12865 - HD 188112 - a candidate Supernova Ia progenitor

Cycle: 20, 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) HD-188112	STIS/CCD STIS/FUV-MAMA STIS/NUV-MAMA	3	22-Aug-2012 21:03:08.0	yes

3 Total Orbits Used

ABSTRACT

Several different explosion channels have been proposed for Type Ia Supernovae (SNe Ia), and tested against observations through hydrodynamic explosion simulations and radiative-transfer

calculations. A promising scenario is the double detonation of a sub-Chandrasekhar-mass C/O white dwarf (WD), where a surface detonation in freshly accreted He subsequently triggers a detonation in the C/O core. The companion and He donor would likely be a low-mass He WD. Potential progenitor systems (i.e., binaries of a sufficiently massive C/O WD with a low-mass He WD) have never been observed so far. However, HD~188112 might be part of such a system. HD~188112 is a nearby, bright, radial-velocity variable He WD of 0.24 M$_\odot$, whose unseen companion has been inferred to be another WD of at least 0.73 M$_\odot$. The exact mass of the companion depends on the unknown inclination of the system. Assuming tidally locked rotation, the inclination can be determined measuring the broadening of metal lines due to rotation. Since the metallicity of HD 188112 is extremely low (1/100 solar), this measurement can only be performed in the UV, making the use of HST mandatory. If the mass of the companion of HD 188112 is confirmed to be between 0.95 and 1.05 M$_\odot$, the first candidate double-detonation SN Ia progenitor system has been found.

OBSERVING DESCRIPTION

The project requires time series spectroscopy with E140H and E230. Time tag mode ist used for the NUV. The star is too bright in the FUV to use Time Tag mode. Thererfore observations are broken into a series of 22 exposures of 2 minutes duration.

REAL TIME JUSTIFICATION

No

CALIBRATION JUSTIFICATION

standard

ADDITIONAL COMMENTS

No

Visit

Proposal 12865, Visit 01, implementation Thu Aug 23 01:03:25 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/CCD, STIS/FUV-MAMA, STIS/NUV-MAMA

Special Requirements: (none)

Fixed Targets

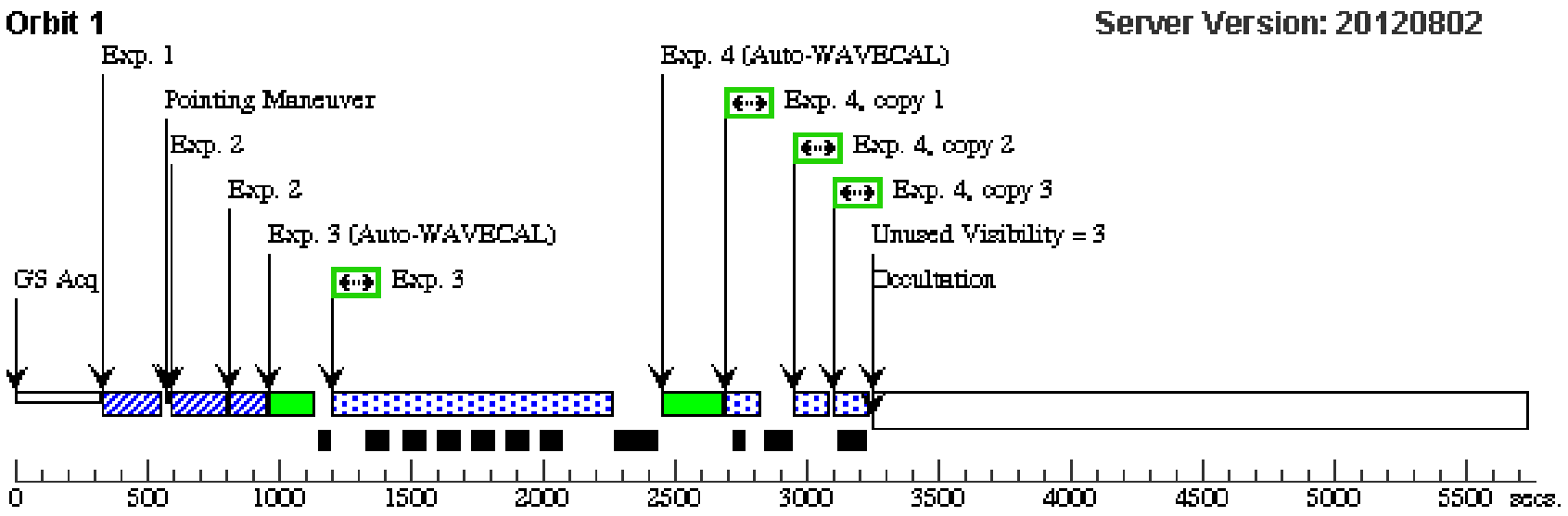
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	HD-188112	RA: 19 54 31.4205 (298.6309188d) Dec: -28 20 20.67 (-28.33907d) Equinox: J2000		V=10.22+/-0.1	Reference Frame: ICRS

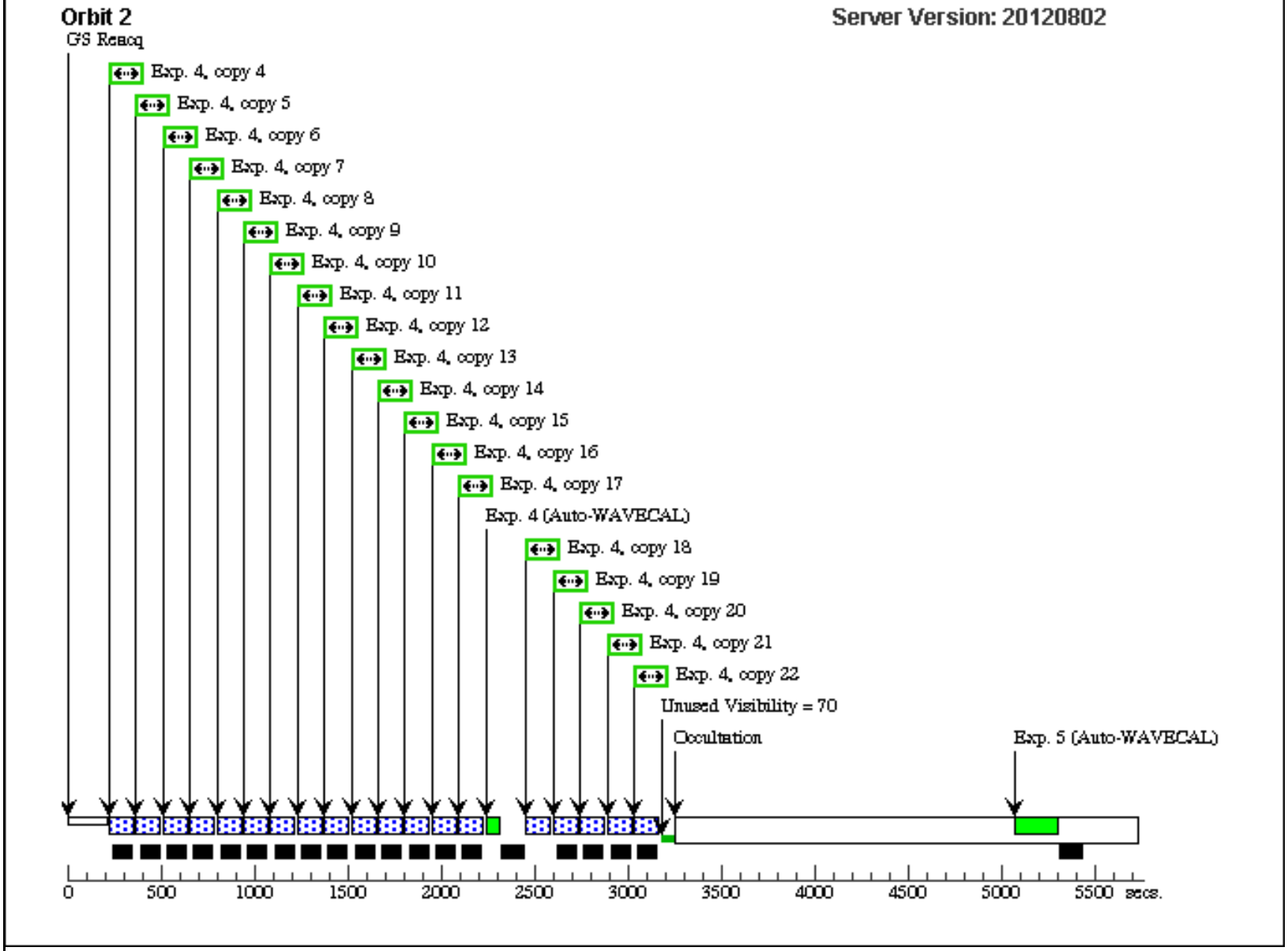
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.

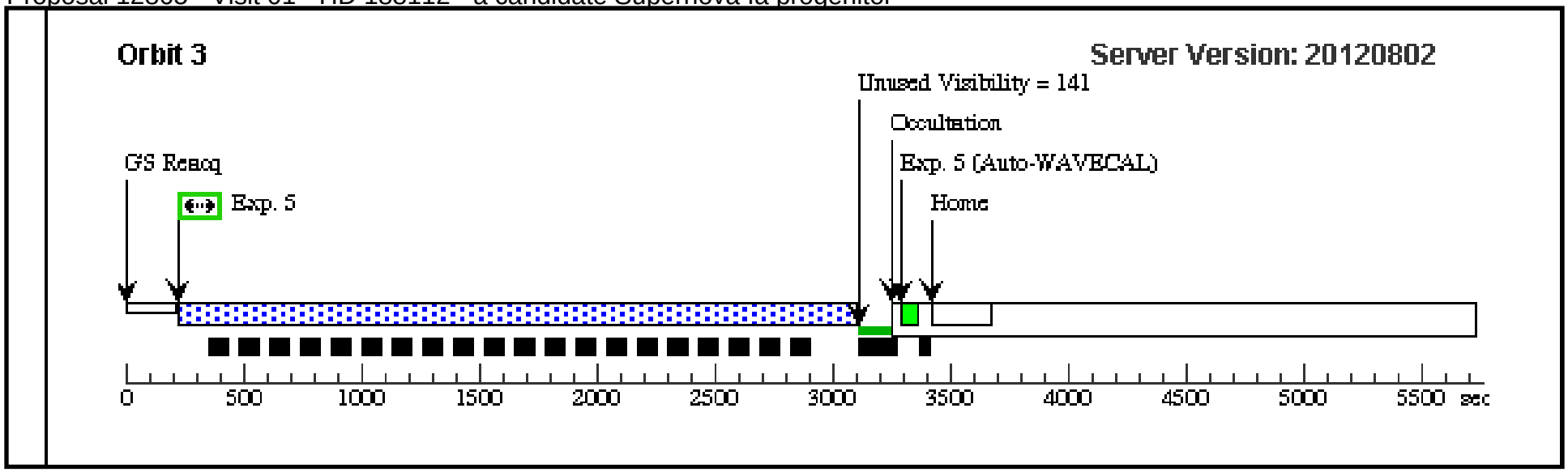
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	(STIS.im.413623)	(1) HD-188112	STIS/CCD, ACQ, F28X50LP	MIRROR				0.2 Secs	
								[==>]	***[1]***
2		(1) HD-188112	STIS/CCD, ACQ/PEAK, 0.2X0.09	MIRROR				0.1 Secs	
								[==>]	***[1]***
3	(STIS.sp.415271)	(1) HD-188112	STIS/NUV-MAMA, TIME-TAG, 0.2X0.09	E230H 2812 A	BUFFER-TIME=130			1040 Secs	
								[==>]	***[1]***
4	(STIS.sp.415272)	(1) HD-188112	STIS/FUV-MAMA, ACCUM, 0.2X0.09	E140H 1343 A				120 Secs X 22	
								[==>(Copy 1)]	
								[==>(Copy 2)]	***[1]***
								[==>(Copy 3)]	
								[==>(Copy 4)]	
								[==>(Copy 5)]	
								[==>(Copy 6)]	
								[==>(Copy 7)]	
								[==>(Copy 8)]	
								[==>(Copy 9)]	
								[==>(Copy 10)]	
								[==>(Copy 11)]	
								[==>(Copy 12)]	
								[==>(Copy 13)]	***[2]***
								[==>(Copy 14)]	
								[==>(Copy 15)]	
								[==>(Copy 16)]	
								[==>(Copy 17)]	
								[==>(Copy 18)]	
								[==>(Copy 19)]	
								[==>(Copy 20)]	
								[==>(Copy 21)]	
								[==>(Copy 22)]	
5	(STIS.sp.415275)	(1) HD-188112	STIS/NUV-MAMA, TIME-TAG, 0.2X0.09	E230H 2812 A	BUFFER-TIME=130			2860 Secs	
								[==>]	***[3]***

Orbit Structure




Orbit 2
Server Version: 20120802
GS Reacq
Exp. 4, copy 4
Exp. 4, copy 5
Exp. 4, copy 6
Exp. 4, copy 7
Exp. 4, copy 8
Exp. 4, copy 9
Exp. 4, copy 10
Exp. 4, copy 11
Exp. 4, copy 12
Exp. 4, copy 13
Exp. 4, copy 14
Exp. 4, copy 15
Exp. 4, copy 16
Exp. 4, copy 17
Exp. 4 (Auto-WAVECAL)
Exp. 4, copy 18
Exp. 4, copy 19
Exp. 4, copy 20
Exp. 4, copy 21
Exp. 4, copy 22
Unused Visibility = 70
Occultation
Exp. 5 (Auto-WAVECAL)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.


Orbit 3
Server Version: 20120802
Unused Visibility = 141
Occultation
GS Reacq
Exp. 5 (Auto-WAVECAL)
Exp. 5
Home
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec