



14359 - N103B: A Type Ia Remnant with Circumstellar Interaction... Kepler's Older Cousin?

Cycle: 23, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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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) N103B	WFC3/IR WFC3/UVIS	4	28-Oct-2015 21:33:39.0	yes
02	(3) N103B-KNOT	COS/FUV	1	28-Oct-2015 21:33:42.0	yes

5 Total Orbits Used

ABSTRACT

We have recently found that the LMC supernova remnant N103B is only the second known case (after Kepler's SNR) of a Type Ia SN remnant that is interacting with dense circumstellar material (CSM) long after its explosion (1,000 years). We are obtaining a deep 400 ks Chandra observation and also received 5 orbits of HST time to study this fascinating object. The nature of the progenitor systems of Type Ia SNe is not well understood. Our WFC3 and COS FUV observations will both locate the SN ejecta products and characterize the distribution of the CSM, presumably created by mass loss from the pre-SN system. We will also measure or put limits on the expansion of the remnant. Together, these observations will illuminate the nature of both the progenitor system and the explosion mechanism itself.

OBSERVING DESCRIPTION

This program is paired with a Chandra program, but the observations do not need to be coordinated. Here we request WFC3 UVIS and IR imaging and COS FUV G140L spectra of the supernova remnant N103B in the Large Magellanic Cloud.

The imaging will include WFC3/UVIS F657N, F502N, and F673N narrow bands plus F547M continuum to allow star subtraction. Then with WFC3/IR, we will do F164N ([FeII] imaging with F160W for star subtraction.

The COS spectrum will be obtained for a bright knot of emission in the supernova remnant. Its position has been measured accurately with respect to the GSC 2.3 catalog stars using archival images from program 13282 (Chu PI). The knot of emission is large enough that a dead reckoning slew to the indicated position is sufficiently accurate for our needs. (An offset TA from a star was considered, but we opted not to do this.) The FUV G140L grating with 4 FPPOS positions is used for the spectroscopy.

Proposal 14359 - Visit 01 - N103B: A Type Ia Remnant with Circumstellar Interaction... Kepler's Older Cousin?

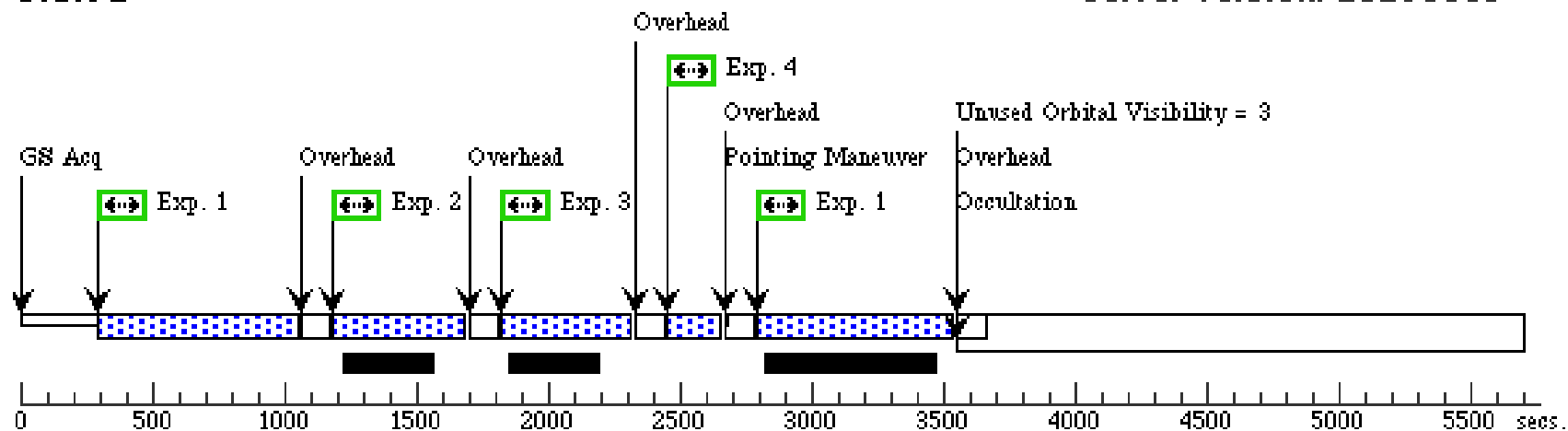
Visit	Proposal 14359, Visit 01, implementation				Thu Oct 29 01:33:43 GMT 2015	
	Diagnostic Status: No Diagnostics					
	Scientific Instruments: WFC3/IR, WFC3/UVIS					
	Special Requirements: (none)					
	Comments: WFC3/UVIS					
Patterns	#	Primary Pattern		Secondary Pattern	Exposures	
	(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(6)	
	(2)	Pattern Type=WFC3-IR-DITHER-BOX-MIN Purpose=DITHER Number Of Points=4 Point Spacing=0.572 Line Spacing=0.365	Coordinate Frame=POS-TARG Pattern Orientation=18.528 Angle Between Sides=74.653 Center Pattern=false		(5)	
	(3)	Pattern Type=WFC3-UVIS-GAP-LINE Purpose=MOSAIC Number Of Points=4 Point Spacing=2.414 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.759 Angle Between Sides= Center Pattern=true		(1-4)	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	N103B Alt Name1: SNR-J050854-684447	RA: 05 08 58.9730 (77.2457208d) Dec: -68 43 35.11 (-68.72642d) Equinox: J2000		V=22 6563: 4.4E-15 ergs/cm2/s/arcsec 2	Reference Frame: ICRS
	Comments: The source is an extended emission line source, so a V-magnitude is not really relevant for this case. This position is the geometric center of the SNR, as measured on an archival WFC3 F656N image from program 13282 (Chu, PI). Extended=YES					

Proposal 14359 - Visit 01 - N103B: A Type Ia Remnant with Circumstellar Interaction... Kepler's Older Cousin?

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) N103B	WFC3/UVIS, ACCUM, UVIS2-FIX	F657N	FLASH=10		Pattern 3, Exps 1-4 in Visit 01 (3)	700 Secs (2979 Secs)	
									[==>726.0 Secs (Pattern 1)]	[1]
									[==>726.0 Secs (Pattern 2)]	
									[==>798.0 Secs (Pattern 3)]	[2]
									[==>729.0 Secs (Pattern 4)]	[3]
	2		(1) N103B	WFC3/UVIS, ACCUM, UVIS2-FIX	F502N	FLASH=10		Pattern 3, Exps 1-4 in Visit 01 (3)	450 Secs (2051 Secs)	
									[==>476.0 Secs (Pattern 1)]	[1]
									[==>548.0 Secs (Pattern 2)]	
									[==>548.0 Secs (Pattern 3)]	[2]
									[==>479.0 Secs (Pattern 4)]	[3]
	3		(1) N103B	WFC3/UVIS, ACCUM, UVIS2-FIX	F673N	FLASH=10		Pattern 3, Exps 1-4 in Visit 01 (3)	450 Secs (1982 Secs)	
									[==>476.0 Secs (Pattern 1)]	[1]
									[==>548.0 Secs (Pattern 2)]	[2]
									[==>479.0 Secs (Pattern 3)]	
									[==>479.0 Secs (Pattern 4)]	[3]
	4		(1) N103B	WFC3/UVIS, ACCUM, UVIS2-FIX	F547M	FLASH=10		Pattern 3, Exps 1-4 in Visit 01 (3)	150 Secs (782 Secs)	
									[==>176.0 Secs (Pattern 1)]	[1]
									[==>248.0 Secs (Pattern 2)]	[2]
									[==>179.0 Secs (Pattern 3)]	
									[==>179.0 Secs (Pattern 4)]	[3]
	5		(1) N103B	WFC3/IR, MULTIACCUM, IR-FIX	F164N	NSAMP=11; SAMP-SEQ=SPAR S50		Pattern 2, Exps 5-5 in Visit 01 (2)	502.936801 Secs (2011.747 Secs)	
									[==>(Pattern 1)]	
									[==>(Pattern 2)]	
									[==>(Pattern 3)]	
									[==>(Pattern 4)]	[4]
	6		(1) N103B	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=12; SAMP-SEQ=SPAR S10		Pattern 1, Exps 6-6 in Visit 01 (1)	112.942884 Secs (338.829 Secs)	
									[==>(Pattern 1)]	
									[==>(Pattern 2)]	
									[==>(Pattern 3)]	[4]

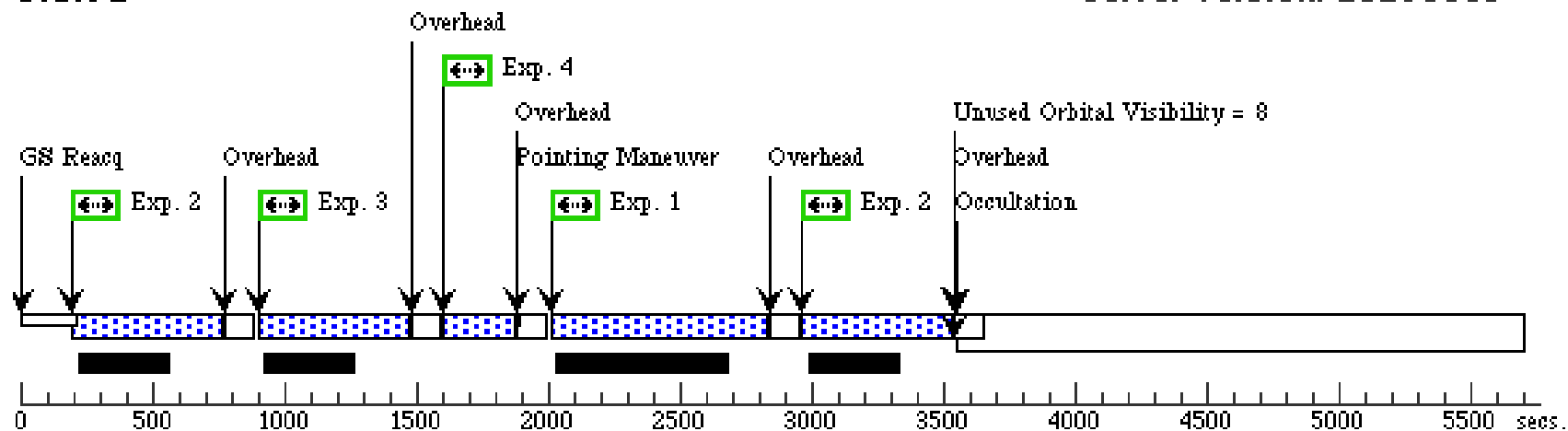
Orbit 1

Server Version: 20150609



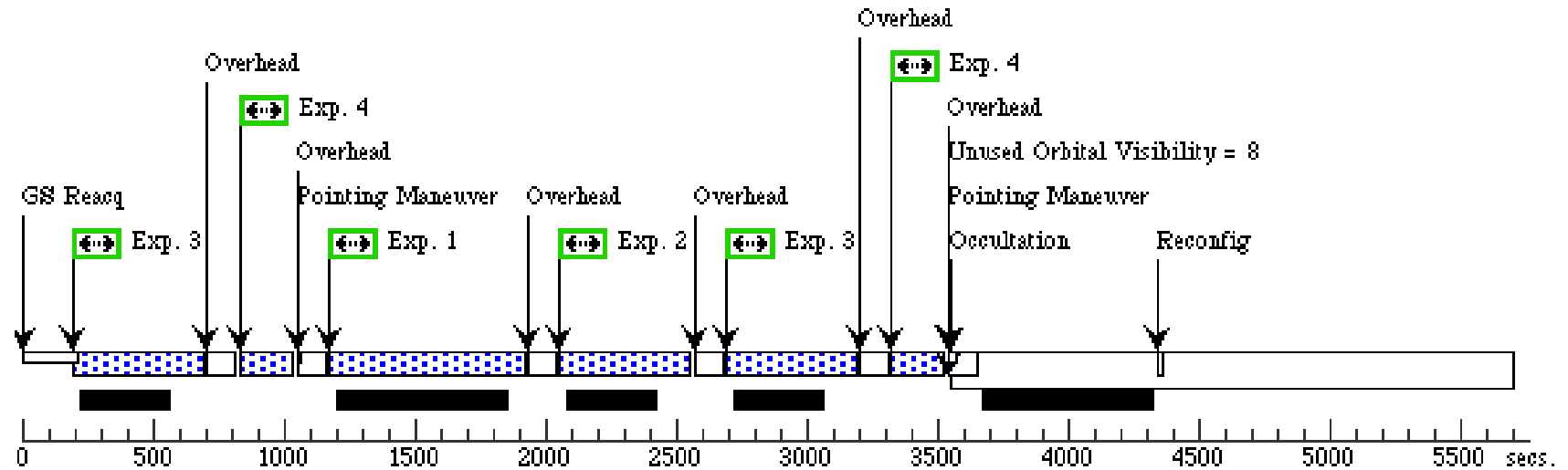
Orbit 2

Server Version: 20150609



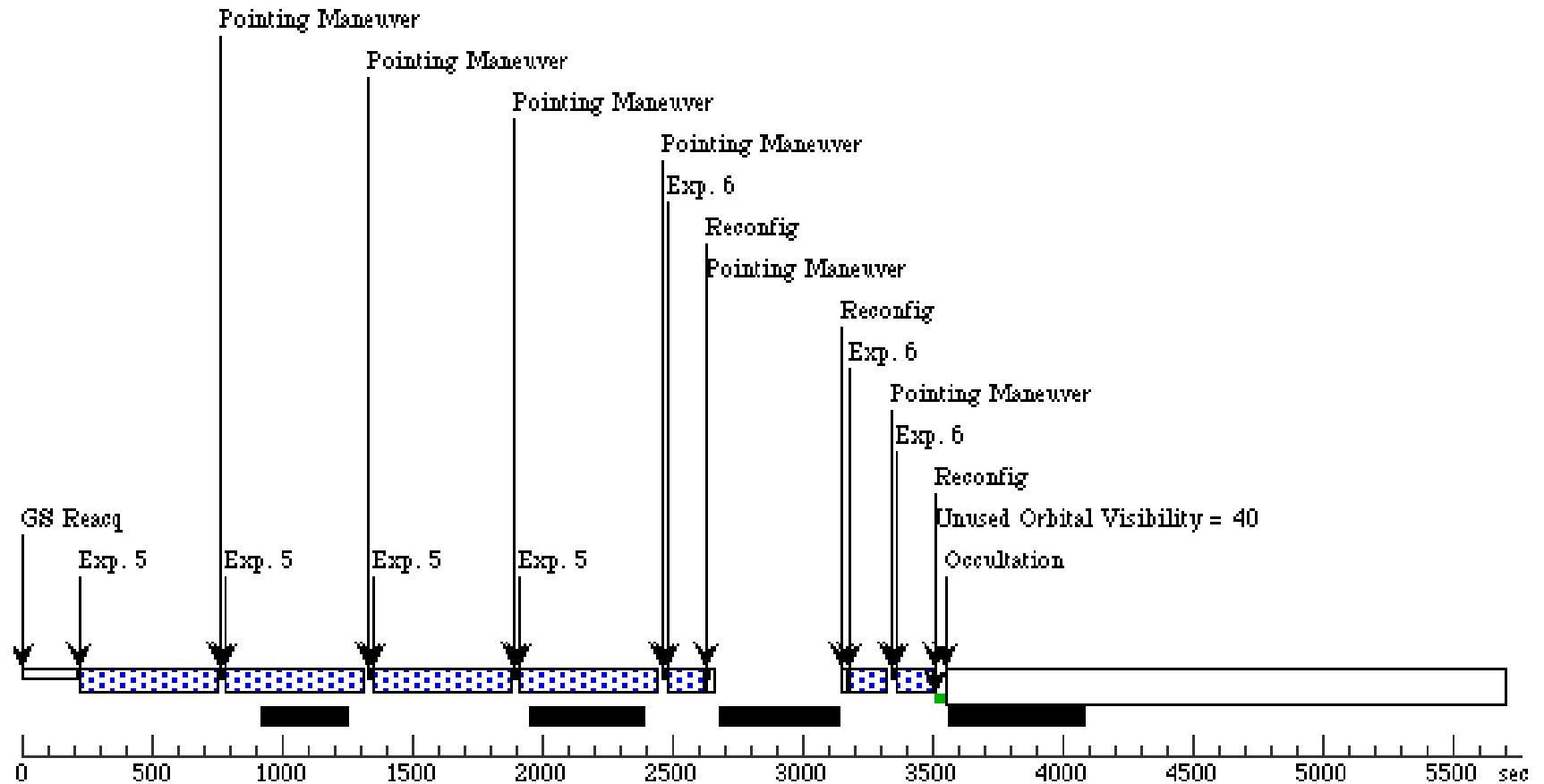
Orbit 3

Server Version: 20150609



Orbit 4

Server Version: 20150609



Proposal 14359 - Visit 02 - N103B: A Type Ia Remnant with Circumstellar Interaction... Kepler's Older Cousin?

Visit	Proposal 14359, Visit 02, implementation					Thu Oct 29 01:33:44 GMT 2015				
	Diagnostic Status: Warning									
	Scientific Instruments: COS/FUV									
	Special Requirements: (none)									
Diagnostics	(Visit 02) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE									
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	(Visit 02) Warning (Orbit Planner): REFERENCE-FRAME MUST BE ICRS OR GSC1 FOR SMALL APERTURE									
	(Visit 02) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronagraphy with STIS or COS.									
	(Exposure 1 (Visit 02)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See the proposal instructions for more details.									
	(Exposure 2 (Visit 02)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See the proposal instructions for more details.									
	(Exposure 3 (Visit 02)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See the proposal instructions for more details.									
Fixed Targets	(Exposure 4 (Visit 02)) Warning (Form): COS FUV PSA science exposures with extended targets have special calibration limitations. See the proposal instructions for more details.									
	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(3)	N103B-KNOT	RA: 05 08 58.5210 (77.2438375d) Dec: -68 43 32.04 (-68.72557d) Equinox: J2000			V=29 F(CIV-1550)=7E-15 ergs/cm2/s, other emission lines fainter		Reference Frame: GSC 2.3		
	Comments: Extended emission-line knot in SNR N103B; V mag is irrelevant. Position as measured on archival WFC3 F656N image from program 13282 (Chu, PI) corrected to GSC 2.3 catalog system. Extended=YES									
Exposures	#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(COS.sp.749 423)	(3) N103B-KNOT	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=1; BUFFER-TIME=10000			500 Secs (710 Secs) [==>710.0 Secs]	[1]
	2	(COS.sp.749 423)	(3) N103B-KNOT	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=2; BUFFER-TIME=10000			500 Secs (710 Secs) [==>710.0 Secs]	[1]
	3	(COS.sp.749 423)	(3) N103B-KNOT	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=3; BUFFER-TIME=10000			500 Secs (710 Secs) [==>710.0 Secs]	[1]
	4	(COS.sp.749 423)	(3) N103B-KNOT	COS/FUV, TIME-TAG, PSA	G140L 1105 A	FP-POS=4; BUFFER-TIME=10000			500 Secs (710 Secs) [==>710.0 Secs]	[1]

