



11637 - A Closeup View of a Twin of SN 1987A Before Explosion

Cycle: 17, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
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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	(1) SBW1	WFC3/UVIS	1	22-Jun-2009 21:05:27.0	yes
02	(1) SBW1	STIS/CCD	1	22-Jun-2009 21:05:32.0	yes

2 Total Orbits Used

ABSTRACT

Last year we reported the discovery of a ring nebula called SBW1 around a blue supergiant star in our Galaxy. In almost every respect, it is a true "twin" of the equatorial ring nebula around SN 1987A: it has an identical physical radius of 0.2pc, a similar expansion speed and age, it is located in a massive HII region, the central star is an early B supergiant with the same luminosity as SN1987A's progenitor, and the ring's structure in our ground-based H-alpha images looks almost identical to early HST images of SN1987A's ring. The detailed density structure of SN1987A's ring on scales smaller than the limiting resolution of HST has become a pressing question, because the forward shock of the supernova is now colliding with

that ring, causing it to brighten by 3 orders of magnitude and giving rise to a series of "hotspots" around the ring. HST/WFC3 images of SBW1 will provide a snapshot of an SN1987A-like ring before the supernova explodes, and will provide a detailed view of the important density inhomogeneities in the ring with a physical spatial resolution 10 times better than HST images of SN1987A (because SBW1 is 10 times closer to us). STIS spectra will allow us to directly measure the radial density structure of the ring. Both the overall radial density profile and the detailed structures of the clumps that give rise to the "hotspots" are critical factors in modeling the rapid evolution of SN1987A, and our proposed study of SBW1 will provide extremely valuable input for those models.

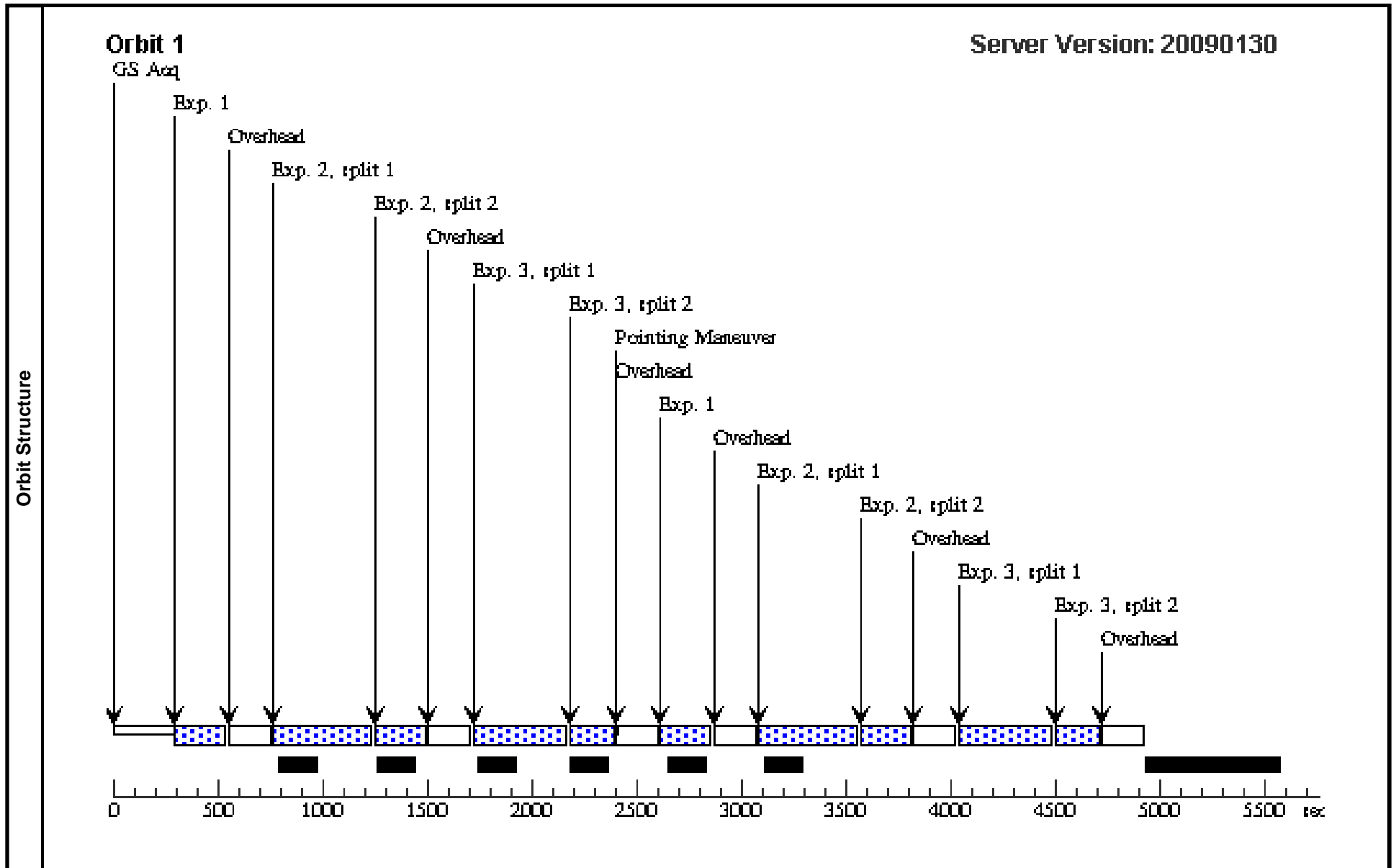
OBSERVING DESCRIPTION

This program will obtain F656N, F658N, and F502N images with WFC3 of the ring nebula around SBW2, as well as STIS/CCD spectra including the H-alpha and [S II] emission lines.

Proposal 11637 - Visit 01 - A Closeup View of a Twin of SN 1987A Before Explosion

Tue Jun 23 01:05:36 GMT 2009

Visit	Proposal 11637, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS Special Requirements: CVZ Comments: for imaging, central star is centered on CCD1, and only CCD1 is read out. use 2-pt dither for all, and CR-SPLIT for F656N and F658N.										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
		(1)	Pattern Type=WFC3-UVIS-DITHER- Coordinate Frame=POS-TARG LINE Pattern Orientation=46.84 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.145 Line Spacing=							(1-3)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	SBW1	RA: 10 40 19.4000 (160.0808333d) Dec: -59 49 9.70 (-59.81936d) Equinox: J2000				V=12.7		Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1		(1) SBW1	WFC3/UVIS, ACCUM, UVIS1-2K4-SUB	F502N	CR-SPLIT=NO		Pattern 1, Exps 1-3 (1)	210 Secs [=>(Pattern 1)] [=>(Pattern 2)]	[1]	
	<i>Comments: not doing CR-SPLIT for the F502N images.</i>										
	2		(1) SBW1	WFC3/UVIS, ACCUM, UVIS1-2K4-SUB	F658N	CR-SPLIT=2		Pattern 1, Exps 1-3 (1)	480 Secs [=>(Pattern 1, Split 1)] [=>(Pattern 1, Split 2)] [=>(Pattern 2, Split 1)] [=>(Pattern 2, Split 2)]	[1]	
3		(1) SBW1	WFC3/UVIS, ACCUM, UVIS1-2K4-SUB	F656N	CR-SPLIT=2		Pattern 1, Exps 1-3 (1)	420 Secs [=>(Pattern 1, Split 1)] [=>(Pattern 1, Split 2)] [=>(Pattern 2, Split 1)] [=>(Pattern 2, Split 2)]	[1]		



Proposal 11637 - Visit 02 - A Closeup View of a Twin of SN 1987A Before Explosion

Tue Jun 23 01:05:37 GMT 2009

Visit	Proposal 11637, Visit 02, implementation Diagnostic Status: Warning Scientific Instruments: STIS/CCD Special Requirements: CVZ; ORIENT 72.0D TO 82.0 D; ORIENT 252.0D TO 262.0 D <i>Comments: The slit will be offset by 0.3 arcsec on either side of the star, and the slit should be oriented at a position angle of +32d (or +122d) with a tolerance of +-5d.</i>																																																																				
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