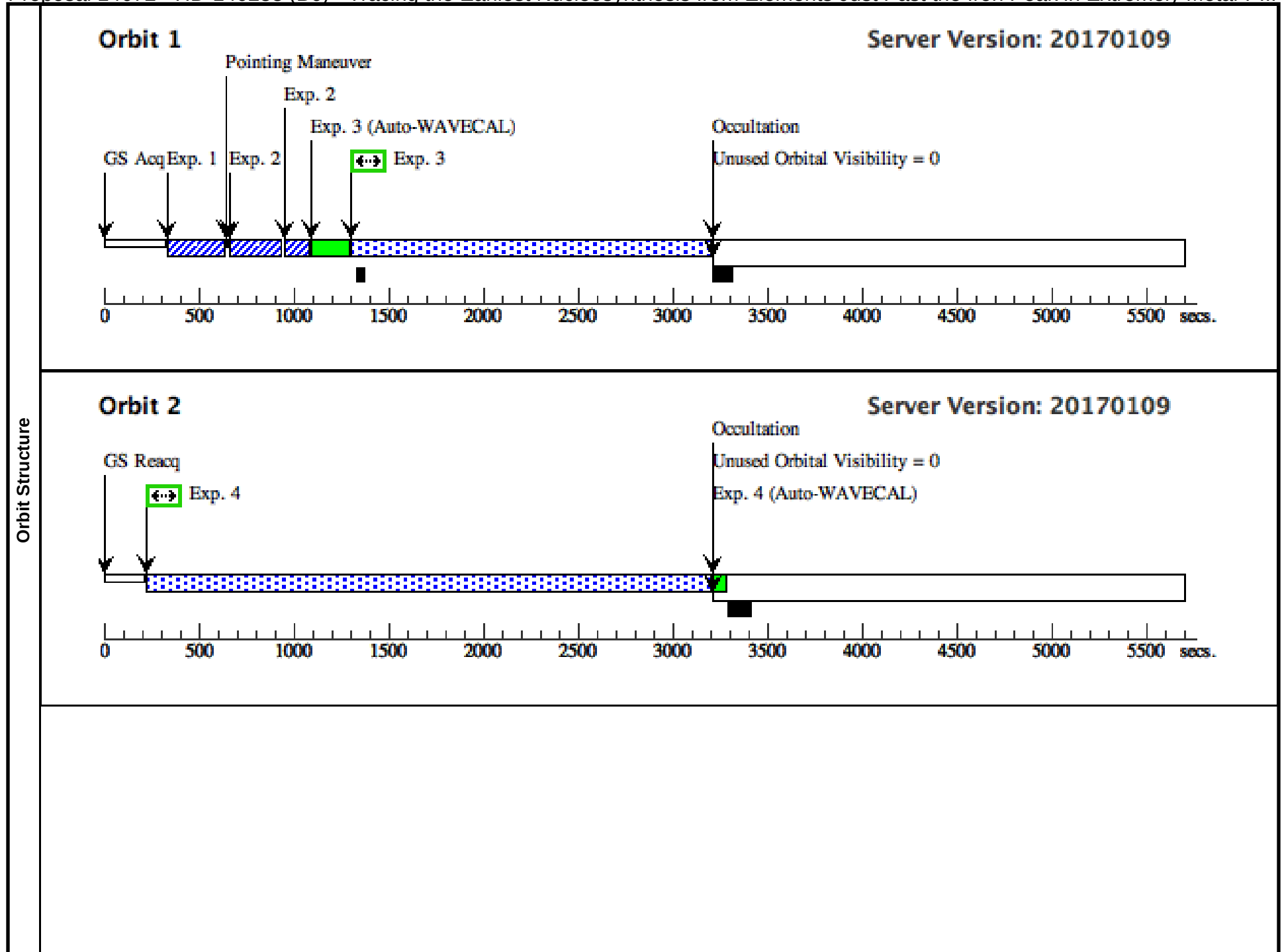
Visit	Proposal 14672, HD-140283 (B5), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	HD-140283	RA: 15 43 1.8857 (235.7578571d) Dec: -10 56 5.47 (-10.93485d) Equinox: J2000	Proper Motion RA: -1114.9 mas/yr Proper Motion Dec: -304.4 mas/yr Parallax: .017" Epoch of Position: 2016	V=7.212	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates revised for epoch 2016 by T Ayres and adopted for GO-14161									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 069)	(2) HD-140283	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.ta.715510 ETC run									
	2	(STIS.sp.82 3075)	(2) HD-140283	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715522 ETC run									
	3	(STIS.sp.82 2431)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				1880 Secs (1880 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715614 ETC run									
	4	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)	
									[==>]	[2]
	5	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)	
									[==>]	[3]

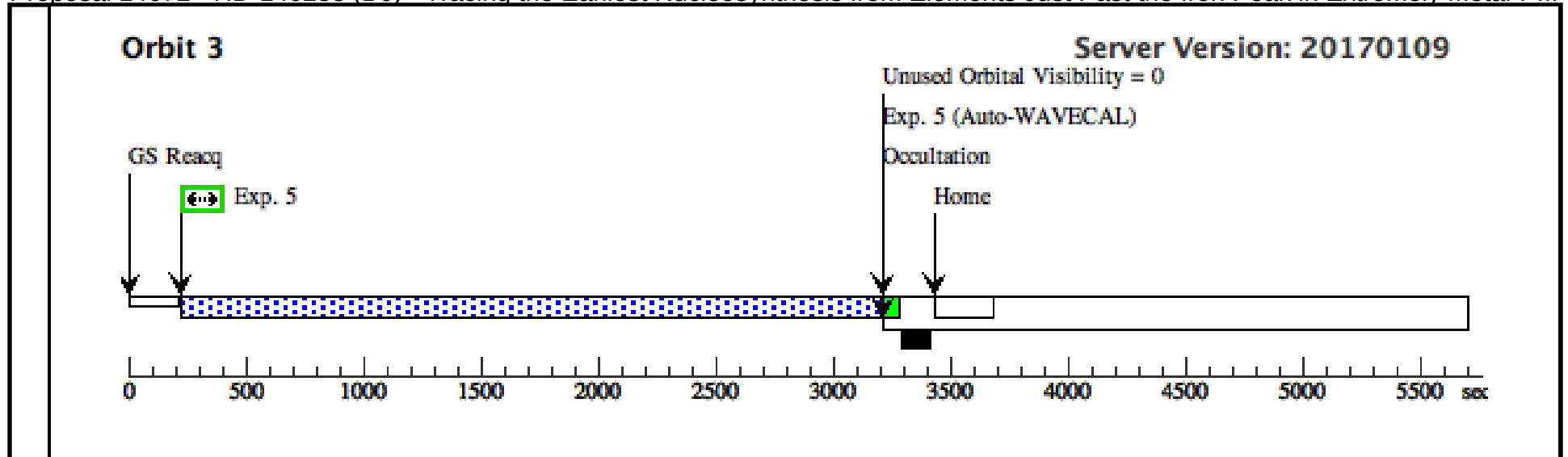




Proposal 14672 - HD-140283 (B6) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-P...

Visit	Proposal 14672, HD-140283 (B6), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	HD-140283	RA: 15 43 1.8857 (235.7578571d) Dec: -10 56 5.47 (-10.93485d) Equinox: J2000	Proper Motion RA: -1114.9 mas/yr Proper Motion Dec: -304.4 mas/yr Parallax: .017" Epoch of Position: 2016	V=7.212	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates revised for epoch 2016 by T Ayres and adopted for GO-14161									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 069)	(2) HD-140283	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.ta.715510 ETC run									
	2	(STIS.sp.82 3075)	(2) HD-140283	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715522 ETC run									
	3	(STIS.sp.82 2431)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				1880 Secs (1880 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715614 ETC run									
4	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)		
								[==>]	[2]	
5	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)		
								[==>]	[3]	





Proposal 14672 - HD-140283 (B7) - Tracing the Earliest Nucleosynthesis from Elements Just Past the Iron Peak in Extremely Metal-P...

Visit	Proposal 14672, HD-140283 (B7), scheduling								Thu Feb 16 02:05:20 GMT 2017	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/NUV-MAMA, STIS/CCD									
	Special Requirements: (none)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	HD-140283	RA: 15 43 1.8857 (235.7578571d) Dec: -10 56 5.47 (-10.93485d) Equinox: J2000	Proper Motion RA: -1114.9 mas/yr Proper Motion Dec: -304.4 mas/yr Parallax: .017" Epoch of Position: 2016	V=7.212	Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.									
	Coordinates revised for epoch 2016 by T Ayres and adopted for GO-14161									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(STIS.ta.823 069)	(2) HD-140283	STIS/CCD, ACQ, F25ND3	MIRROR				1 Secs (1 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.ta.715510 ETC run									
	2	(STIS.sp.82 3075)	(2) HD-140283	STIS/CCD, ACQ/PEAK, 0.2X0.09	G430L 4300 A				0.2 Secs (0.2 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715522 ETC run									
	3	(STIS.sp.82 2431)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				1880 Secs (1880 Secs)	
									[==>]	[1]
	Comments: Based on GO-14161 STIS.sp.715614 ETC run									
	4	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)	
									[==>]	[2]
	5	(STIS.sp.82 2448)	(2) HD-140283	STIS/NUV-MAMA, ACCUM, 0.2X0.09	E230H 1963 A				2966 Secs (2966 Secs)	
								[==>]	[3]	

