11119 - The Stellar Origins of Supernovae

Cycle: 16, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Schuyler D. Van Dyk (PI)	**Jet Propulsion Laboratory**	**vandyk@ipac.caltech.edu**
Dr. Weidong Li (CoI)	University of California - Berkeley	wli@astro.berkeley.edu
Dr. Alex V. Filippenko (CoI)	University of California - Berkeley	alex@astro.berkeley.edu
Dr. Nathan Smith (CoI)	University of California - Berkeley	nathans@astro.berkeley.edu
Mr. Ryan Foley (CoI)	University of California - Berkeley	rfoley@astron.berkeley.edu
Mr. Jean-Charles Cuillandre (CoI)	Canada-France-Hawaii Telescope Corporation	jcc@cfht.hawaii.edu
Dr. Saurabh Jha (CoI)	KIPAC/SLAC; Rutgers University (in 2007 Sept.)	saurabh@slac.stanford.edu
Dr. Mario Hamuy (CoI)	Universidad de Chile	mhamuy@das.uchile.cl

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) SN2007GR	WFPC2	1	15-Jul-2008 21:23:36.0	yes
02	(2) SN2008AX	WFPC2	1	15-Jul-2008 21:23:45.0	yes
03	(3) SN2008CN	WFPC2	1	15-Jul-2008 21:23:52.0	yes
04	(4) SNIA2007WW	WFPC2	1	15-Jul-2008 21:23:55.0	yes

4 Total Orbits Used

ABSTRACT

Supernovae (SNe) have a profound effect on galaxies, and have been used recently as precise cosmological probes, resulting in the discovery of the accelerating Universe. They are clearly very important events deserving of intense study. Yet, even with nearly 4000 known SNe, we know relatively little about the stars which give rise to these powerful explosions. The main limitation has been the lack of spatial resolution in pre-SN imaging data. However, since 1999 our team has been at the vanguard of directly identifying SN progenitor stars in HST images. From this exciting new line of study, the emerging trend from 5 detections for Type II-Plateau SNe is that their progenitors appear to be relatively low mass (8 to 20 Msun) red supergiants, although more cases are needed. Nonetheless, the nature of the progenitors of Type Ib/c SNe, a subset of which are associated with the amazing gamma-ray bursts, remains ambiguous. Furthermore, we remain in the continually embarrassing situation that we still do not yet know which progenitor systems explode as Type Ia SNe, which are currently being used for precision cosmology. We propose to confirm the identities of the progenitors of 4 SNe within 17 Mpc, which we expect to occur during Cycle 16, through ToO observations using WFPC2/PC.

OBSERVING DESCRIPTION

We plan for four ToO triggers during Cycle 16. Generally, if we detect one or more candidate stellar objects within a 1-sigma positional uncertainty in ACS or WFPC2 pre-supernova archival image(s), we will request a trigger to confirm the progenitor candidate. We request imaging with WFPC2/PC, to provide the highest possible spatial resolution. Imaging will be in two bands, generally V (F555W) and I (F814W). We will likely request triggers when the SN is still fairly bright, depending on its age at discovery, but limit this to m>~13 mag. The imaging will be done in pairs of short and long exposures per band. If we are very fortunate to have a nearby (<~ 6 Mpc) SN Ia occur, we will image in pairs of U (F336W) and B (F439W) exposures, since these SNe will likely be too bright in the redder bands, but fade more rapidly in the blue. The ToOs are not at all urgent, and the SNe can be imaged many months after explosion, so there should be no disruption of normal scheduling. We will not place constraints on the observations, given the two-gyro operational mode. We request triggers with exposures of 40s/800s in F555W and 20s/700s in F814W, with possibly one trigger with exposures of 80s/1000s in F336W and 40s/500s in F439W, in CR splits with WFPC2/PC.

Proposal 11119 - Visit 01 - The Stellar Origins of Supernovae

Visit

Proposal 11119, Visit 01, completed — Wed Jul 16 01:23:59 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: AFTER 20-OCT-2007:00:00:00

Fixed Targets

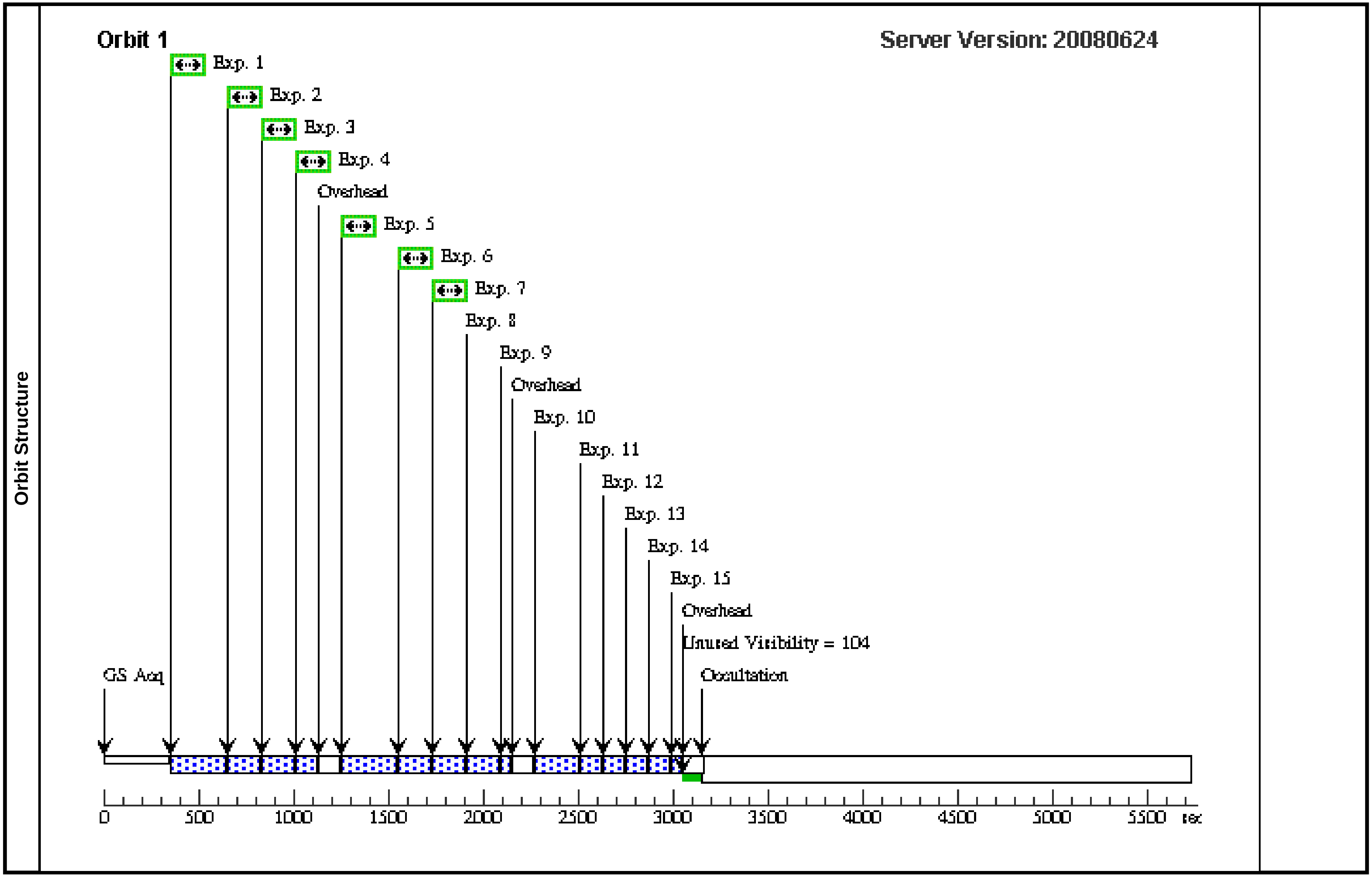
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SN2007GR	RA: 02 43 27.9800 (40.8665833d) Dec: +37 20 44.70 (37.34575d) Equinox: J2000		V=15+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
2		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
3		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
4		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
5		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
6		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
7		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
8		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
9		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
10		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
11		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
12		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
13		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
14		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
15		(1) SN2007GR	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs	
								[==>]	*[1]*


Orbit Structure
Orbit 1
Server Version: 20080624
Exp. 1
Exp. 2
Exp. 3
Exp. 4
Overhead
Exp. 5
Exp. 6
Exp. 7
Exp. 8
Exp. 9
Overhead
Exp. 10
Exp. 11
Exp. 12
Exp. 13
Exp. 14
Exp. 15
Overhead
Unused Visibility = 104
GS Acq
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11119, Visit 02, completed — Wed Jul 16 01:24:00 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: ON HOLD

On Hold Comments: ToO

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	SN2008AX	RA: 12 30 40.8200 (187.6700833d) Dec: +41 38 15.20 (41.63756d) Equinox: J2000		V=15.4+/-1	Reference Frame: ICRS

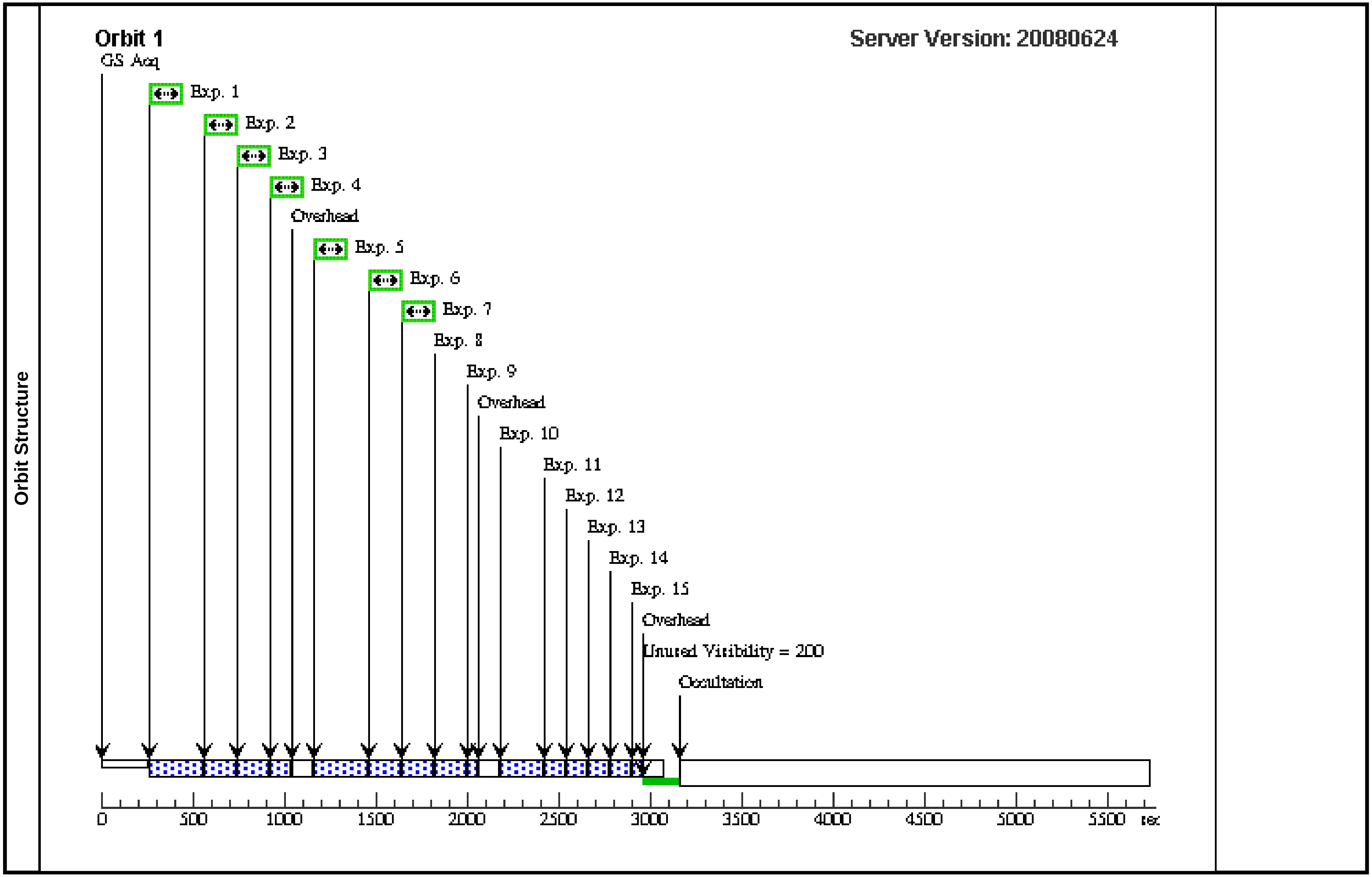
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15	GS ACQ SCENARI O SINGLE		100.0 Secs *[==>]*	*[1]*
2		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
3		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
4		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
5		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
6		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
7		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F450W	ATD-GAIN=15			100.0 Secs *[==>]*	*[1]*
8		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
9		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
10		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
11		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
12		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*
13		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs *[==>]*	*[1]*

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
14		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs	
								[==>]	***[1]***
15		(2) SN2008AX	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40.0 Secs	
								[==>]	***[1]***

Proposal 11119 - Visit 02 - The Stellar Origins of Supernovae



Visit

Proposal 11119, Visit 03, implementation Wed Jul 16 01:24:01 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: (none)

Fixed Targets

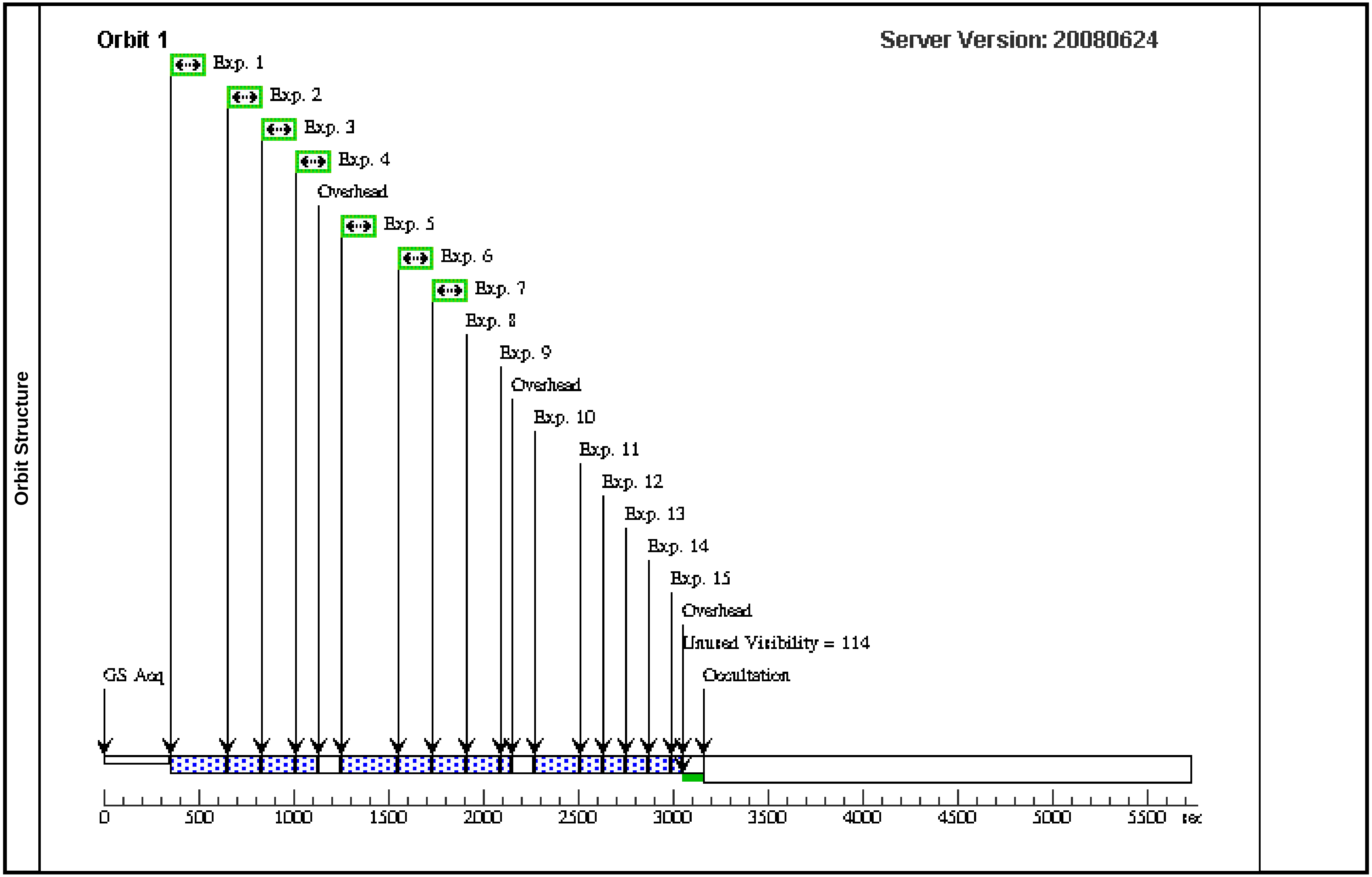
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	SN2008CN	RA: 12 40 55.6400 (190.2318333d) Dec: -40 58 12.90 (-40.97025d) Equinox: J2000		V=16.5+/-0.5	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F555W	ATD-GAIN=15	GS ACQ SCENARIO BASE1T3		100 Secs *[==>]*	***[1]***
2		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F555W	ATD-GAIN=15			100 Secs *[==>]*	***[1]***
3		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F555W	ATD-GAIN=15			100 Secs *[==>]*	***[1]***
4		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F555W	ATD-GAIN=15			100 Secs *[==>]*	***[1]***
5		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F555W	ATD-GAIN=15			100 Secs *[==>]*	***[1]***
6		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F555W	ATD-GAIN=15			100 Secs *[==>]*	***[1]***
7		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F555W	ATD-GAIN=15			100 Secs *[==>]*	***[1]***
8		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40 Secs *[==>]*	***[1]***
9		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40 Secs *[==>]*	***[1]***
10		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40 Secs *[==>]*	***[1]***
11		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40 Secs *[==>]*	***[1]***
12		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40 Secs *[==>]*	***[1]***
13		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40 Secs *[==>]*	***[1]***
14		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40 Secs *[==>]*	***[1]***

Exposures (continued)

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
15		(3) SN2008CN	WFPC2, IMAGE, PC1-FIX	F814W	ATD-GAIN=15			40 Secs	
								[==>]	***[1]***


Orbit Structure
Orbit 1
Server Version: 20080624
Exp. 1
Exp. 2
Exp. 3
Exp. 4
Overhead
Exp. 5
Exp. 6
Exp. 7
Exp. 8
Exp. 9
Overhead
Exp. 10
Exp. 11
Exp. 12
Exp. 13
Exp. 14
Exp. 15
Overhead
Unused Visibility = 114
GS Acq
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11119, Visit 04, implementation Wed Jul 16 01:24:01 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: ON HOLD

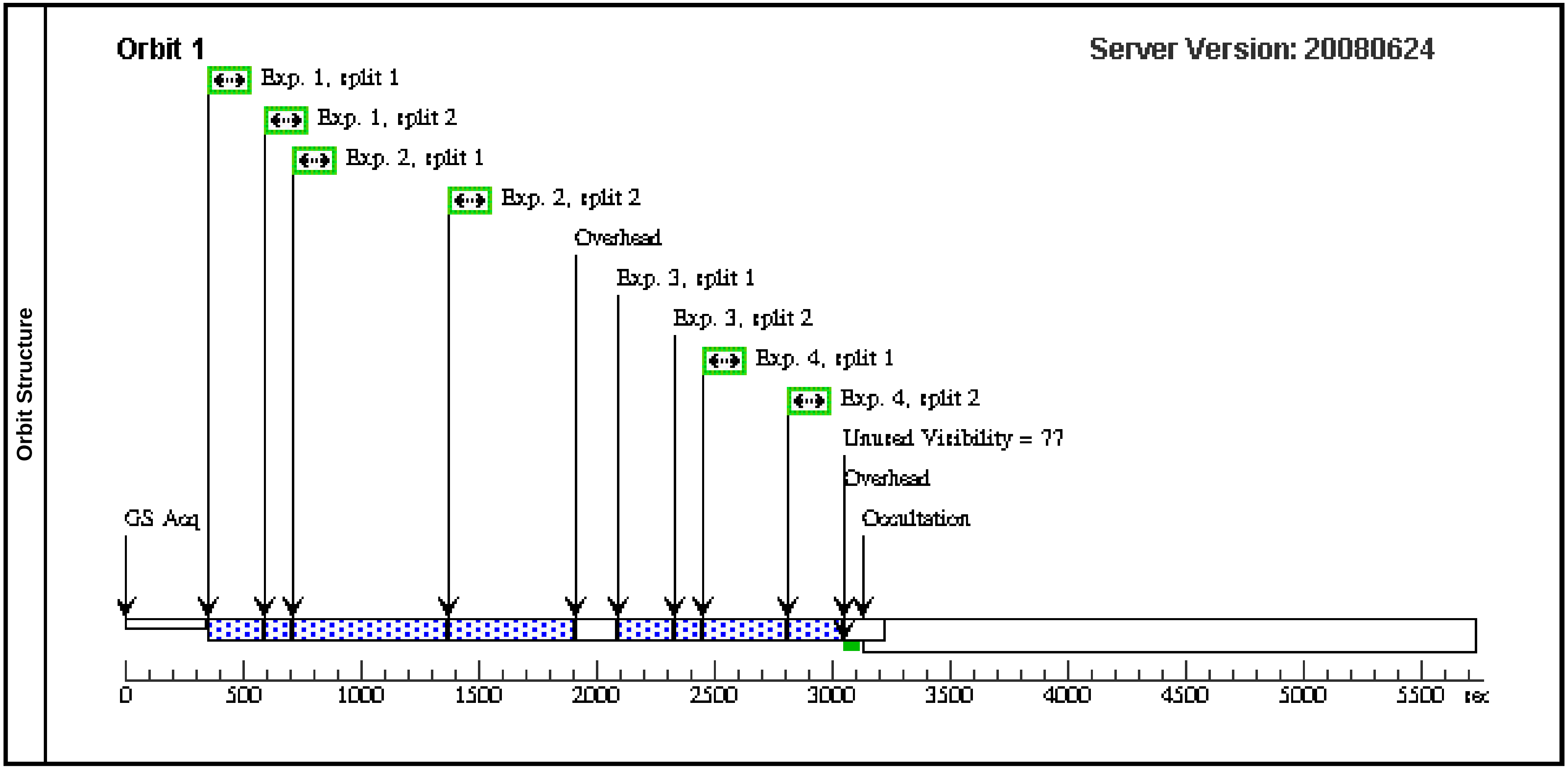
On Hold Comments: ToO

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	SNIA2007WW	RA: 00 00 0.0000 (.0000000d) Dec: +00 00 0.00 (.00000d) Equinox: J2000		V=18+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(4) SNIA2007WW	WFPC2, IMAGE, PC1-FIX	F336W	CR-SPLIT=0.5			80.0 Secs *[==>40.0 Secs (Split 1)]* *[==>40.0 Secs (Split 2)]*	***[1]***
2		(4) SNIA2007WW	WFPC2, IMAGE, PC1-FIX	F336W	CR-SPLIT=0.5			1000.0 Secs *[==>500.0 Secs (Split 1)]* *[==>500.0 Secs (Split 2)]*	***[1]***
3		(4) SNIA2007WW	WFPC2, IMAGE, PC1-FIX	F439W	CR-SPLIT=0.5			40.0 Secs *[==>(Split 1)]* *[==>(Split 2)]*	***[1]***
4		(4) SNIA2007WW	WFPC2, IMAGE, PC1-FIX	F439W	CR-SPLIT=0.5			500.0 Secs *[==>200.0 Secs (Split 1)]* *[==>200.0 Secs (Split 2)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20080624
Exp. 1, split 1
Exp. 1, split 2
Exp. 2, split 1
Exp. 2, split 2
Overhead
Exp. 3, split 1
Exp. 3, split 2
Exp. 4, split 1
Exp. 4, split 2
Unused Visibility = 77
Overhead
GS Acq
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec