14226 - Stellar Forensics VII: A post-explosion view of the progenitors of core-collapse supernovae

Cycle: 23, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) SN-2012EC	ACS/WFC	2	14-Jul-2015 21:23:39.0	yes

2 Total Orbits Used

ABSTRACT

Recent studies have used high spatial resolution HST observations of supernova (SN) sites to directly identify the progenitors of core-collapse SNe on pre-explosion images. These studies have set constraints about the nature of massive stars and their evolution just prior to their explosion as SNe. Now, at late-times when the SNe have faded sufficiently, it is possible to return to the sites of these core-collapse SNe to search for clues about the nature of their progenitors.

We request time to conduct deep, late-time, high-resolution imaging with ACS WFC of the site of the core-collapse SN 2012ec. We aim to: 1) Confirm our original identification, made in pre-explosion HST images, by confirming that the progenitor is now missing; 2) Apply image

subtraction techniques for this late-time imaging with our pre-explosion images to determine accurate photometry of the progenitor to constrain its temperature and luminosity; and 3) use the stellar population in the immediate vicinity of the SN to determine the reddening and extinction that affected the progenitor. HST provides the unique combination of high-resolution optical/IR imaging at very faint magnitudes that will facilitate this study.

OBSERVING DESCRIPTION

We require deep three colour observations of the site of SN 2012ec in the galaxy NGC 1084. The observations will use the ACS WFC, with a 1kx1k subarray (to minimise overheads due to readout time). We will use the F475W, F606W and F814W filters. For each filter we will use a four point box dither pattern, to aid the removal of hot pixels and cosmic rays and to provide improved sampling of the PSF. The coordinates for the target, SN 2012ec, were retrieved from the CfA SN list (http://www.cbat.eps.harvard.edu/lists/Supernovae.html). These observations are intended to reach limiting magnitudes of m_F435W = 27, m_F555W = 27 and m_F814W = 26.5 at 3sigma.

Visit

Proposal 14226, Visit 01 Wed Jul 15 01:23:41 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: AFTER 01-MAR-2016:00:00:00

Comments: There is no particular urgency for these observations, but the later they occur the better (so we have provided a suggested timing constraint of after 1st March 2016).

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=false		(1), (2), (3)

Fixed Targets

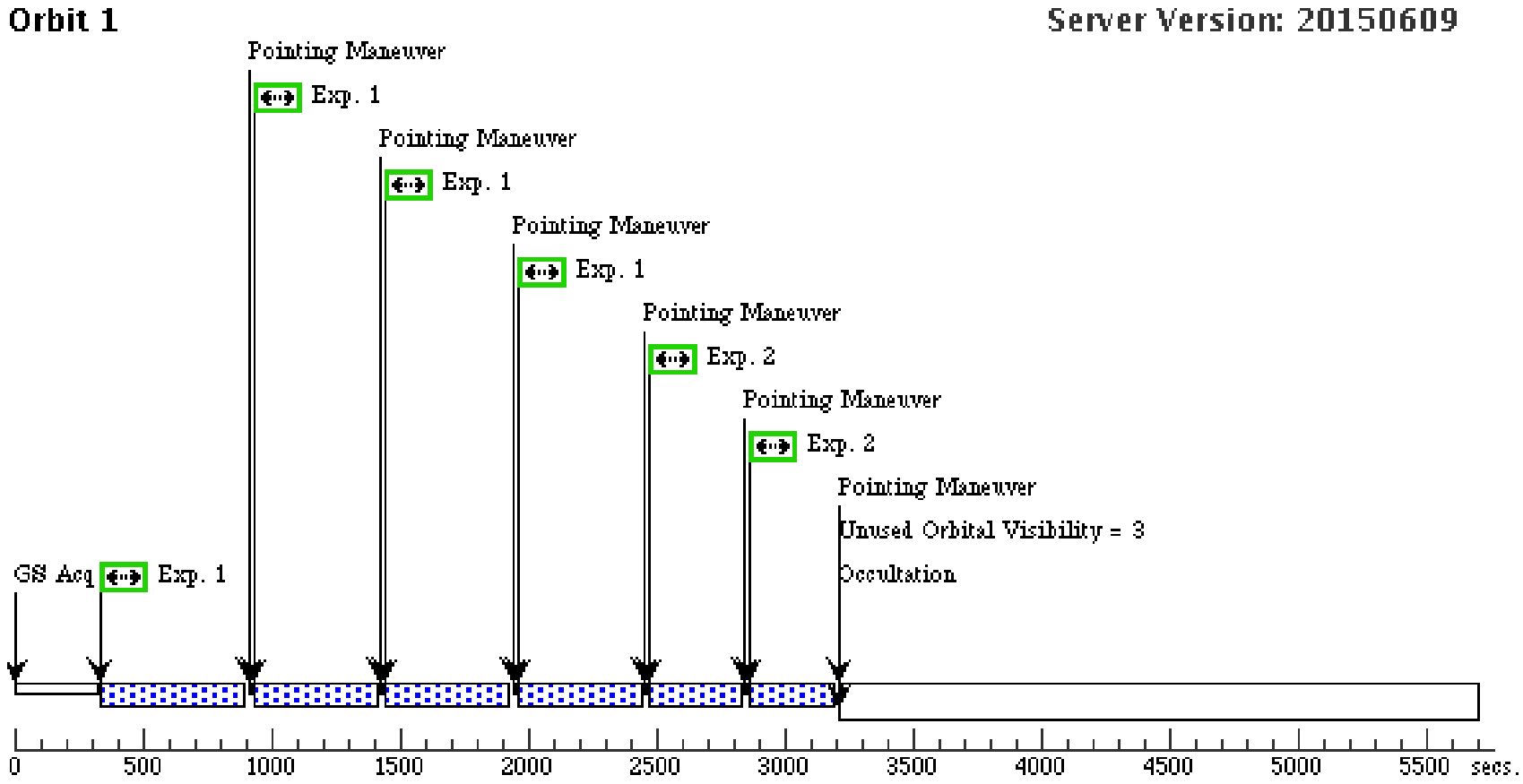
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SN-2012EC	RA: 02 45 59.8800 (41.4995000d) Dec: -07 34 27.00 (-7.57417d) Equinox: J2000		V=27	Reference Frame: SIMBAD

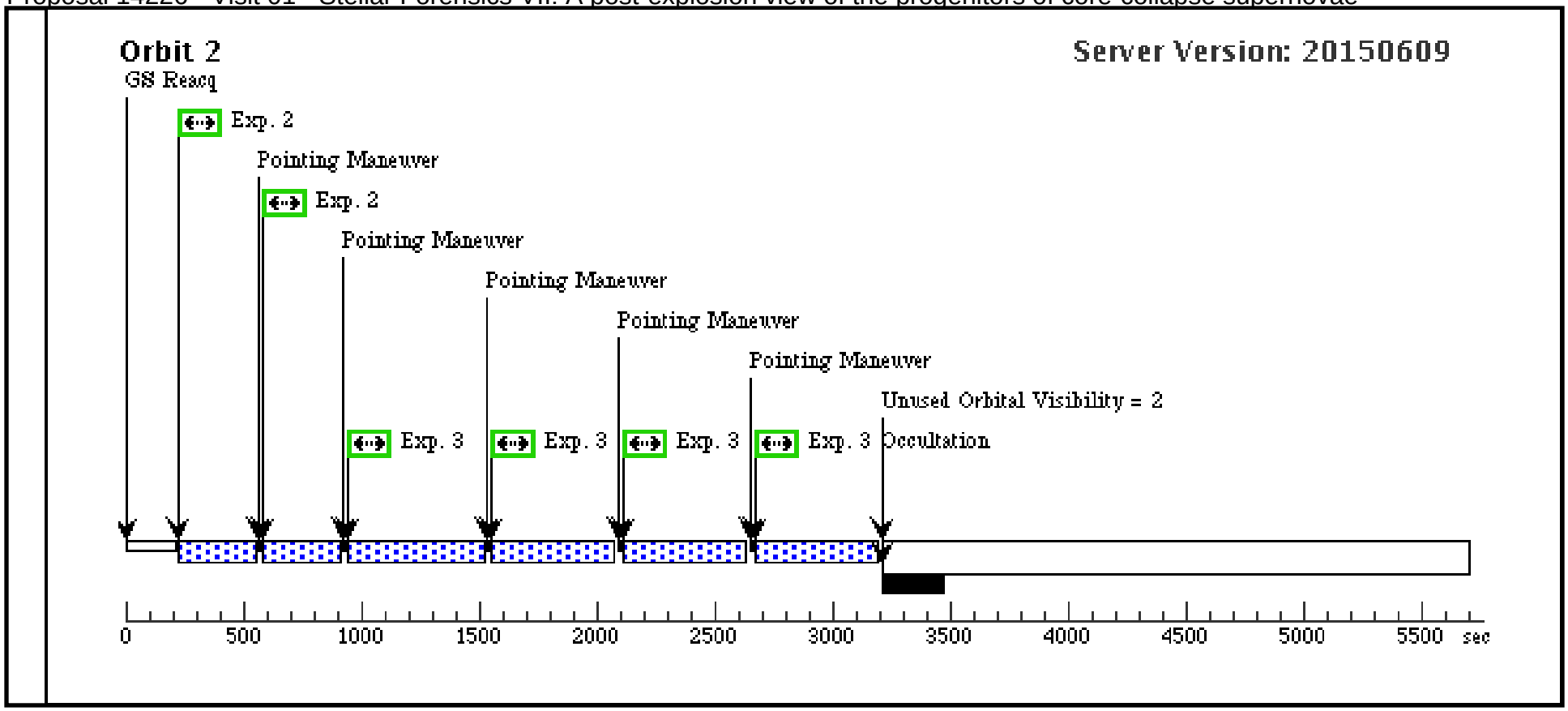
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SN-2012EC	ACS/WFC, ACCUM, WFC1-1K	F475W			Pattern 1, Exps 1-1 in Visit 01 (1)	390 Secs (1560 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	
								[==>(Pattern 4)]	
2		(1) SN-2012EC	ACS/WFC, ACCUM, WFC1-1K	F606W			Pattern 1, Exps 2-2 in Visit 01 (1)	235 Secs (940 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	***[2]***
								[==>(Pattern 4)]	
3		(1) SN-2012EC	ACS/WFC, ACCUM, WFC1-1K	F814W			Pattern 1, Exps 3-3 in Visit 01 (1)	432 Secs (1728 Secs)	
								[==>(Pattern 1)]	***[2]***
								[==>(Pattern 2)]	
								[==>(Pattern 3)]	
								[==>(Pattern 4)]	

Orbit Structure

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GS Reacq
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Pointing Maneuver
Exp. 2
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Unused Orbital Visibility = 2
Exp. 3
Exp. 3
Exp. 3
Exp. 3
Occultation
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2500
3000
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sec