



12762 - M51: Using the Kinematics of a Grand-Design Spiral to Understand the Physics of the Hot ISM, SNRs, and XRBs

Cycle: 19, 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	(6) M51-1	WFC3/UVIS	2	03-Oct-2011 21:20:31.0	yes
02	(7) M51-2	WFC3/UVIS	2	03-Oct-2011 21:20:40.0	yes
03	(8) M51-3	WFC3/UVIS	2	03-Oct-2011 21:20:48.0	yes
04	(9) M51-4	WFC3/UVIS	2	03-Oct-2011 21:20:55.0	yes
05	(6) M51-1 (7) M51-2	WFC3/UVIS	1	03-Oct-2011 21:21:04.0	yes
06	(8) M51-3 (9) M51-4	WFC3/UVIS	1	03-Oct-2011 21:21:09.0	yes

10 Total Orbits Used

ABSTRACT

M51 is an iconic grand design spiral galaxy with a strong arm/inter-arm density contrast and a high star-formation rate, but with very little star-formation between its arms. As a result, one can age-date the hot gas and high-mass binaries produced in the arms that have moved into the inter-arm regions. We are carrying out 750 ks observation with ACIS-S3 to employ this technique to measure gas cooling times, search for non-radiative cooling, and constrain time scales for HMXB evolution. This is the HST portion of this joint Chandra/HST program. It consists of 10 orbits of HST WFC3 observations in [SII], which with existing HST/ACS data, will allow the first comprehensive survey of the rich population of SNR expected in M51. Given the strong density contrast, we will better characterize SNR properties as a function of environment.

OBSERVING DESCRIPTION

The proposal obtains images in [S II] and a nearby continuum band F689M of the central portions of M51.

Basically we intend to carry out a 4 point mosaic observation of M51 at an orientation that is reasonable to assure that the S-Array chip of Chandra is in the overlap region. The target positions were generated with the Mosaic tool, and then broken into individual visits, so that we could match the half orbit continuum exposures to the individual pieces of the mosaic.

The dither pattern for [S II] is intended to provide good psf sampling and to paper over the gap between the two ACS chips. The continuum pointings have less dithering due to the very short time available.

The orientation requirements are match to the likely orientation of the S3 chip on Chandra.

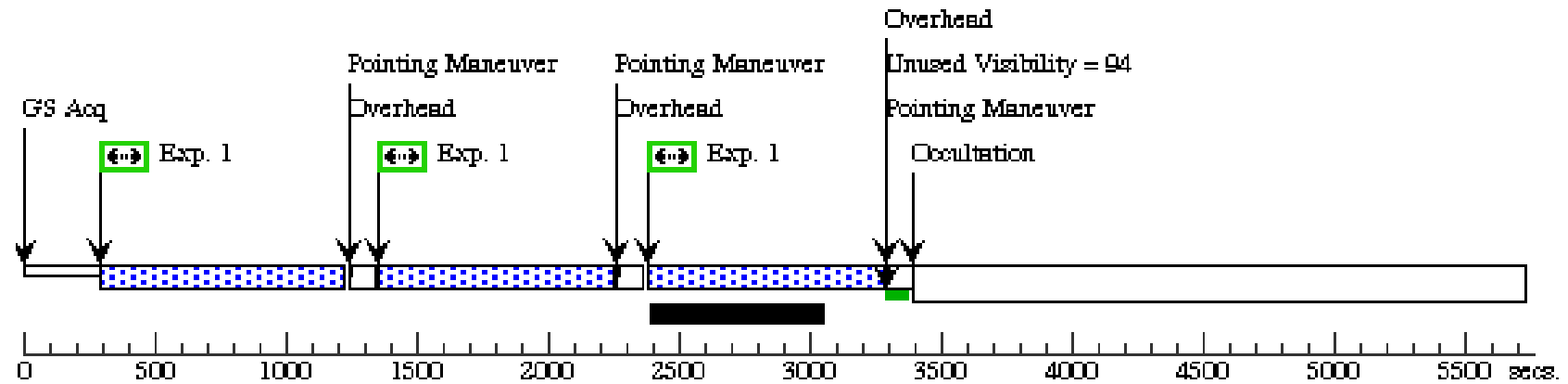
The main complication in planning was that the Mosaic visits have to occupy full visits and 4 points does not divide into 10 equally.

Proposal 12762 - Visit 01 - M51: Using the Kinematics of a Grand-Design Spiral to Understand the Physics of the Hot ISM, SNRs, and...

Visit	Proposal 12762, Visit 01										Tue Oct 04 01:21:15 GMT 2011	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: ORIENT 190D TO 190 D											
	Comments: [S II] at position 1. All of the observations are tied to the orientation for this field											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(3)	Pattern Type=WFC3-UVIS-MOS-DITH-LINE		Coordinate Frame=POS-TARG		Pattern Type=WFC3-UVIS-MOS-DITH-LINE		Coordinate Frame=POS-TARG		(1)		
		Purpose=MOSAIC		Angle Between Sides=		Purpose=DITHER		Angle Between Sides=				
		Number Of Points=3		Center Pattern=true		Number Of Points=2		Center Pattern=false				
		Point Spacing=2.4				Point Spacing=0.119						
		Line Spacing=				Line Spacing=						
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(6)	M51-1	RA: 13 29 56.9092 (202.4871217d)				V=8.36		Reference Frame: ICRS			
			Dec: +47 13 28.82 (47.22467d)									
			Equinox: J2000									
		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		(6) M51-1	WFC3/UVIS, ACCUM, UVIS-FIX		F673N			Pattern 3, Exps 1-1 in Visit 01 (3)	900 Secs		
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										[==>(Pattern 1,2)]		[1]
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									[==>(Pattern 3,2)]			

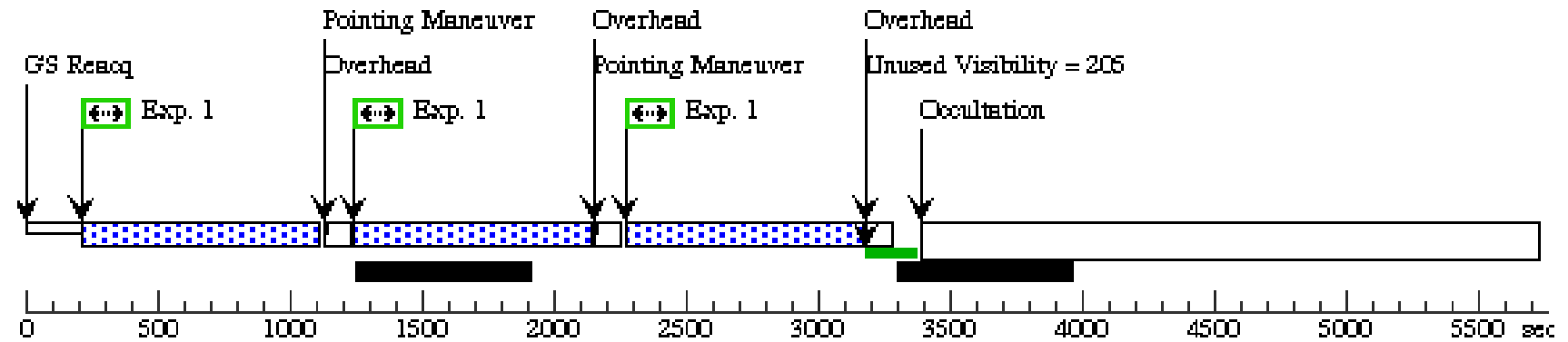
Orbit 1

Server Version: 20110811



Orbit 2

Server Version: 20110811

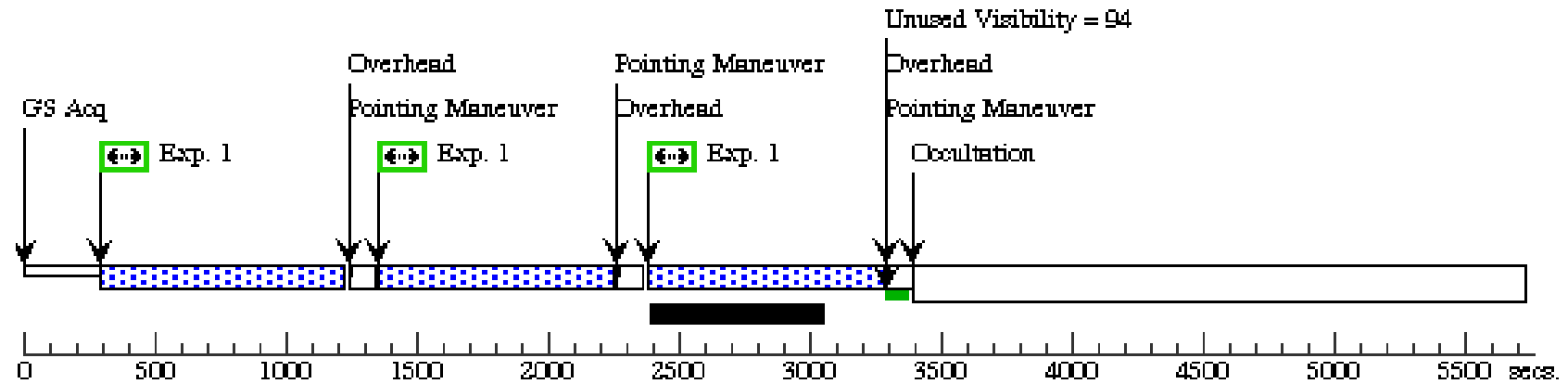


Proposal 12762 - Visit 02 - M51: Using the Kinematics of a Grand-Design Spiral to Understand the Physics of the Hot ISM, SNRs, and...

Visit	Proposal 12762, Visit 02										Tue Oct 04 01:21:17 GMT 2011	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SAME ORIENT AS 01											
	Comments: [S II] at positions 2											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(3)	Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=MOSAIC Number Of Points=3 Point Spacing=2.4 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=85.754 Angle Between Sides= Center Pattern=true		Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.119 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=33.606 Angle Between Sides= Center Pattern=false		(1)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(7)	M51-2	RA: 13 30 4.4002 (202.5183342d) Dec: +47 11 22.57 (47.18960d) Equinox: J2000				V=8.36		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		(7) M51-2	WFC3/UVIS, ACCUM, UVIS-FIX		F673N			Pattern 3, Exps 1-1 in Visit 02 (3)	900 Secs		
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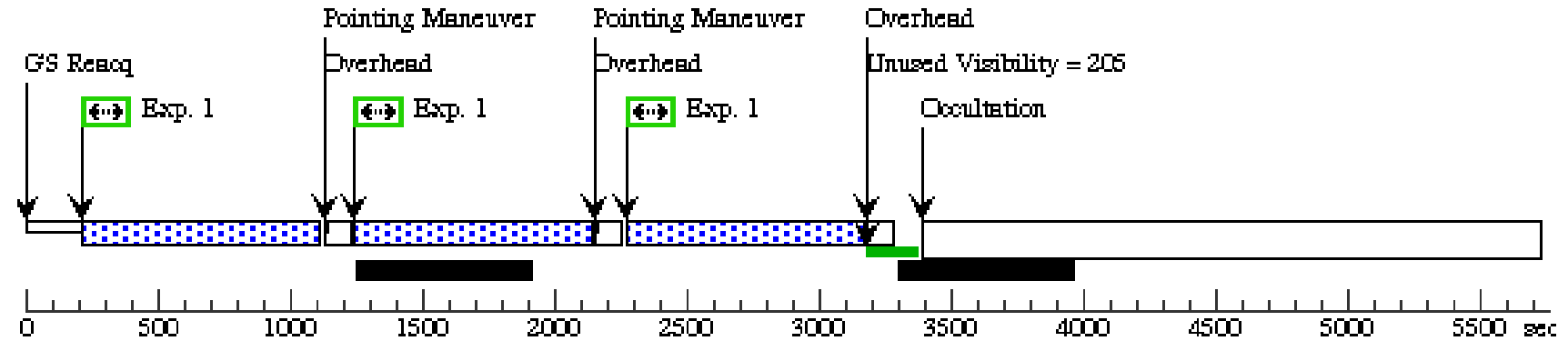
Orbit 1

Server Version: 20110811



Orbit 2

Server Version: 20110811

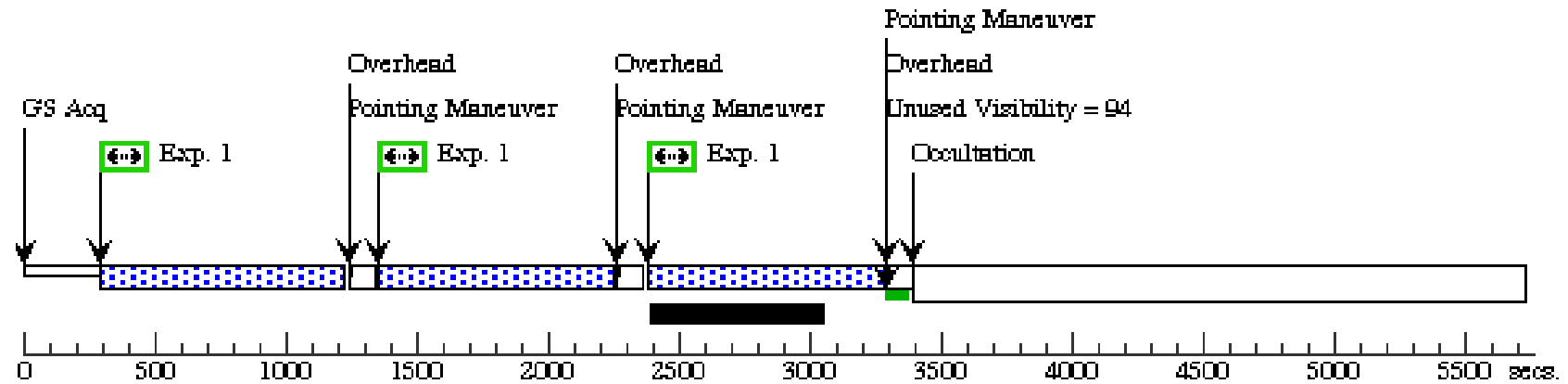


Proposal 12762 - Visit 03 - M51: Using the Kinematics of a Grand-Design Spiral to Understand the Physics of the Hot ISM, SNRs, and...

Visit	Proposal 12762, Visit 03										Tue Oct 04 01:21:18 GMT 2011	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SAME ORIENT AS 01											
	Comments: [S II] at position 3											
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(3)	Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=MOSAIC Number Of Points=3 Point Spacing=2.4 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=85.754 Angle Between Sides= Center Pattern=true		Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.119 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=33.606 Angle Between Sides= Center Pattern=false		(1)		
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(8)	M51-3	RA: 13 29 44.9958 (202.4374825d) Dec: +47 12 3.24 (47.20090d) Equinox: J2000				V=8.36		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		(8) M51-3	WFC3/UVIS, ACCUM, UVIS-FIX		F673N			Pattern 3, Exps 1-1 in Visit 03 (3)	900 Secs		
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										[==>(Pattern 3,2)]		

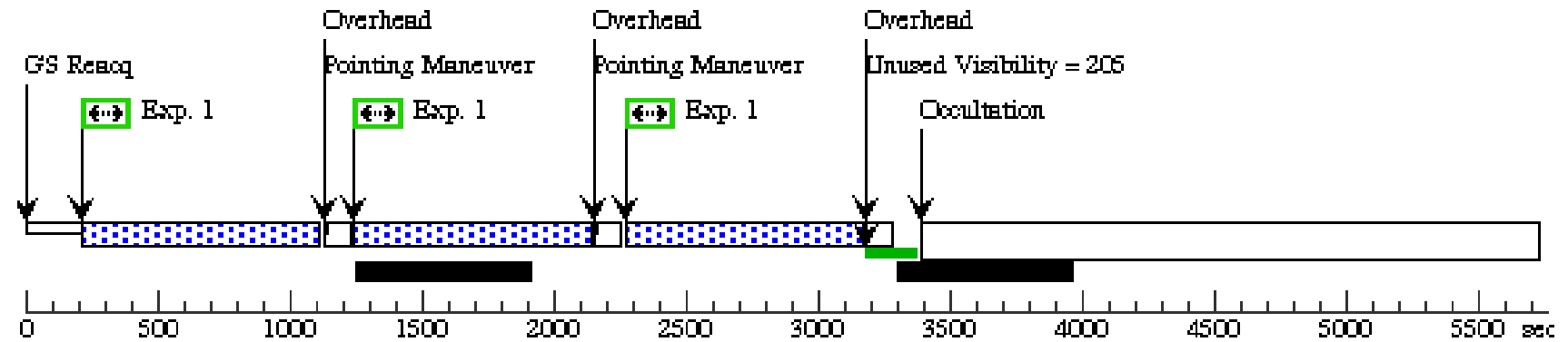
Orbit 1

Server Version: 20110811



Orbit 2

Server Version: 20110811

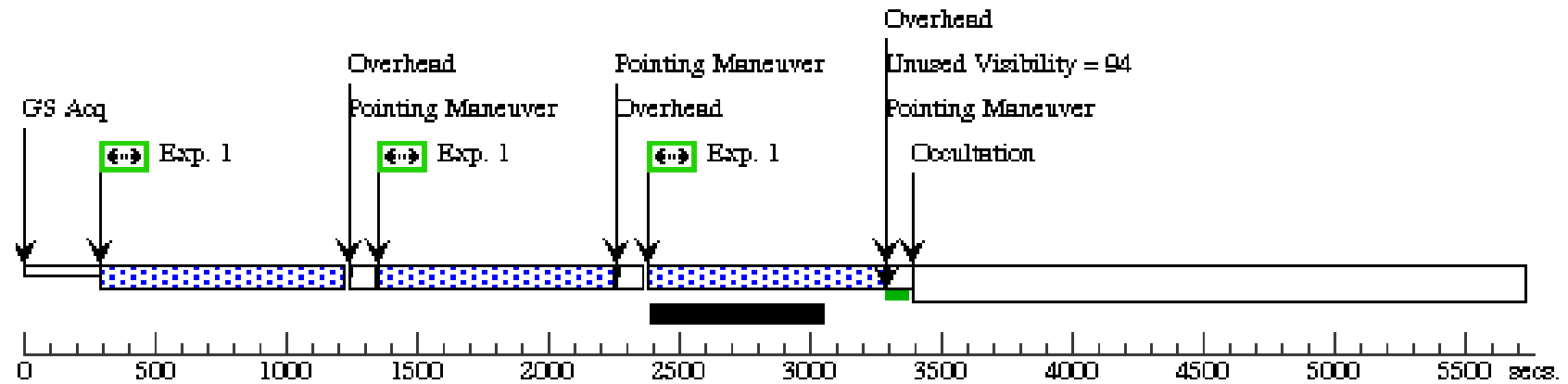


Proposal 12762 - Visit 04 - M51: Using the Kinematics of a Grand-Design Spiral to Understand the Physics of the Hot ISM, SNRs, and...

Visit	Proposal 12762, Visit 04										Tue Oct 04 01:21:18 GMT 2011	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SAME ORIENT AS 01											
Comments: [S II] at position 4												
Patterns	#	Primary Pattern				Secondary Pattern				Exposures		
	(3)	Pattern Type=WFC3-UVIS-MOS-DITH-LINE		Coordinate Frame=POS-TARG		Pattern Type=WFC3-UVIS-MOS-DITH-LINE		Coordinate Frame=POS-TARG		(1)		
		Purpose=MOSAIC		Pattern Orientation=85.754		Purpose=DITHER		Pattern Orientation=33.606				
		Number Of Points=3		Angle Between Sides=		Number Of Points=2		Angle Between Sides=				
		Point Spacing=2.4		Center Pattern=true		Point Spacing=0.119		Center Pattern=false				
		Line Spacing=				Line Spacing=						
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(9)	M51-4	RA: 13 29 52.4868 (202.4686950d)				V=8.36		Reference Frame: ICRS			
			Dec: +47 09 57.03 (47.16584d)									
			Equinox: J2000									
	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		(9) M51-4	WFC3/UVIS, ACCUM, UVIS-FIX		F673N			Pattern 3, Exps 1-1 in Visit 04 (3)	900 Secs		
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										[==>(Pattern 1,2)]		
										[==>(Pattern 2,1)]		
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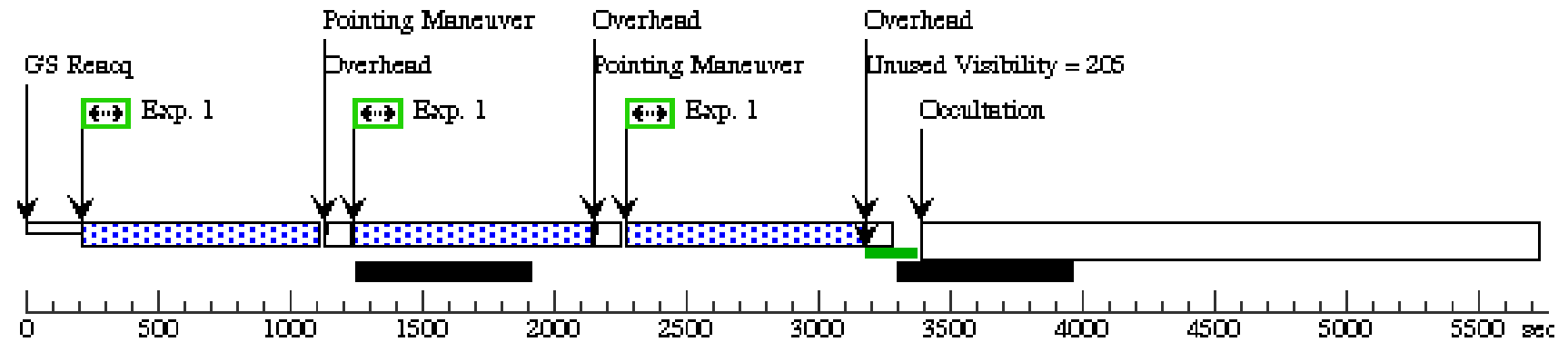
Orbit 1

Server Version: 20110811



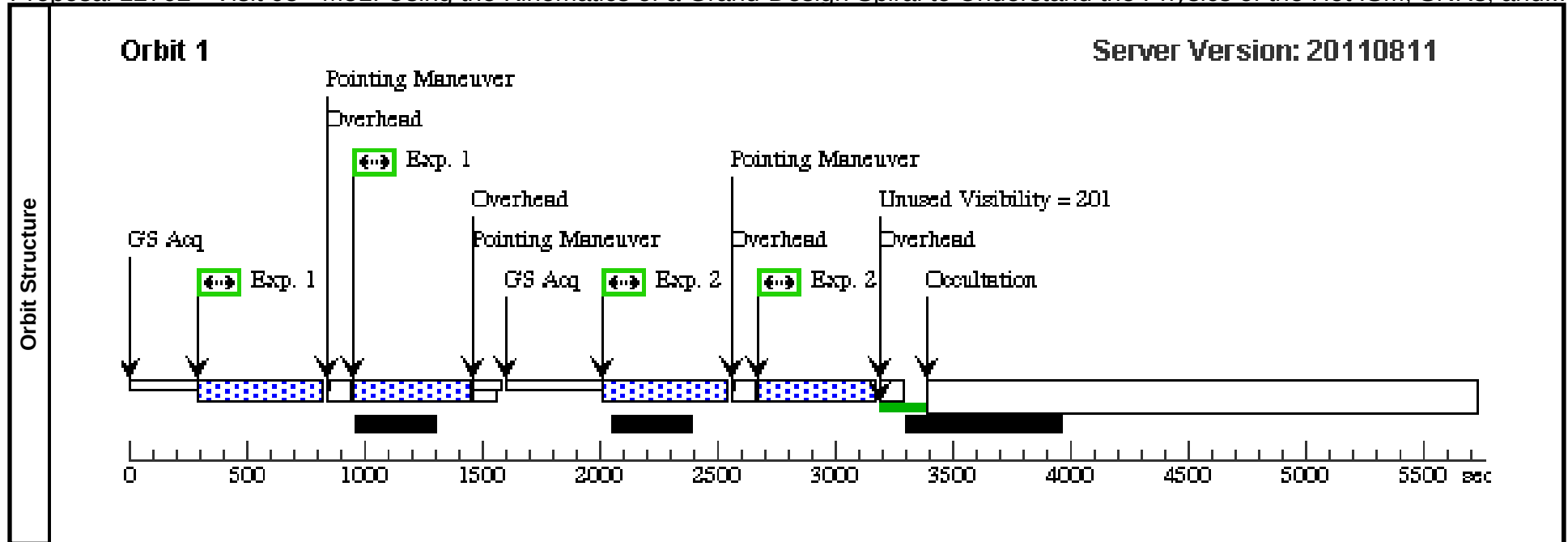
Orbit 2

Server Version: 20110811



Proposal 12762 - Visit 05 - M51: Using the Kinematics of a Grand-Design Spiral to Understand the Physics of the Hot ISM, SNRs, and...

Visit	Proposal 12762, Visit 05										Tue Oct 04 01:21:20 GMT 2011	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SAME ORIENT AS 01											
	Comments: Continuum observations at the first two positions in M51											
Patterns	#	Primary Pattern					Secondary Pattern				Exposures	
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Coordinate Frame=POS-TARG Pattern Orientation=46.84 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.145 Line Spacing=									(1), (2)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(6)	M51-1	RA: 13 29 56.9092 (202.4871217d) Dec: +47 13 28.82 (47.22467d) Equinox: J2000				V=8.36		Reference Frame: ICRS			
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.											
	(7)	M51-2	RA: 13 30 4.4002 (202.5183342d) Dec: +47 11 22.57 (47.18960d) Equinox: J2000				V=8.36		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		(6) M51-1	WFC3/UVIS, ACCUM, UVIS-FIX	F689M			Pattern 2, Exps 1-1 in Visit 05 (2)	500 Secs			
									[==>(Pattern 1)]		[1]	
									[==>(Pattern 2)]			
	2		(7) M51-2	WFC3/UVIS, ACCUM, UVIS-FIX	F689M			Pattern 2, Exps 2-2 in Visit 05 (2)	500 Secs			
									[==>(Pattern 1)]		[1]	
									[==>(Pattern 2)]			



Proposal 12762 - Visit 06 - M51: Using the Kinematics of a Grand-Design Spiral to Understand the Physics of the Hot ISM, SNRs, and...

Visit	Proposal 12762, Visit 06										Tue Oct 04 01:21:21 GMT 2011	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/UVIS											
	Special Requirements: SAME ORIENT AS 01											
	Comments: Continuum imaging at the second two positions in M51											
Patterns	#	Primary Pattern					Secondary Pattern				Exposures	
	(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Coordinate Frame=POS-TARG Pattern Orientation=46.84 Purpose=DITHER Angle Between Sides= Number Of Points=2 Center Pattern=false Point Spacing=0.145 Line Spacing=									(1), (2)	
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous			
	(8)	M51-3	RA: 13 29 44.9958 (202.4374825d) Dec: +47 12 3.24 (47.20090d) Equinox: J2000				V=8.36		Reference Frame: ICRS			
	Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.											
	(9)	M51-4	RA: 13 29 52.4868 (202.4686950d) Dec: +47 09 57.03 (47.16584d) Equinox: J2000				V=8.36		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		(8) M51-3	WFC3/UVIS, ACCUM, UVIS-FIX	F689M			Pattern 2, Exps 1-1 in Visit 06 (2)	500 Secs			
									[>=>(Pattern 1)]		[1]	
									[>=>(Pattern 2)]			
	2		(9) M51-4	WFC3/UVIS, ACCUM, UVIS-FIX	F689M			Pattern 2, Exps 2-2 in Visit 06 (2)	500 Secs			
									[>=>(Pattern 1)]		[1]	
									[>=>(Pattern 2)]			

