



12279 - FK Comae, King of Spin: the Movie

Cycle: 18, Proposal Category: GO

(Availability Mode: SUPPORTED)

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) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:13.0	yes
02	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:18.0	yes
03	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:22.0	yes
04	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:26.0	yes
05	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:29.0	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>
06	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:33.0	yes
07	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:36.0	yes
08	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:40.0	yes
09	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:45.0	yes
10	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:48.0	yes
11	(1) HD117555	COS/FUV COS/NUV	1	07-Apr-2011 21:14:51.0	yes

11 Total Orbits Used

ABSTRACT

FK Comae is an ultra-fast rotating, single yellow giant, product of a recent W UMa merger. Extraordinary levels of FUV and X-ray emission rate FK Comae a coronal powerhouse on par with the most extreme of the better known activity heavyweights: short-period RS CVn binaries. As a single star, FK Comae has clear advantages as a laboratory for exploring the outer limits of magnetospheric activity among the coronal cool stars. FK Comae has a long history of attention at optical and X-ray wavelengths, thanks to its generously spotted surface, and proclivity to flare regularly at high energies. FUSE discovered ultra-broad, redshifted profiles of O VI and C III, but unfortunately the singular observation could not be repeated, thanks to the satellite's flaky attitude system. The remarkable FUV spectrum was taken just a few months before STIS failed in 2004, so there was no opportunity to turn the more powerful gaze of Hubble to the task. Now, finally, the amazing sensitivity of Cosmic Origins Spectrograph can be brought to bear: a single orbit can capture an FUV spectrum of FK Comae with S/N at instrumental limits for bright lines, and digging down to faint Fe XXI 1354 (bridge to the coordinated Chandra HETGS pointing we also are proposing).

We will trace how the bright FUV regions relate spatially to the photospheric dark spots, to inform ideas of coronal structure and heating in these advanced objects. We will probe whether a global magnetosphere exists, and whether the field lines are loaded with hot coronal gas (>10 MK), as well as the cooler 0.3 MK material already suggested by highly broadened FUSE O VI. Further, we will test whether the striking 100 km/s redshifts

of the FUV lines, and similar shifts seen in Ne X by Chandra HETGS, are caused by a massive coronal outflow (perhaps implicated in magnetic braking). Our method is to exploit, on the one hand, emission-line "Doppler imaging," whereby bright surface regions are mapped onto specific locations in the global profile, according to the line-of-sight rotational velocity. On the other hand, we compare features of different opacity and excitation (e.g., Si III 1206 and Si IV 1393) to deduce whether, say, a red asymmetry is caused by blueshifted absorption, or alternatively by infall of the entire feature. Multiple epochs spaced over two rotation periods break the degeneracy between profile distortions caused by disk passage of hot patches (Doppler imaging part), and those caused by large-scale flows. Contemporaneous spot maps from the ground will provide a fundamental magnetic context for the coordinated FUV and X-ray "movies."

OBSERVING DESCRIPTION

Overview

The observational objective of the program is to carry out time-domain spectroscopy of the fast-rotating, hyperactive, heavily "spotted" yellow giant FK Comae. We focus on small segments of the NUV and FUV regions where nevertheless numerous important diagnostic emission lines fall. The program calls for eleven COS observations spaced roughly evenly over two spin periods (about 5 days total), the minimum necessary to separate persistent surface features, rotationally mapped onto the very broad line profiles, from transient flares, a common occurrence on this magnetically challenged object. The eleven 1-orbit HST pointings will be coordinated with Chandra transmission grating spectroscopy and Zeeman Doppler Imaging from groundbased telescopes.

COS Acquisition & Science Exposures

The COS observations will be the same in each orbit, and consist of an NUV imaging acquisition with the BOA and MIRROR-A, then a short (51 s) exposure of the 2800 Å region with G285M-2676, where the key MgII h & k features fall on stripe "C." The NUV exposure is followed by a pair of G130M-1291 observations, for 900 s each, at FP-POS 3 and 4 and on detector segment "A" only (see below), to fill out the orbit.

1) Imaging ACQ

A UV-VIS spectral energy distribution for FK Com was carefully constructed from the extensive IUE low-dispersion SW and LW material available for this object, for wavelengths below about 3200 Å; joined at the longer wavelengths to a Kurucz model selected on the basis of the match to the longward end of the IUE SED. Assuming a stellar radius of 8.6 R_{sun} and the approximate Hipparcos distance of 230 pc, the best fit SED was for $\log(g)=3.0$ and $T_{\text{eff}}=4900$ K, very reasonable for this mid-G giant with a large surface coverage of cool spots. The COS ETC then indicated that FK Com is a few times brighter than safety limits for the PSA/MIRROR-B combination (NUV imaging acquisition), so we were forced to use the BOA/MIRROR-A combination. The recommended exposure time for $S/N=60$ is 42 s. Other possible acquisition approaches were investigated, including several types of dispersed light ACQ/SEARCH followed by XD and D pickups, but the NUV imaging acquisition was faster than the other cases considered, and sufficiently robust for this target whose coordinates and proper motions are well known.

2) FUV (& NUV) S/N

S/N expectations for the cumulative 1800 s of G130M exposure were estimated by creating a proxy high-resolution FUV spectrum from STIS observations of the hyperactive RS CVn star HR1099. The flux densities of the latter were scaled to FK Com by determining the ratio of the average IUE SW-LO spectrum of FK to that of HR1099, Gaussian smoothed to the same resolution, in bins of 50 Å over the full grasp of G130M-1291 (i.e., including both detector segments). The scaled proxy FK spectrum then was smoothed by an appropriate rotational broadening to account for the suppression of the flux densities compared with the more slowly rotating HR1099. Results are given in COS.A322770, which shows that the key FUV lines like CII 1335 and SiIV 1393 will be recorded at peak S/N per resol of around 40 in each single orbit pointing. (The NUV G285M exposure will yield $S/N \sim 15$ at the peaks of the two MgII features, based on an average IUE LW-HI moderate-resolution spectrum [COS.A322755].)

3) Over-bright Ly-alpha?

There is one important caveat to the FUV simulation: the Lyman- α line of the proxy spectrum likely is much brighter than expected from FK Com itself. Because of geocoronal contamination of the IUE spectra at the HI line, the scaling for the HR1099 spectrum is grossly overestimated at those wavelengths. Furthermore, the FK Com Ly- α line is expected to be much weaker relative to that of HR1099 because of the large interstellar column ($\sim 10^{21}$ per cm^2), including some local HI absorption, which will obliterate the central peak of the line, and impact the surrounding broad wings as well.

Thus, the true Ly- α peak of FK should be below the predictions, which themselves however violate safety limits by a factor of 2, or so. We

therefore examined IUE SW-LO spectra of FK Com taken through the large aperture (10"x20") compared with those through the small aperture (3" diameter). If the target was well centered in both apertures, the Ly- α flux should be mainly stellar in the SMAP but mainly geocoronal in the LAP. Scaling down the LAP geocoronal peak flux by the ratio of SMAP to LAP areas indicates only about a 30% geocoronal correction to the SMAP Ly- α flux. The residual peak is at about $2\text{E-}13$ in flux density, which translates to about $2\text{E-}12$ in integrated flux, when the $\sim 50\%$ throughput of the SMAP and ~ 5 Å resolution are taken into account. The broad FUV emissions of FK Com observed by FUSE have FWHMs of around 500 km/s, or about 2 Å at Ly- α . Thus, a very rough flux density for the peak Ly- α emission would be around $1\text{E-}12$. This is a factor of only ~ 2 below the detector safety threshold. The FUSE observation of FK Com shows a broad feature at Ly- β , with a peak flux density of $2\text{E-}14$. The flux density scaling between Ly- α and - β is around 20, or more, based on a cursory examination of active stars like HR1099. This also would predict a Ly- α flux density near $0.5\text{E-}12$, consistent with the IUE scaling within the large uncertainties. Unfortunately, this is about as good as it can get, prediction-wise.

The reluctant conclusion is that the FK Com FUV hydrogen emission could be close enough to safety limits to jeopardize the entire sequence, if an overlight condition is triggered. The implication is that the detector side B should be inactivated for the FUV exposures (as was done for the majority of targets in program 11687). The key spectral diagnostics, fortunately, mainly fall on the A side of G130M, so there will be minimal loss of information. (We also included the short NUV exposure of MgII to serve as a proxy for the "lost" HI feature.) The downside is the cost of 300 s for the reconfiguration.

Safety Checking

As far as bright-object safety limits are concerned, FK Com already has been cleared for a Cycle 17 SNAP program (11687), mainly on the basis of an earlier FUSE pointing, through its LSA, which showed no hot star continuum sources in the field of the target. This check will hold for many decades owing to the negligible proper motion of FK Com. In addition, while the hyperactive star is known to flare frequently, it has been observed many times by IUE (and other high-energy experiments) so the flare statistics and amplitude distributions are well known. Typically, the FUV emissions increase in strength by only factors of ~ 2 during large flares, which is far below the FUV safety limits. It is important to understand, with regard to the flaring behavior, that the FK Comae stars are distinguished by slow, long-duration ($\sim$ hours) flares of modest amplitude, but large integrated energy; quite unlike the M-dwarf flare stars whose FUV outbursts tend to be very short ($\sim$ minutes), but larger in amplitude, and very occasionally in the realm of "super flares." The long history of X-ray, UV, and optical observations of FK Com, prototype of a larger class whose

Proposal 12279 (STScI Edit Number: 2, Created: Thursday, April 7, 2011 8:14:55 PM EST) - Overview

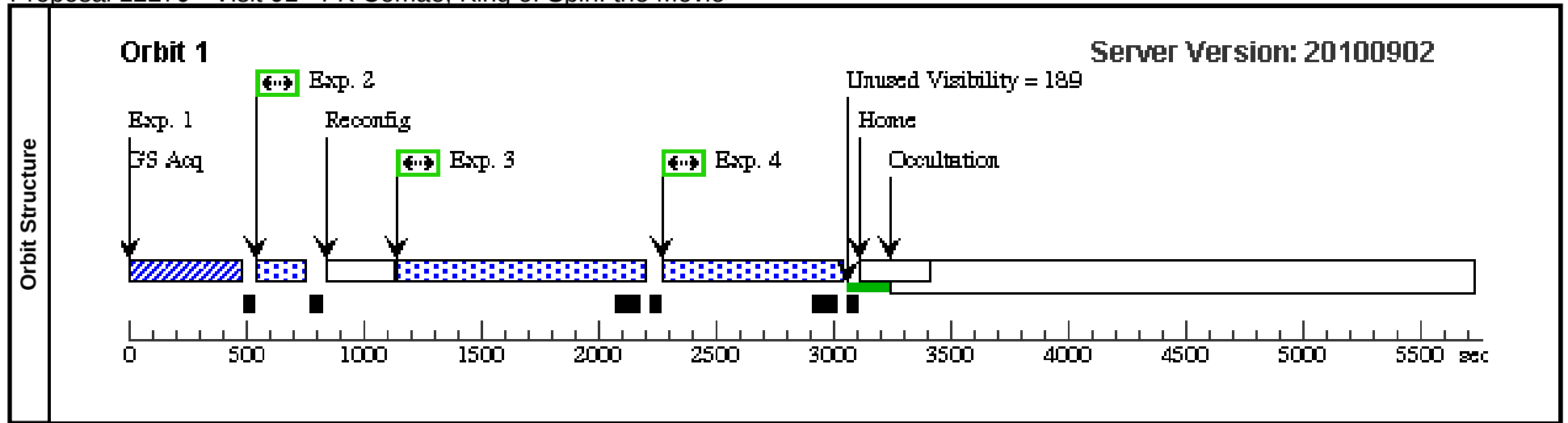
members also have been extensively observed, has not captured any behavior analogous to the -- albeit very rare -- dMe super flares, so there is good reason to believe that the flare mechanism on the fast-spinning FK Com yellow giants is quite distinct from that on the tiny, more slowly rotating M dwarfs, although of course strong magnetic fields ultimately are responsible for the events on both types of object.

Scheduling

The visibility period in April/May 2011 is optimum for the project because of lack of constraints on the Chandra side, and good access for the groundbased ZDI component. The "BETWEEN" range was selected so that no matter when Visit 01 was scheduled in that range, Visit 11 still will fall within the constraint-free zone for Chandra. The 0.5 D timing of the sequence was accomplished using the "AFTER 01 BY XX D TO YY D" option, with a ± 0.15 D range ($\pm 6\%$ in phase) around each nominal 0.5 D increment to allow for ease of scheduling around SAA passes.

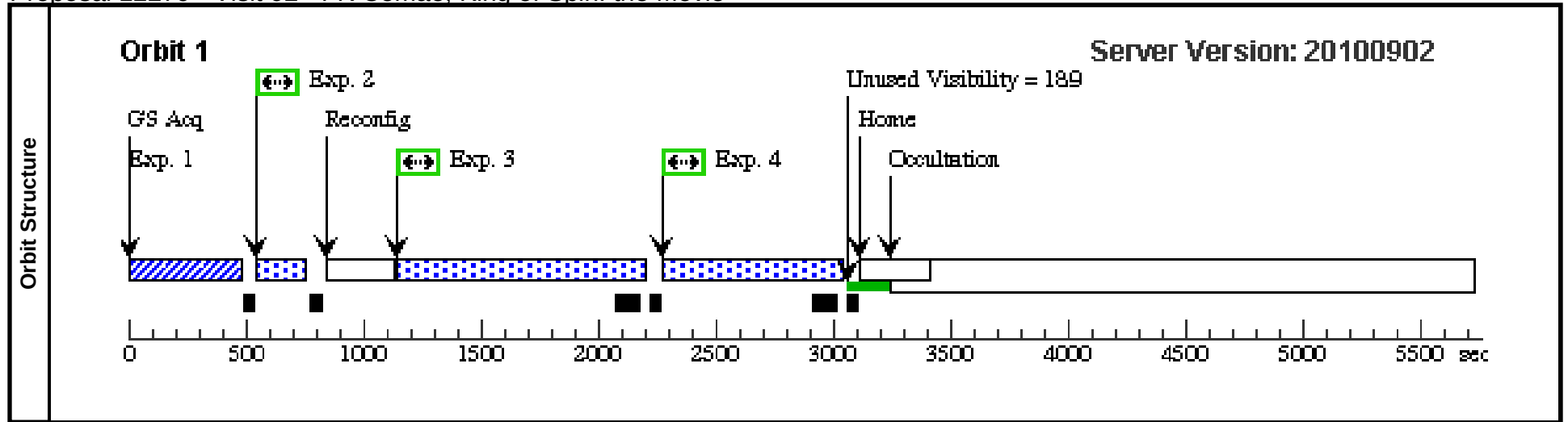
Proposal 12279 - Visit 01 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 01, scheduling										Fri Apr 08 01:14:55 GMT 2011	
	Diagnostic Status: Warning											
	Scientific Instruments: COS/NUV, COS/FUV											
	Special Requirements: (none)											
Diagnostics	(Visit 01) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.											
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)		Proper Motion RA: -0.004 sec of time/yr		V=8.17+/-0.5		Reference Frame: ICRS			
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)		Proper Motion Dec: -0.020 arcsec/yr							
			Equinox: J2000		Parallax: 0.0042"							
					Epoch of Position: 2010							
					Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit	
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs			
									[==>]		[1]	
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).											
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs			
					2676 A	BUFFER-TIME=120			[==>]		[1]	
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs			
					1291 A	BUFFER-TIME=790;			[==>]		[1]	
						SEGMENT=A						
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs			
				1291 A	BUFFER-TIME=610;			[==>]		[1]		
					SEGMENT=A							



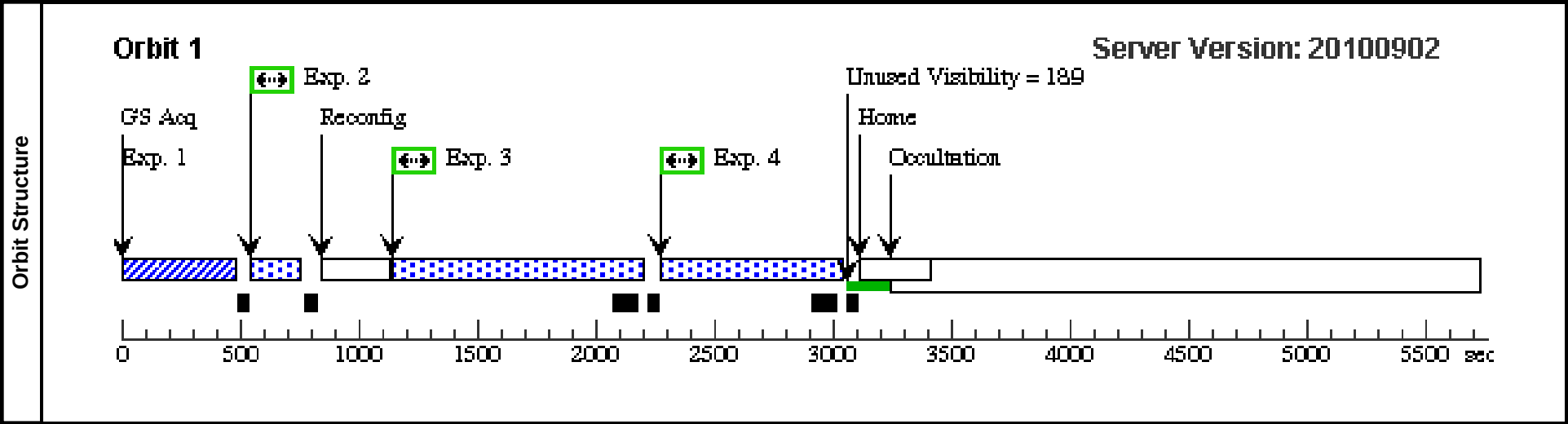
Proposal 12279 - Visit 02 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 02, scheduling						Fri Apr 08 01:14:56 GMT 2011			
	Diagnostic Status: Warning									
	Scientific Instruments: COS/NUV, COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 02) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)	Proper Motion RA: -0.004 sec of time/yr	V=8.17+/-0.5	Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)	Proper Motion Dec: -0.020 arcsec/yr						
			Equinox: J2000	Parallax: 0.0042"						
			Epoch of Position: 2010							
			Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs	
									[==>]	[1]
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).									
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs	
					2676 A	BUFFER-TIME=120			[==>]	[1]
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs	
					1291 A	BUFFER-TIME=790;			[==>]	[1]
					SEGMENT=A					
4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;				720 Secs	
				1291 A	BUFFER-TIME=610;				[==>]	[1]
					SEGMENT=A					



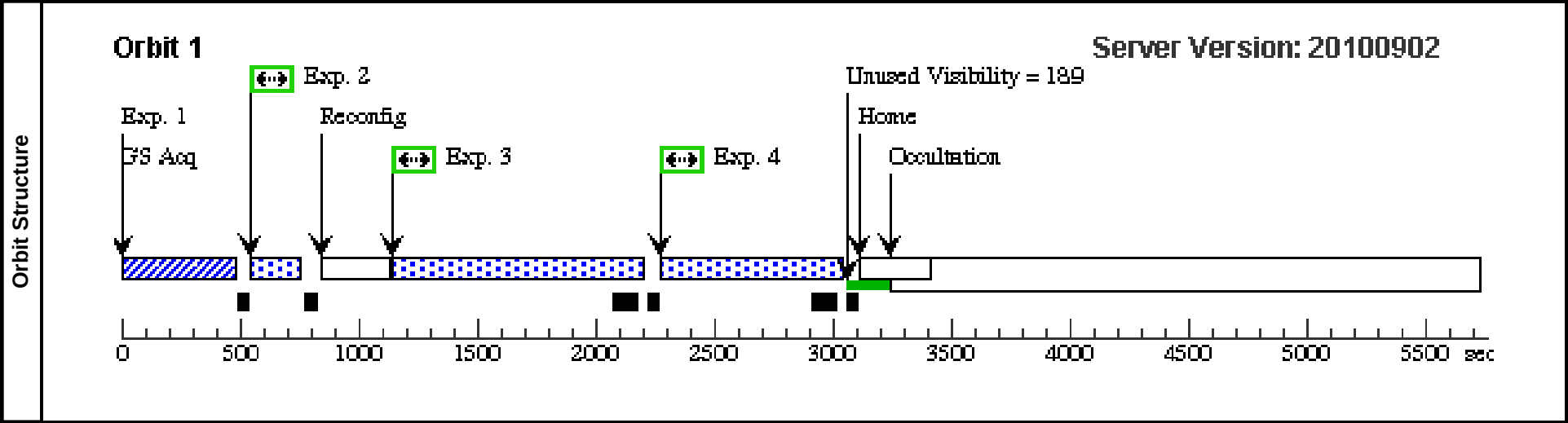
Proposal 12279 - Visit 03 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 03, scheduling						Fri Apr 08 01:14:57 GMT 2011			
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	Scientific Instruments: COS/NUV, COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 03) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)	Proper Motion RA: -0.004 sec of time/yr	V=8.17+/-0.5	Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)	Proper Motion Dec: -0.020 arcsec/yr						
			Equinox: J2000	Parallax: 0.0042"						
			Epoch of Position: 2010							
			Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs	
									[==>]	[1]
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).									
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs	
					2676 A	BUFFER-TIME=120			[==>]	[1]
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs	
					1291 A	BUFFER-TIME=790;			[==>]	[1]
						SEGMENT=A				
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs	
				1291 A	BUFFER-TIME=610;			[==>]	[1]	
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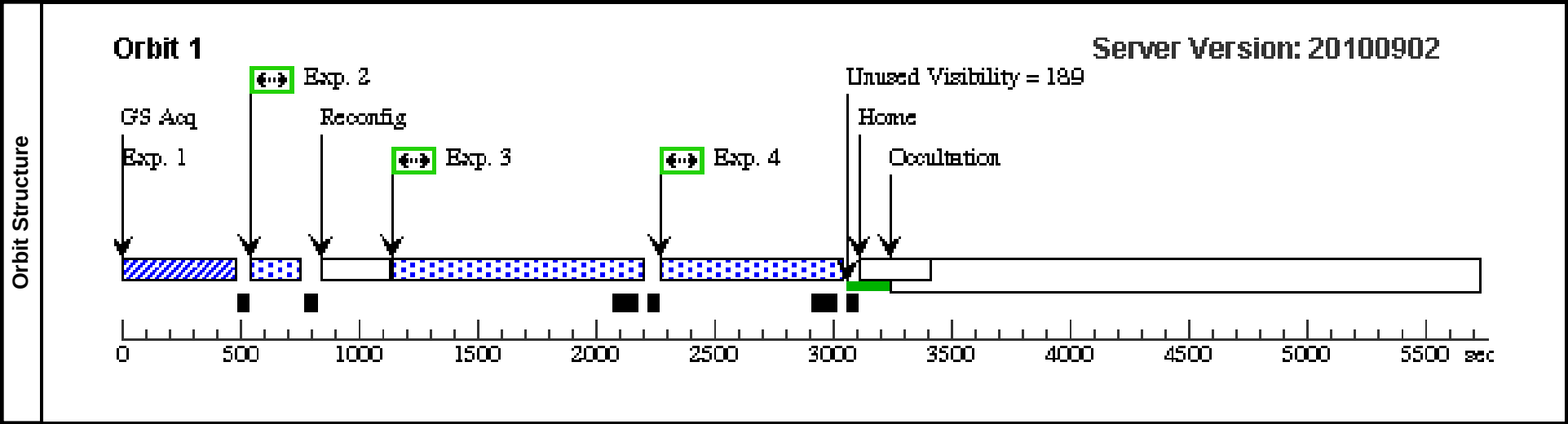
Proposal 12279 - Visit 04 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 04, scheduling						Fri Apr 08 01:14:57 GMT 2011			
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	Scientific Instruments: COS/NUV, COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 04) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)	Proper Motion RA: -0.004 sec of time/yr	V=8.17+/-0.5	Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)	Proper Motion Dec: -0.020 arcsec/yr						
			Equinox: J2000	Parallax: 0.0042"						
			Epoch of Position: 2010							
			Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs	
									[==>]	[1]
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).									
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs	
					2676 A	BUFFER-TIME=120			[==>]	[1]
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs	
					1291 A	BUFFER-TIME=790;			[==>]	[1]
						SEGMENT=A				
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs	
				1291 A	BUFFER-TIME=610;			[==>]	[1]	
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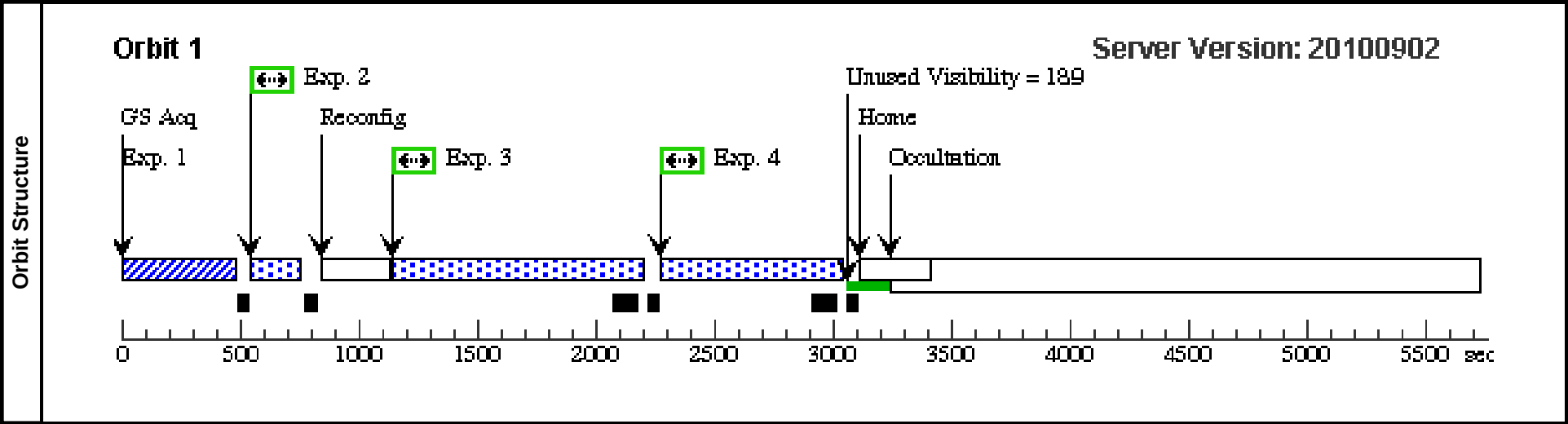
Proposal 12279 - Visit 05 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 05, scheduling										Fri Apr 08 01:14:57 GMT 2011			
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	Scientific Instruments: COS/NUV, COS/FUV													
	Special Requirements: (none)													
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Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Fluxes		Miscellaneous				
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		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)		Proper Motion Dec: -0.020 arcsec/yr									
			Equinox: J2000		Parallax: 0.0042"									
					Epoch of Position: 2010									
					Radial Velocity: -16.6 km/sec									
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s													
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit			
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs					
									[==>]		[1]			
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).													
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs					
					2676 A	BUFFER-TIME=120			[==>]		[1]			
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs					
					1291 A	BUFFER-TIME=790;			[==>]		[1]			
					SEGMENT=A									
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs					
					1291 A	BUFFER-TIME=610;			[==>]		[1]			
						SEGMENT=A								



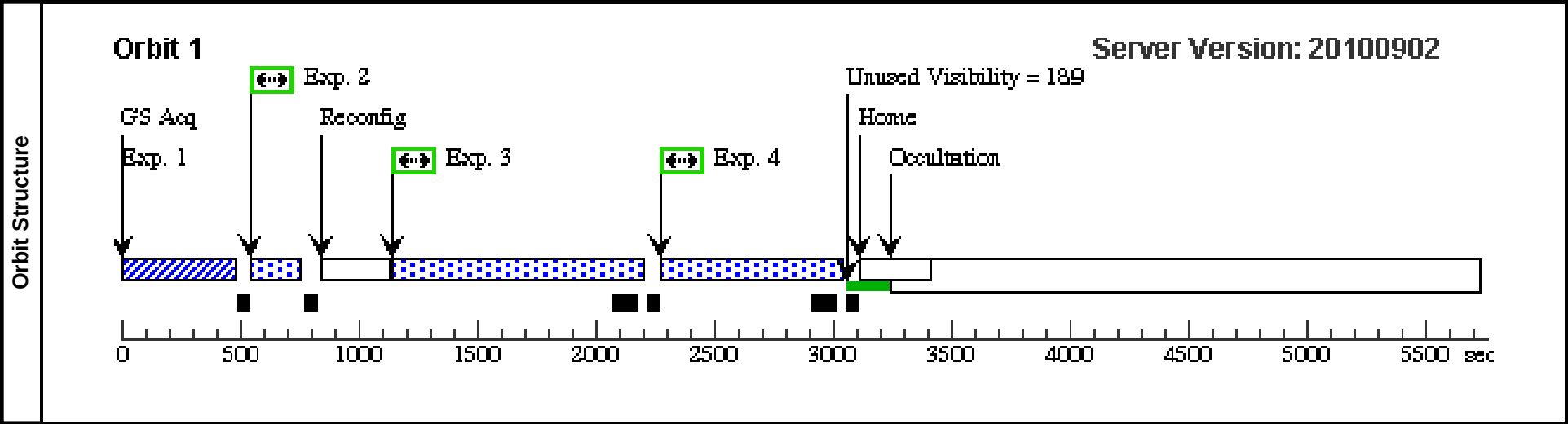
Proposal 12279 - Visit 06 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 06, scheduling										Fri Apr 08 01:14:58 GMT 2011			
	Diagnostic Status: Warning													
	Scientific Instruments: COS/NUV, COS/FUV													
	Special Requirements: (none)													
Diagnostics	(Visit 06) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.													
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections			Fluxes		Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)		Proper Motion RA: -0.004 sec of time/yr			V=8.17+/-0.5		Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)		Proper Motion Dec: -0.020 arcsec/yr									
			Equinox: J2000		Parallax: 0.0042"									
					Epoch of Position: 2010									
					Radial Velocity: -16.6 km/sec									
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s													
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit			
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs					
									[==>]		[1]			
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).													
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs					
					2676 A	BUFFER-TIME=120			[==>]		[1]			
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs					
					1291 A	BUFFER-TIME=790;			[==>]		[1]			
						SEGMENT=A								
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs					
				1291 A	BUFFER-TIME=610;			[==>]		[1]				
					SEGMENT=A									



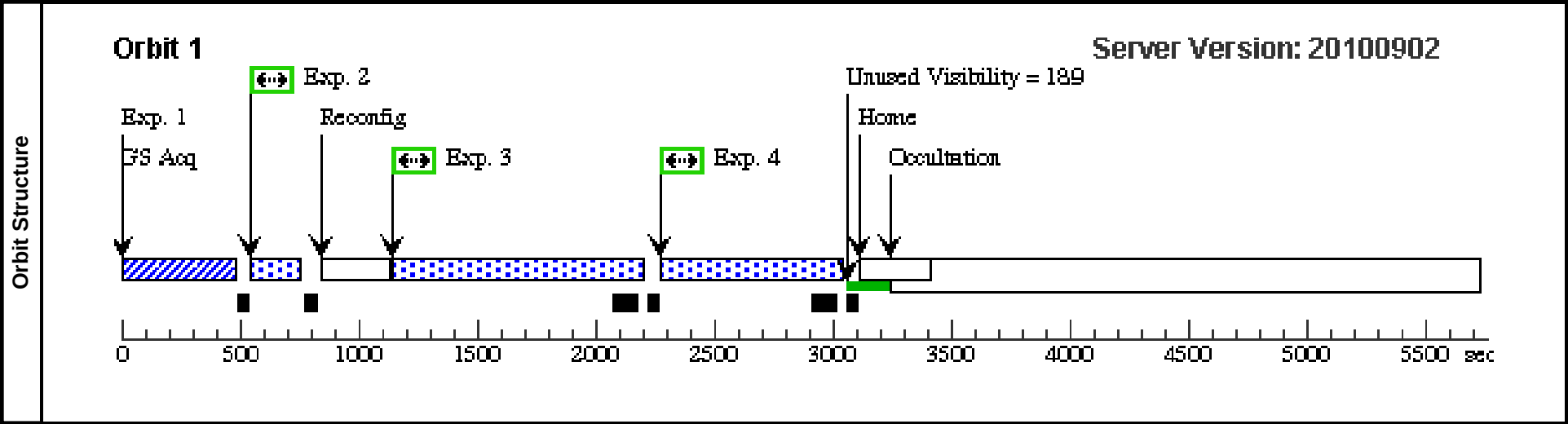
Proposal 12279 - Visit 07 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 07, implementation						Fri Apr 08 01:14:58 GMT 2011			
	Diagnostic Status: Warning									
	Scientific Instruments: COS/NUV, COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 07) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)	Proper Motion RA: -0.004 sec of time/yr	V=8.17+/-0.5	Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)	Proper Motion Dec: -0.020 arcsec/yr						
			Equinox: J2000	Parallax: 0.0042"						
			Epoch of Position: 2010							
			Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs	
									[==>]	[1]
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).									
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs	
					2676 A	BUFFER-TIME=120			[==>]	[1]
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs	
					1291 A	BUFFER-TIME=790;			[==>]	[1]
						SEGMENT=A				
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs	
				1291 A	BUFFER-TIME=610;			[==>]	[1]	
					SEGMENT=A					



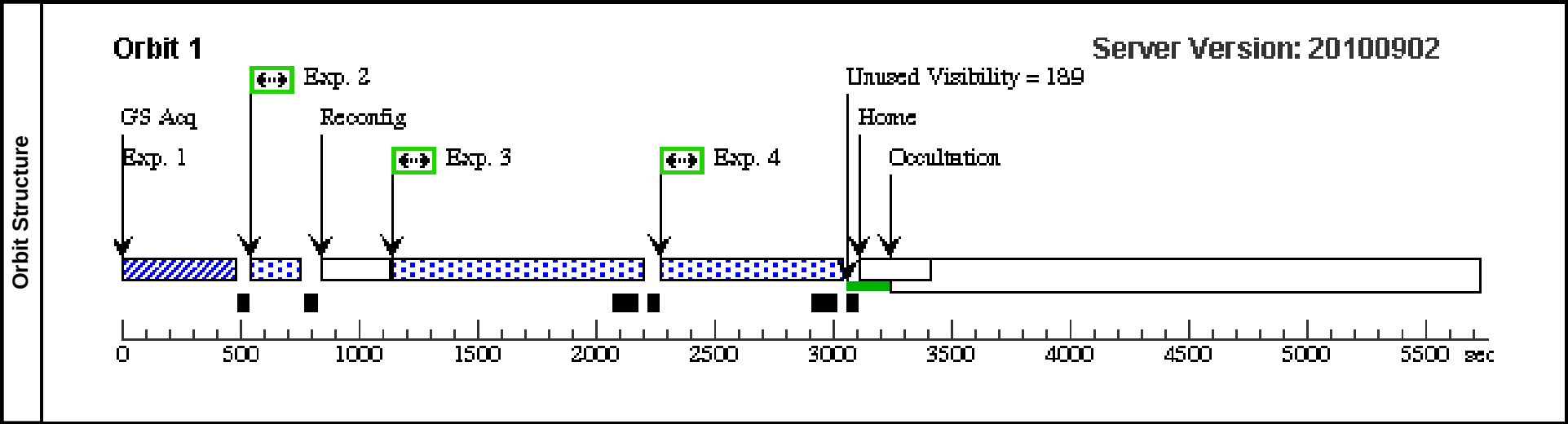
Proposal 12279 - Visit 08 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 08, implementation						Fri Apr 08 01:14:58 GMT 2011			
	Diagnostic Status: Warning									
	Scientific Instruments: COS/NUV, COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 08) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)	Proper Motion RA: -0.004 sec of time/yr	V=8.17+/-0.5	Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)	Proper Motion Dec: -0.020 arcsec/yr						
			Equinox: J2000	Parallax: 0.0042"						
			Epoch of Position: 2010							
			Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs	
									[==>]	[1]
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).									
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs	
					2676 A	BUFFER-TIME=120			[==>]	[1]
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs	
					1291 A	BUFFER-TIME=790;			[==>]	[1]
						SEGMENT=A				
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs	
				1291 A	BUFFER-TIME=610;			[==>]	[1]	
					SEGMENT=A					



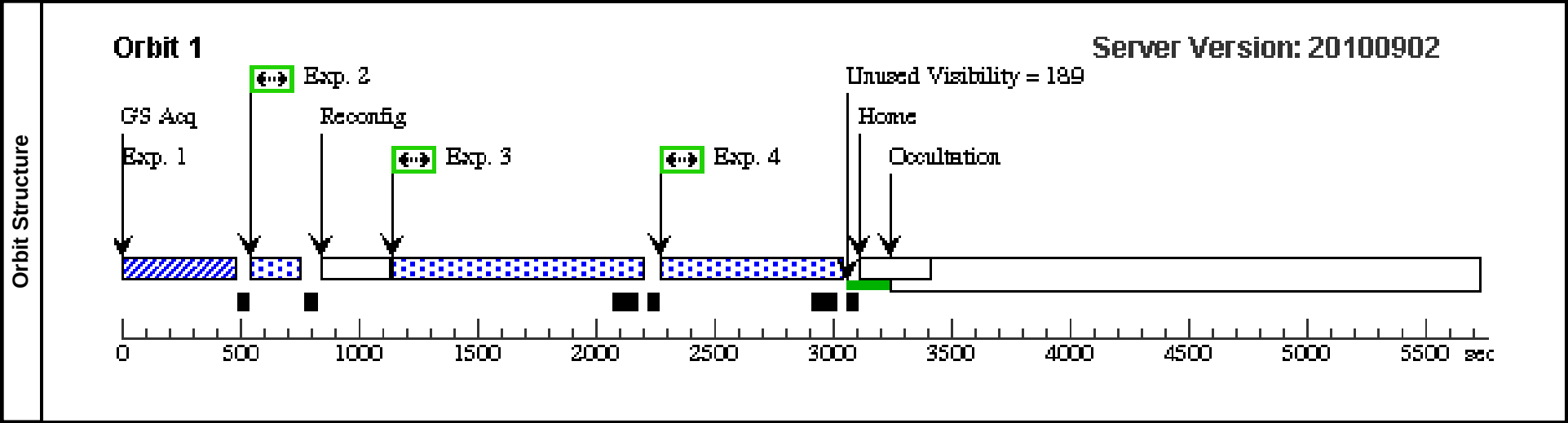
Proposal 12279 - Visit 09 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 09, implementation						Fri Apr 08 01:14:58 GMT 2011			
	Diagnostic Status: Warning									
	Scientific Instruments: COS/NUV, COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 09) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)	Proper Motion RA: -0.004 sec of time/yr	V=8.17+/-0.5	Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)	Proper Motion Dec: -0.020 arcsec/yr						
			Equinox: J2000	Parallax: 0.0042"						
			Epoch of Position: 2010							
			Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs	
									[==>]	[1]
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).									
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs	
					2676 A	BUFFER-TIME=120			[==>]	[1]
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs	
					1291 A	BUFFER-TIME=790;			[==>]	[1]
						SEGMENT=A				
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs	
				1291 A	BUFFER-TIME=610;			[==>]	[1]	
					SEGMENT=A					



Proposal 12279 - Visit 10 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 10, implementation						Fri Apr 08 01:14:59 GMT 2011			
	Diagnostic Status: Warning									
	Scientific Instruments: COS/NUV, COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 10) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)	Proper Motion RA: -0.004 sec of time/yr	V=8.17+/-0.5	Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)	Proper Motion Dec: -0.020 arcsec/yr						
			Equinox: J2000	Parallax: 0.0042"						
			Epoch of Position: 2010							
			Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs	
									[==>]	[1]
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).									
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs	
					2676 A	BUFFER-TIME=120			[==>]	[1]
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs	
					1291 A	BUFFER-TIME=790;			[==>]	[1]
						SEGMENT=A				
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs	
				1291 A	BUFFER-TIME=610;			[==>]	[1]	
					SEGMENT=A					



Proposal 12279 - Visit 11 - FK Comae, King of Spin: the Movie

Visit	Proposal 12279, Visit 11, implementation						Fri Apr 08 01:14:59 GMT 2011			
	Diagnostic Status: Warning									
	Scientific Instruments: COS/NUV, COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 11) Warning (Form): If the target coordinates are not known to 0.4" (or better) an ACQ/SEARCH should precede the ACQ/IMAGE.									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	HD117555	RA: 13 30 46.7650 (202.6948542d)	Proper Motion RA: -0.004 sec of time/yr	V=8.17+/-0.5	Reference Frame: ICRS				
		Alt Name1: FK-COM	Dec: +24 13 57.56 (24.23266d)	Proper Motion Dec: -0.020 arcsec/yr						
			Equinox: J2000	Parallax: 0.0042"						
			Epoch of Position: 2010							
			Radial Velocity: -16.6 km/sec							
	Comments: FK Comae Berenices; G5II; probably closer to G5III; R~9Rsun; Prot~2.4d; vsini~160km/s									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) HD117555	COS/NUV, ACQ/IMAGE, BOA	MIRRORA				42 Secs	
									[==>]	[1]
	Comments: COS.A321599: optimum exp time for S/N=60 is 42 s; for model SED based on average IUE spectrum for FUV and NUV up to 3100 A, followed by Kurucz log(g)=3, Teff=5000 K scaled to ~4900 K to fit the longward end of IUE composite spectrum (for Rstar= 8.6 Rsun).									
	2		(1) HD117555	COS/NUV, TIME-TAG, PSA	G285M	FP-POS=3;			51 Secs	
					2676 A	BUFFER-TIME=120			[==>]	[1]
	3		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=3;			900 Secs	
					1291 A	BUFFER-TIME=790;			[==>]	[1]
						SEGMENT=A				
	4		(1) HD117555	COS/FUV, TIME-TAG, PSA	G130M	FP-POS=4;			720 Secs	
				1291 A	BUFFER-TIME=610;			[==>]	[1]	
					SEGMENT=A					

