



11654 - UV Studies of a Core Collapse Supernova

Cycle: 17, 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	(3) SN2010AL	STIS/CCD	2	22-Apr-2010 21:02:02.0	yes
02	(3) SN2010AL	STIS/CCD STIS/FUV-MAMA	3	22-Apr-2010 21:02:09.0	yes
03	(3) SN2010AL CCDFLAT	STIS/CCD	3	22-Apr-2010 21:02:20.0	yes
04	(3) SN2010AL	COS/FUV COS/NUV	2	22-Apr-2010 21:02:26.0	yes

10 Total Orbits Used

ABSTRACT

Observations of the UV spectrum of core collapse SNe hold unique information about nucleosynthesis, the mass loss history, shock physics and dust formation in the explosion of massive stars.

This proposal aims at a detailed study of a bright core collapse SN, discovered by any of the many ongoing surveys, either a Type IIP, II_n or Ib_c supernova.

We will address the role of circumstellar interaction and mass loss through

CNO lines in the UV, the nature of dust formation from UV line profiles and use the UV continuum as a diagnostic of non-thermal emission from the shock. The overall goal of our team is

to achieve a better understanding of these objects by combining HST data with complementary ground-based observations.

We have used HST to obtain UV spectra from the explosion to the nebular phase. Over the past decade, we have conducted studies of nearby SNe with HST, and we have published an extensive series of papers. When Nature provides a bright candidate, HST should be ready to respond.

OBSERVING DESCRIPTION

For a type Ib/Ic SNE, we'll use visits 1,2,3,4

Here is the next version of the proposal:

first: here is the sn1998S spectrum from 1100-8200A

this supernova , type II, was taken at 13 days after explosion.

<http://www.cfa.harvard.edu/~pchallis/sn1998S.dat>

I'm using it as a model/input for STIS and COS ETCs for acquisitions and exposure times. Also for brightness limit checks.

There are various observing strategies in this programs. and I'll try to clarify them here. (I'll also add this to the observing description in the proposal).

A) For a supernova without the far UV flux, but maybe bright in near UV and optical, we'll use visits 1,2,3,4 which only use the STIS/CCD. The acquisition time is 1 second for a 14th mag object using STIS/CCD MIRROR+F28X50LP if acceptable, please authorize visits 1,2,3,4

B) For a supernova, like sn1998S, with unknown UV flux, maybe the best and safest plan is to make an observation with the STIS/CCD/G230LB. Measure the UV flux. Use the measured UV flux, to estimate the countrate in the Far UV (down to 1000A). sn1998S was done at phase +13 days, but at earlier phases we expect the UV to be even higher.

then, ask for another ToO to trigger a sequence of visits.

visit 99 is a single 2 orbit visit using STIS/CCD/G230LB and STIS/CCD/G430L and is not linked to any other visit.
if acceptable, please authorize visit 99

then, planning ahead we can prepare a sequence of visits that takes advantage of COS or STIS.

Sequence #1 (using COS with Medium gratings (if we we sign of interstellar interaction))

visits

10,11 for 1998S like, B =14th mag

visit 10: 1 orbit

COS/NUV ACQ/SEARCH/PSA 5 seconds 2x2

COS/NOV ACS/IMAGE/PSA 5 seconds

COS/FUV G130M TIME-TAG 900 seconds buffer-time=1000,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

COS/FUV G160M TIME-TAG 900 seconds buffer-time=1000,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

visit 11: 1 orbit linked to visit 10

STIS/CCD ACQ MIRROR F28X50LP 1 second.

STIS/CCD G230LB 1700 seconds cr-split=2

STIT/CCD G430L 180 seconds cr-split=no

12,13 AFTER visit 10 by 7 to 14 days

visit 11: 2 orbits

COS/NUV ACQ/SEARCH/PSA 5 seconds 2x2

Proposal 11654 (STScI Edit Number: 2, Created: Thursday, April 22, 2010 8:02:29 PM EST) - Overview

COS/NOV ACS/IMAGE/PSA 5 seconds

COS/FUV G130M TIME-TAG 2050 seconds buffer-time=2050,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

COS/FUV G160M TIME-TAG 2700 seconds buffer-time=3100,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

visit 13: 1 orbit linked to visit 11

STIS/CCD ACQ MIRROR F28X50LP 1 second.

STIS/MAMA G230L 1700 seconds

STIT/CCD G430L 180 seconds cr-split=no

14,15 AFTER visit 10 by 30 to 60 days

visit 14: 2 orbits

COS/NUV ACQ/SEARCH/PSA 5 seconds 2x2 - ACQ time will have to be recalculated based on the light curve

COS/NOV ACS/IMAGE/PSA 5 seconds

COS/FUV G130M TIME-TAG 2050 seconds buffer-time=2050,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

COS/FUV G160M TIME-TAG 2700 seconds buffer-time=3100,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

visit 15: 1 orbit linked to visit 14

STIS/CCD ACQ MIRROR F28X50LP 1 second. ACQ time will have to be recalculated based on the light curve

STIS/MAMA G230L 1700 seconds

STIT/CCD G430L 180 seconds cr-split=no

Sequence #2 (using COS with G140L and B = 15th mag.. too faint for COS medium dispersion)

visit 20,21

visit 20: 1 orbit

COS/NUV ACQ/SEARCH/PSA 12 seconds 2x2

COS/NOV ACS/IMAGE/PSA 12 seconds

Proposal 11654 (STScI Edit Number: 2, Created: Thursday, April 22, 2010 8:02:29 PM EST) - Overview

COS/FUV G140L TIME-TAG 2100 seconds buffer-time=2400,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

visit 21: 1 orbit linked to visit 20

STIS/CCD ACQ MIRROR F28X50LP 1 second.

STIS/MAMA G230L 1700 seconds

STIT/CCD G430L 180 seconds cr-split=no

visit 22,23 AFTER 20 by 7 to 14 days

visit 22: 2 orbits

COS/NUV ACQ/SEARCH/PSA 12 seconds 2x2

COS/NOV ACS/IMAGE/PSA 12 seconds

COS/FUV G140L TIME-TAG 2100 seconds buffer-time=3000,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

COS/FUV G140L TIME-TAG 2600 seconds buffer-time=3000,FP-POS=2,SEGMENT=both,exteneded=no,FLASH=yes

visit 23: 1 orbit linked to visit 22

STIS/CCD ACQ MIRROR F28X50LP 1 second.

STIS/MAMA G230L 1700 seconds

STIT/CCD G430L 180 seconds cr-split=no

visit 24,25 AFTER 20 by 30 to 60 days

visit 24: 2 orbits

COS/NUV ACQ/SEARCH/PSA 12 seconds 2x2 - exposure time will have to be recalculated

COS/NOV ACS/IMAGE/PSA 12 seconds - exposure time will have to be recalculated

COS/FUV G140L TIME-TAG 2100 seconds buffer-time=3000,FP-POS=1,SEGMENT=both,exteneded=no,FLASH=yes

COS/FUV G140L TIME-TAG 2600 seconds buffer-time=3000,FP-POS=2,SEGMENT=both,exteneded=no,FLASH=yes

visit 25: 1 orbit linked to visit 24

STIS/CCD ACQ MIRROR F28X50LP 1 second.

STIS/MAMA G230L 1700 seconds

STIT/CCD G430L 180 seconds cr-split=no

then,

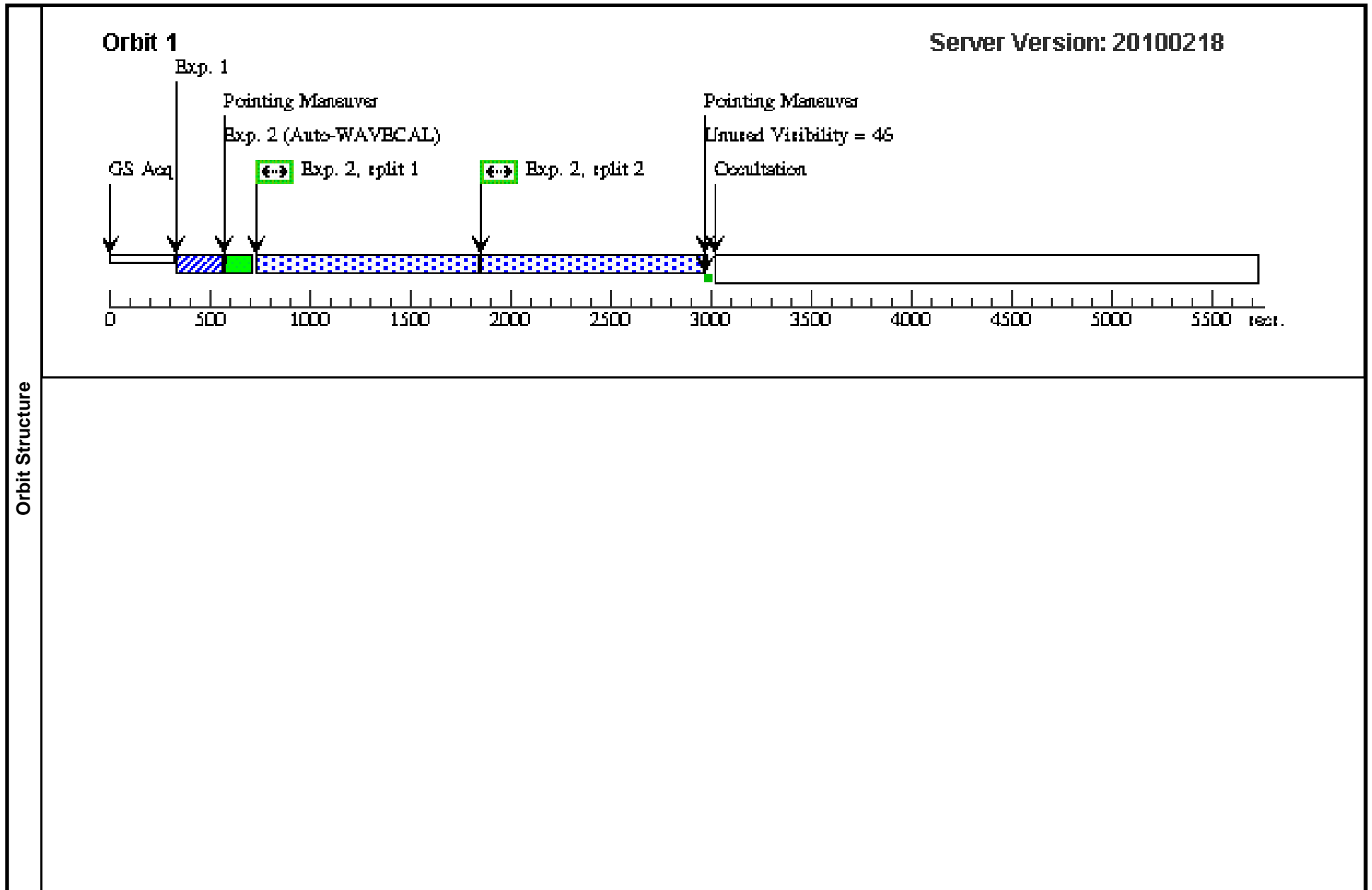
visits 30,31,32 are just like visits 2,3,4

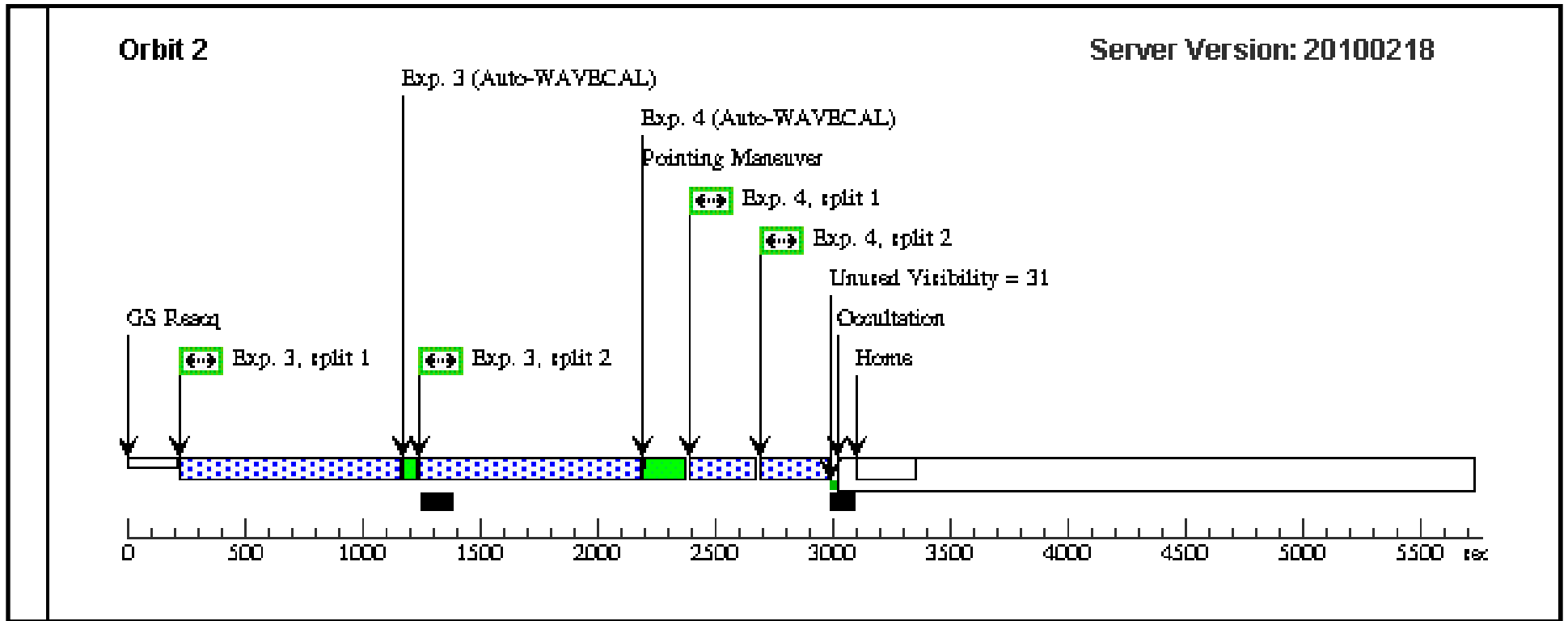
STIS/CCD only (but only 3 visits long)

Proposal 11654 - Visit 01 - UV Studies of a Core Collapse Supernova

Fri Apr 23 01:02:30 GMT 2010

Visit	Proposal 11654, Visit 01, completed Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD Special Requirements: SCHED 100%; ON HOLD Comments: <i>The Visit only uses the STIS/CCD.</i> On Hold Comments: <i>On hold for Target-of-opportunity</i>									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	SN2010AL	RA: 08 14 15.9100 (123.5662917d) Dec: +18 26 18.20 (18.43839d) Equinox: J2000		V=16.4	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(3) SN2010AL		STIS/CCD, ACQ, F28X50LP	MIRROR				1 Secs [==>]	[1]
	2	(3) SN2010AL		STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=2			2150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	3	(3) SN2010AL		STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=2	POS TARG 0.0,0.5		1800 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	4	(3) SN2010AL		STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			500 Secs [==>(Split 1)] [==>(Split 2)]	[2]

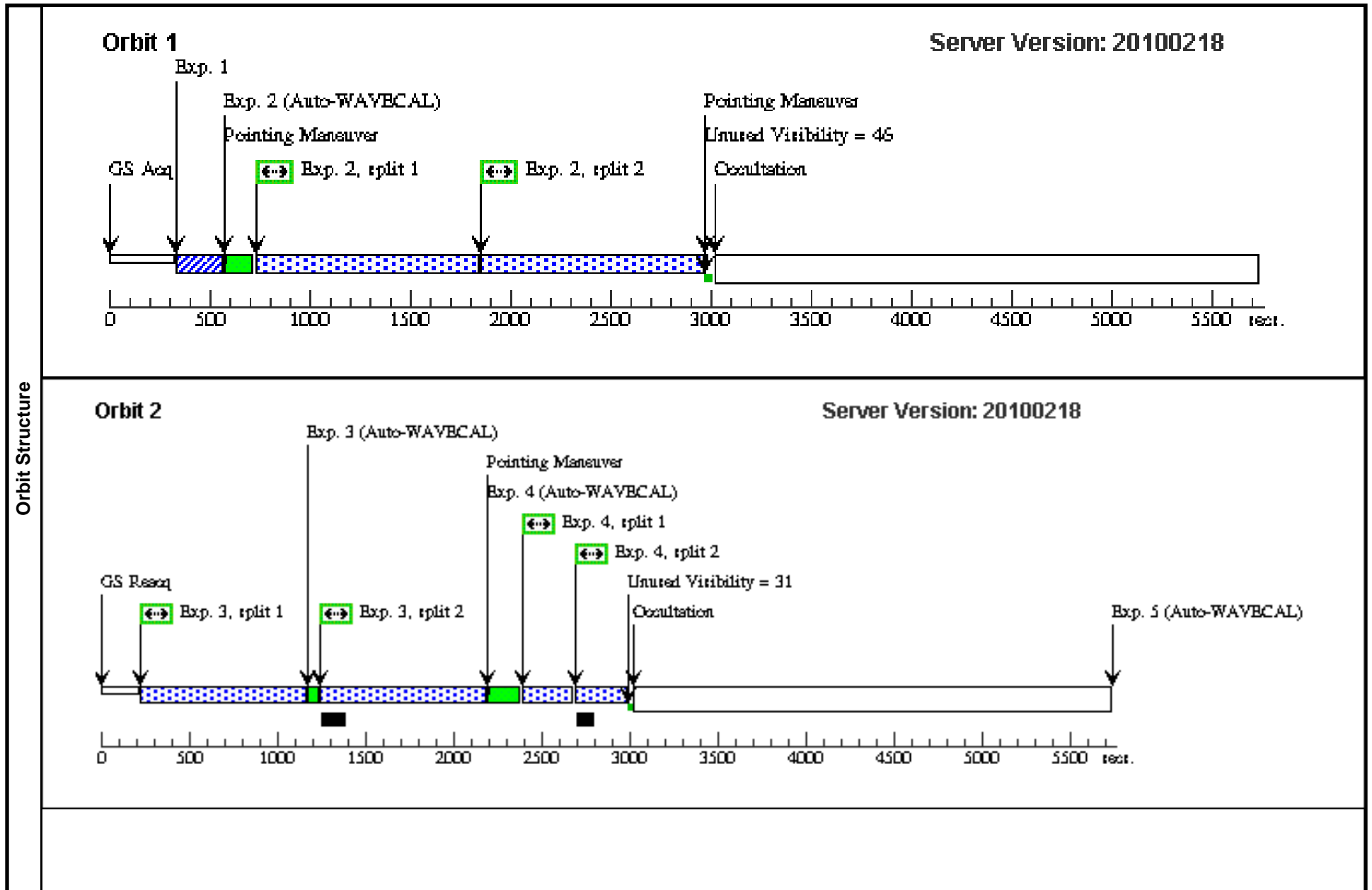


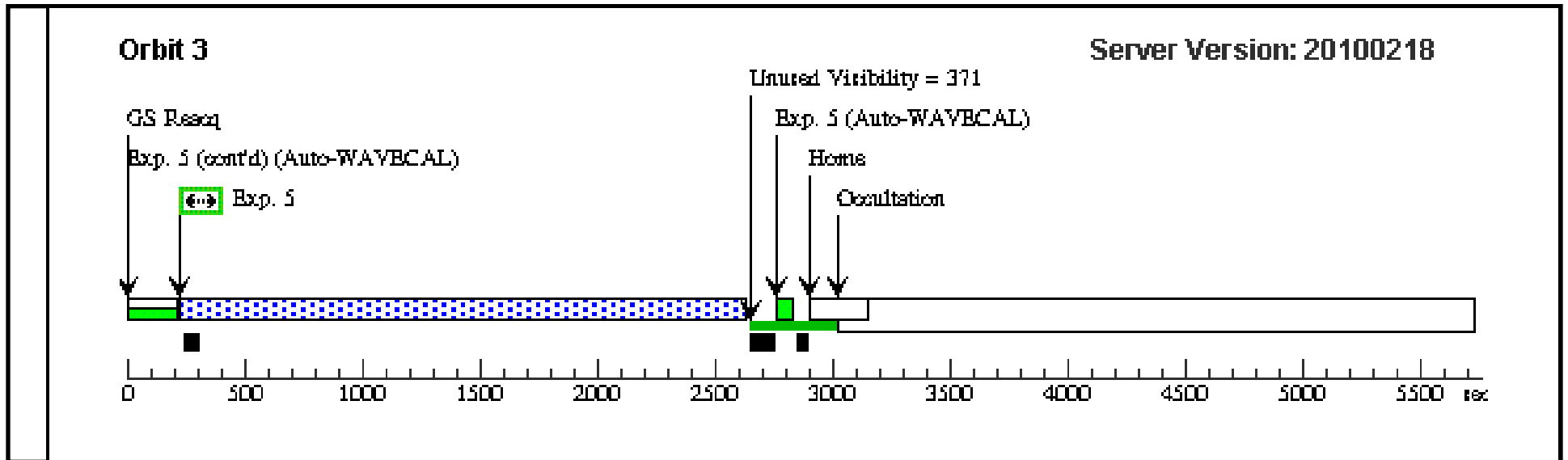


Proposal 11654 - Visit 02 - UV Studies of a Core Collapse Supernova

Fri Apr 23 01:02:31 GMT 2010

Visit	Proposal 11654, Visit 02, completed Diagnostic Status: No Diagnostics Scientific Instruments: STIS/FUV-MAMA, STIS/CCD Special Requirements: SCHED 100%; AFTER 01 BY 7 D TO 12 D; ON HOLD <i>Comments: This visits used the STIS/MAMA . Using the STIS ETC see exposure A290509. this used sn1998S @ day 13 after explosion (very similiar object to sn2010al). this is a good upper limit. The expected flux will be lower because visit 2 will be executed at a phase of ~25 days after explosion. we don't expect any bright emission features.</i> <i>On Hold Comments: On hold for Target-of-opportunity</i>									
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous			
	(3)	SN2010AL	RA: 08 14 15.9100 (123.5662917d) Dec: +18 26 18.20 (18.43839d) Equinox: J2000		V=16.4	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(3) SN2010AL	STIS/CCD, ACQ, F28X50LP	MIRROR					1 Secs [==>]	[1]
	2	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=2				2150 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	3	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=2	POS TARG 0.0,0.5			1800 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	4	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2				500 Secs [==>(Split 1)] [==>(Split 2)]	[2]
5	(3) SN2010AL	STIS/FUV-MAMA, ACCUM, 52X0.2	G140L 1425 A					2400 Secs [==>]	[3]	





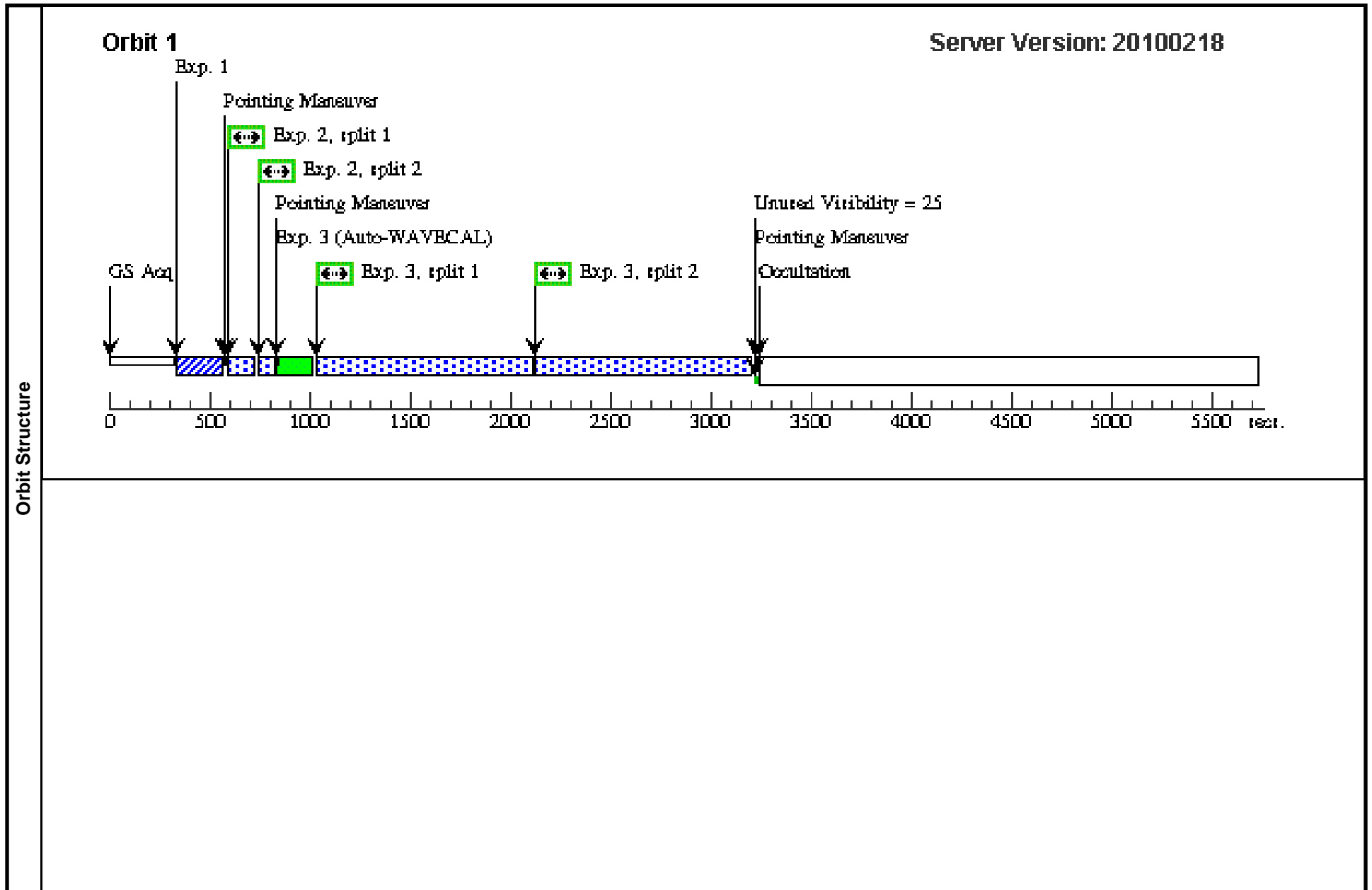
Proposal 11654 - Visit 03 - UV Studies of a Core Collapse Supernova

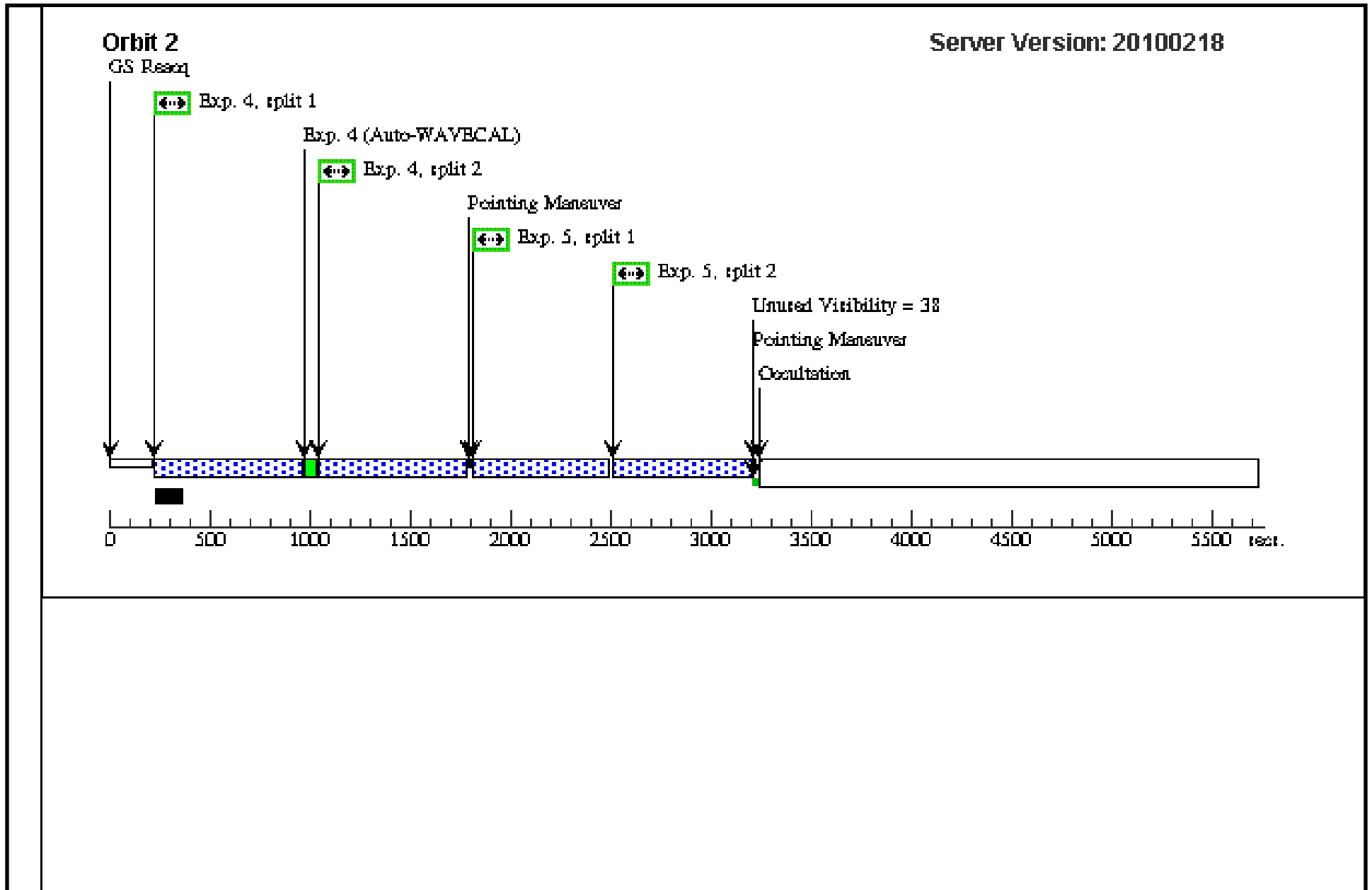
Fri Apr 23 01:02:31 GMT 2010

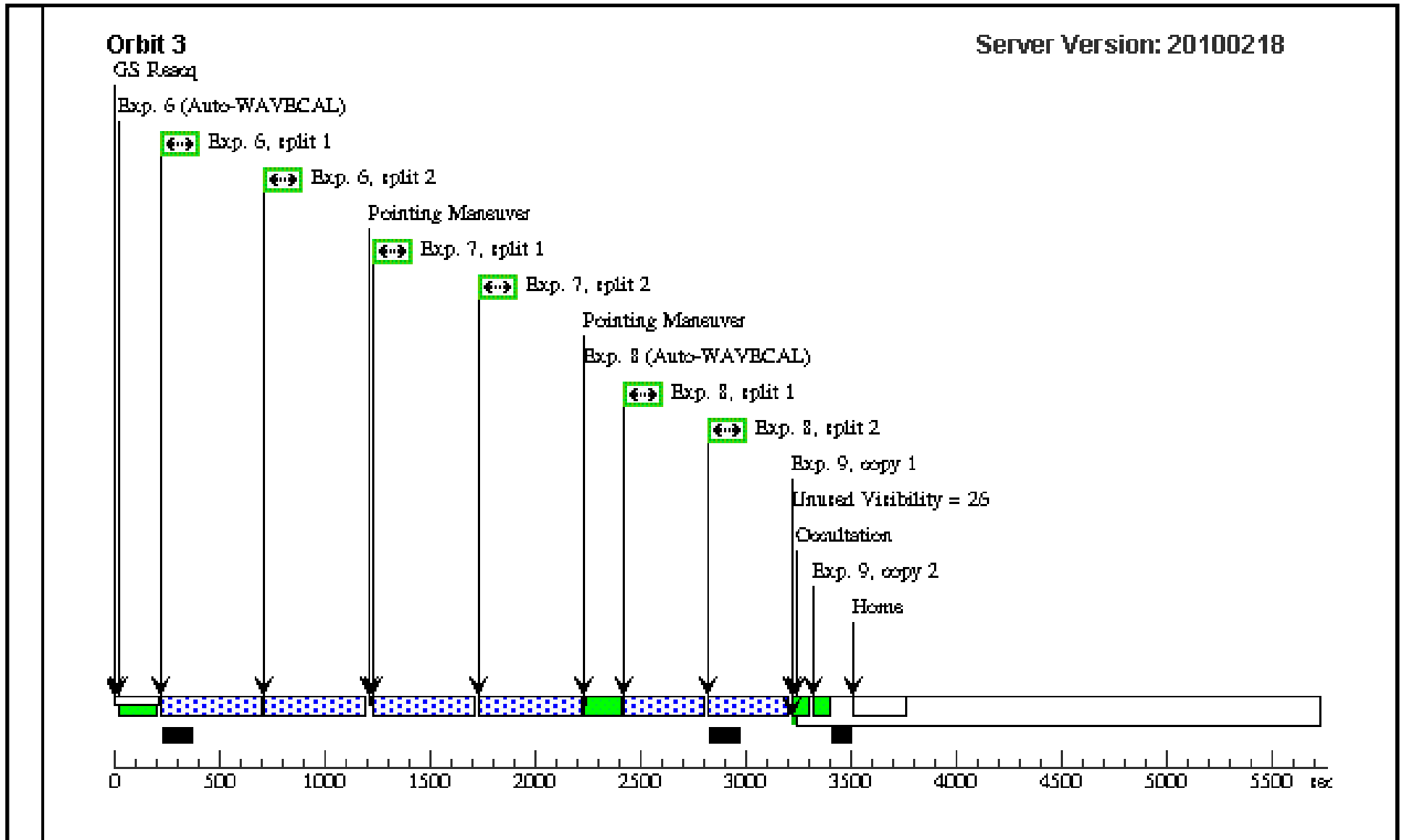
Visit	Proposal 11654, Visit 03, implementation Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD Special Requirements: BEFORE 01-JUN-2010:00:00:00; SEQ 03,04 WITHIN 2 D Comments: <i>please try to schedule before the super</i> <i>BEFORE date of 01-Jun-2010 is preferred but can be relaxed to as late as 01-JUL-2010 if necessary.</i>					
	Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
(3)		SN2010AL	RA: 08 14 15.9100 (123.5662917d) Dec: +18 26 18.20 (18.43839d) Equinox: J2000		V=16.4	Reference Frame: ICRS

Proposal 11654 - Visit 03 - UV Studies of a Core Collapse Supernova

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(3) SN2010AL	(3) SN2010AL	STIS/CCD, ACQ, F28X50LP	MIRROR				2 Secs [==>]	[1]
	2	(3) SN2010AL	(3) SN2010AL	STIS/CCD, ACCUM, F28X50LP	MIRROR	CR-SPLIT=2			90 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	3	(3) SN2010AL	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=2			2100 Secs [==>(Split 1)] [==>(Split 2)]	[1]
	4	(3) SN2010AL	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=2	POS TARG 0,0.25		1400 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	5	(3) SN2010AL	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G230LB 2375 A	CR-SPLIT=2	POS TARG 0,0.5		1300 Secs [==>(Split 1)] [==>(Split 2)]	[2]
	6	(3) SN2010AL	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2			900 Secs [==>(Split 1)] [==>(Split 2)]	[3]
	7	(3) SN2010AL	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G430L 4300 A	CR-SPLIT=2	POS TARG 0,-0.25		900 Secs [==>(Split 1)] [==>(Split 2)]	[3]
	8	(3) SN2010AL	(3) SN2010AL	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A	CR-SPLIT=2			700 Secs [==>(Split 1)] [==>(Split 2)]	[3]
	9	CCDFLAT	CCDFLAT	STIS/CCD, ACCUM, 52X0.2	G750L 7751 A				10 Secs X 2 [==>(Copy 1)] [==>(Copy 2)]	[3]







Proposal 11654 - Visit 04 - UV Studies of a Core Collapse Supernova

Fri Apr 23 01:02:32 GMT 2010

Visit	<p>Proposal 11654, Visit 04, implementation</p> <p>Diagnostic Status: No Diagnostics</p> <p>Scientific Instruments: COS/NUV, COS/FUV</p> <p>Special Requirements: (none)</p> <p><i>Comments: I used our HST/STIS UV spectrum from April 7th as input for the COS/ETC. The ETC using MIRROR A/PSA says 28 seconds for s/n 40. For this visit, the supernova will fade about 0.7 mags in 1 month, which is about a factor of 2 in flux. I took the HST spectrum, divided by 2 and the ETC says 60 seconds for the acquisition exposure time. ASCII spectra can be downloaded here: http://www.cfa.harvard.edu/~pchallis/sn2010ale2_dividedby2.dat The FAR UV spectrum is an emission spectrum. The counts/sec at these lines is very far below the count limits of COS. we expect a s/n ~10-20 in the emission features.</i></p>									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	SN2010AL	RA: 08 14 15.9100 (123.5662917d) Dec: +18 26 18.20 (18.43839d) Equinox: J2000		V=16.4	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(3) SN2010AL		COS/NUV, ACQ/SEARCH, PSA	MIRRORA	SCAN-SIZE=2			90 Secs [=>]	[1]
	2	(3) SN2010AL		COS/FUV, ACCUM, PSA	G140L 1105 A				1900 Secs [=>]	[1]
	3	(3) SN2010AL		COS/FUV, ACCUM, PSA	G140L 1105 A	FP-POS=2			2950 Secs [=>]	[2]
	<p><i>Comments: I added FP-POS=2 to shift in the dispersion direction, which will help remove the fixed pattern noise.</i></p>									

