



12993 - The Stellar Environment of SN 2008jb: Resolving the Nature of the Progenitor

Cycle: 20, Proposal Category: GO
(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Jose Luis Prieto (PI) (Contact)	Princeton University	jprieto@astro.princeton.edu
Dr. John J. Eldridge (CoI)	The University of Auckland	j.eldridge@auckland.ac.nz
Dr. Janice C. Lee (CoI)	Space Telescope Science Institute	jlee@stsci.edu

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) SN-2008JB	WFC3/IR WFC3/UVIS	5	09-Jul-2012 23:29:22.0	yes

5 Total Orbits Used

ABSTRACT

Type IIP supernovae, the most common kind of core-collapse supernova (ccSN) explosions, have been associated with the deaths of red-supergiant stars with main sequence masses $M = 8\text{--}15\text{ Msun}$, through the direct detection of several progenitors using HST. These studies have also shown a dearth of high-mass ($40 > M > 15\text{ Msun}$) SN progenitor stars when compared to local populations of supergiants. However, the sample of nearby ccSNe ($< 20\text{ Mpc}$) used for progenitor studies is highly biased to large spiral galaxies, limiting the range of physical properties (like metallicity) that affect stellar evolution. We propose to obtain deep multi-color images with WFC3 of the birthplace of SN 2008jb to study its resolved stellar environment and constrain the age and mass of its progenitor. This ccSN was discovered by a galaxy-unbiased survey in a low-metallicity, Magellanic-type dwarf irregular galaxy at 10 Mpc. The photometric light curve properties of the event were consistent with normal Type IIP SNe;

however, the explosion occurred within a large star-forming region. The approximate age of this region of ~ 9 Myr is more consistent with the young age and high-mass estimated for the progenitor of SN 1987A in the LMC, than with any nearby Type IIP SN. The deep optical and near-IR HST data will allow us to detect massive stars in the environment of SN 2008fb and accurately constrain the ages of the stellar populations using well-calibrated stellar evolution and population synthesis models. These data will also allow us to constrain the late-time SN energetics, dust formation in the SN ejecta or circumstellar medium, and stellar feedback from massive stars and SNe in the star-forming region.

OBSERVING DESCRIPTION

We plan to use WFC3 UVIS and IR detectors for observing the birthplace stellar populations of supernova 2008jb. The main broad-band filters we will use are F336W and F606W with WFC3/UVIS, and F160W with WFC3/IR. For H-alpha imaging with UVIS we plan to use the F657N narrow-band filter.

We have included all the observations requested for this program in 1 visit of 5 orbits. The exposure times required to reach the S/N necessary to characterize the stellar populations are the following:

F606W: 2x500s

F336W: 3x1300s

F657N: 3x800s

F160W: 2x2600s

Organized as follows:

Orbit1: 2x500s (F606W) and 1x1300s (F336W), aperture = UVIS2-FIX

Orbit2: 2x1300s (F336W), aperture = UVIS2-FIX

Orbit3: 3x800s (F657N), aperture = UVIS2-FIX

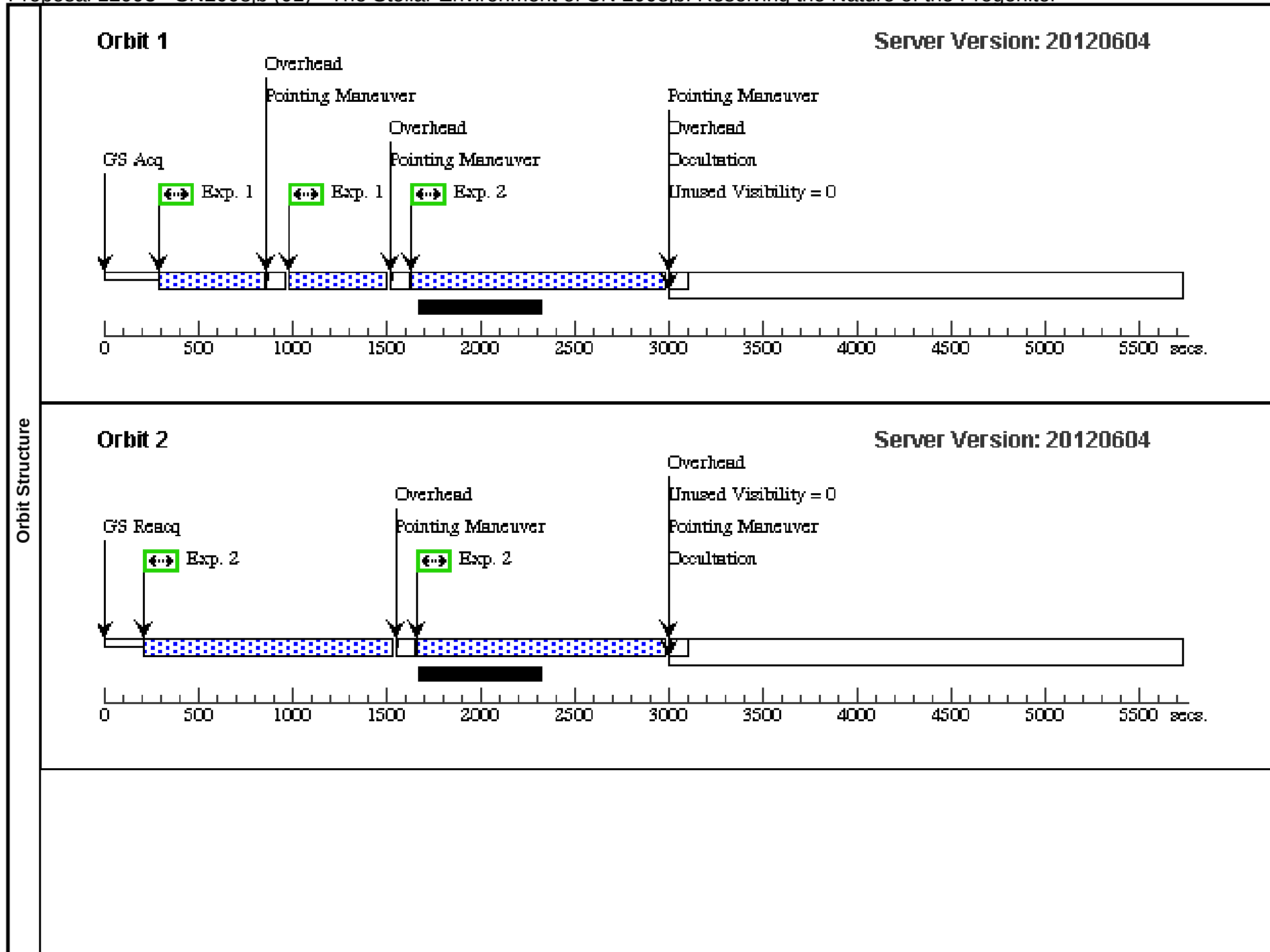
Orbit4: 1x2600s (F160W), aperture = IR (SPARS200, NSTEP=14)

Orbit5: 1x2600s (F160W), aperture = IR (SPARS200, NSTEP=14)

The apertures are selected to fit the star-forming region around SN 2008jb (diameter = 20 arcsec) in one detector. We have chosen standard 2- and 3-point line dithering for WFC3 UVIS exposures to reject cosmic rays and reconstruct the PSF. In the IR we use the standard 2-point dither with spacing necessary to dither over detector "blobs".

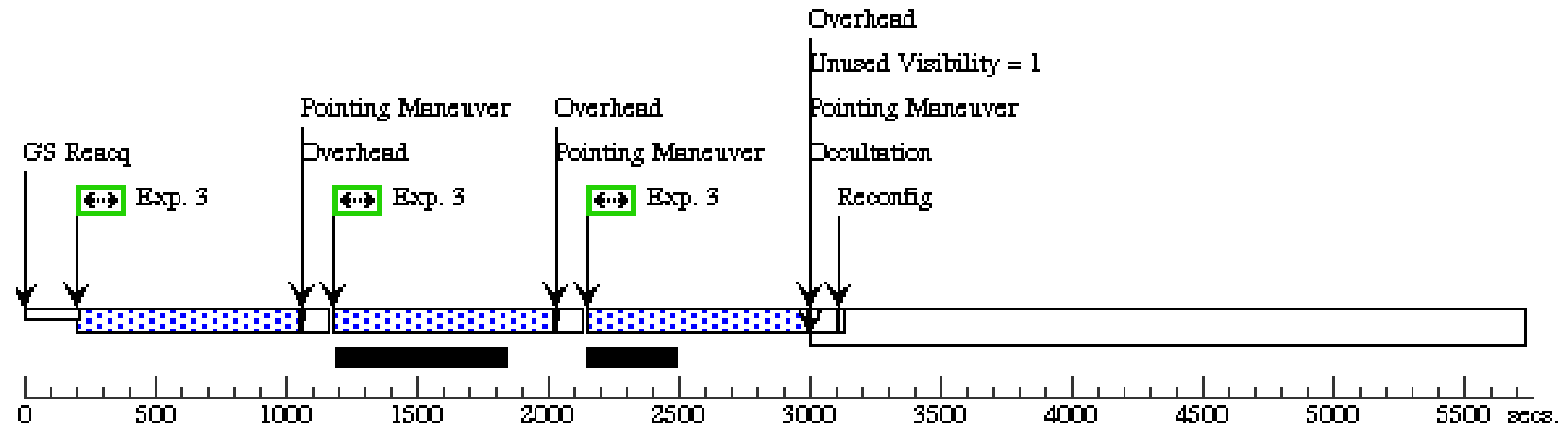
Proposal 12993 - SN2008jb (01) - The Stellar Environment of SN 2008jb: Resolving the Nature of the Progenitor

Visit	Proposal 12993, SN2008jb (01)										Tue Jul 10 03:29:32 GMT 2012			
	Diagnostic Status: No Diagnostics													
	Scientific Instruments: WFC3/IR, WFC3/UVIS													
	Special Requirements: SCHED 100%													
Patterns	#	Primary Pattern					Secondary Pattern					Exposures		
	(1)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=			Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false								(1)	
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=			Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false								(2), (3)	
	(3)	Pattern Type=WFC3-IR-DITHER-BLOB Purpose=DITHER Number Of Points=2 Point Spacing=5.183 Line Spacing=			Coordinate Frame=POS-TARG Pattern Orientation=41.859 Angle Between Sides= Center Pattern=true								(4)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous				
	(1)	SN-2008JB		RA: 03 51 44.6600 (57.9360833d) Dec: -38 27 0.10 (-38.45003d) Equinox: J2000				V=25		Reference Frame: ICRS				
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.													
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit		
	1	SN2008jb_UVIS_F606W	(1) SN-2008JB	WFC3/UVIS, ACCUM, UVIS2-FIX		F606W			Pattern 1, Exps 1-1 in SN2008jb (01) (1)	500 Secs				
										[==>527.0 Secs (Pattern 1)]		[1]		
										[==>527.0 Secs (Pattern 2)]				
	2	SN2008jb_UVIS_F336W	(1) SN-2008JB	WFC3/UVIS, ACCUM, UVIS2-FIX		F336W			Pattern 2, Exps 2-2 in SN2008jb (01) (2)	1300 Secs				
										[==>1327.0 Secs (Pattern 1)]		[1]		
										[==>1323.0 Secs (Pattern 2)]		[2]		
										[==>1323.0 Secs (Pattern 3)]				
	3	SN2008jb_UVIS_F657N	(1) SN-2008JB	WFC3/UVIS, ACCUM, UVIS2-FIX		F657N			Pattern 2, Exps 3-3 in SN2008jb (01) (2)	800 Secs				
										[==>839.0 Secs (Pattern 1)]		[3]		
									[==>839.0 Secs (Pattern 2)]					
									[==>839.0 Secs (Pattern 3)]					
4	SN2008jb_IR_F160W	(1) SN-2008JB	WFC3/IR, MULTIACCUM, IR		F160W	SAMP-SEQ=SPARS 200; NSAMP=14			Pattern 3, Exps 4-4 in SN2008jb (01) (3)	[==>(Pattern 1)]		[4]		
									[==>(Pattern 2)]		[5]			



Orbit 3

Server Version: 20120604



Orbit 4

Server Version: 20120604

