



## 11184 - Imaging the Shock Precursor in Tycho's SNR

Cycle: 16, 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) TYCHO-KNOT-G	WFPC2	3	18-Jan-2008 02:23:05.0	yes
02	(1) TYCHO-KNOT-G	WFPC2	3	18-Jan-2008 02:23:09.0	yes
03	(1) TYCHO-KNOT-G	WFPC2	3	18-Jan-2008 02:23:12.0	yes
04	(1) TYCHO-KNOT-G	WFPC2	1	18-Jan-2008 02:23:14.0	yes

10 Total Orbits Used

### ABSTRACT

Cosmic ray acceleration in supernova remnant shocks requires shock precursors where particles are trapped by plasma turbulence. The precursors also heat and compress the upstream gas, producing H alpha emission and affecting line profiles. We propose to image the brightest non-radiative shock in Tycho's SNR to measure the brightness and width of the precursor. These measurements will constrain 2 key parameters in cosmic ray acceleration models, and they will improve the accuracy of shock speed and electron-ion equilibration derived from H alpha profiles.

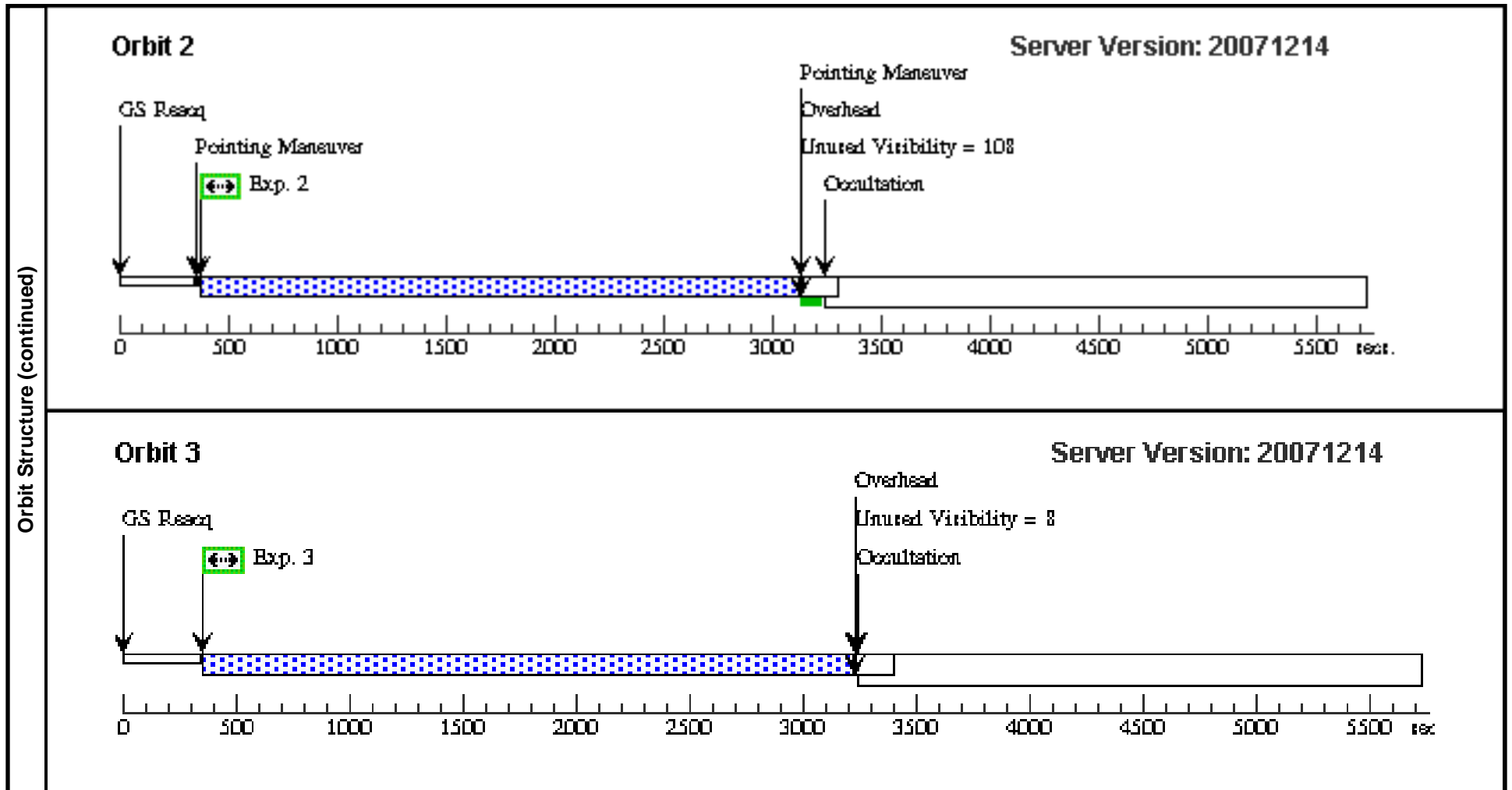
### **OBSERVING DESCRIPTION**

This is a 10 orbit observation at a single pointing with WFPC2 in H alpha. Each exposure is placed at a POS-TARG to give Max Mutchler's recommended dither pattern (number 15). No CR-SPLITS are used because there are 10 separate exposures.

Proposal 11184 - Visit 01 - Imaging the Shock Precursor in Tycho's SNR

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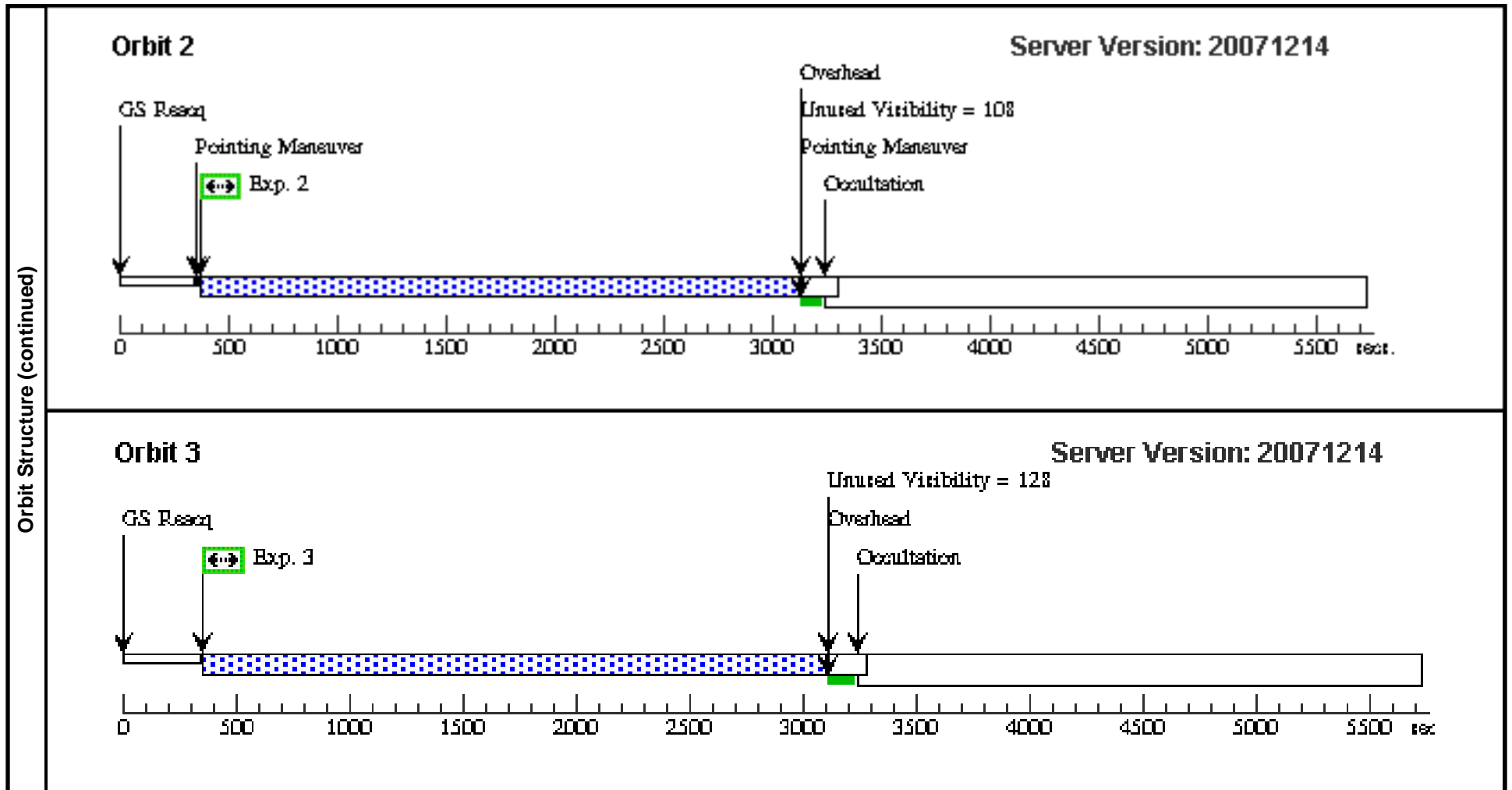
<b>Visit</b>	<b>Proposal 11184, Visit 01</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFPC2 Special Requirements: (none) <i>Comments: Three 1-orbit exposures with 3 POS-TARG values to match pattern 15 box</i>										
	<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
(1)		TYCHO-KNOT-G	RA: 00 25 52.9000 (6.4704167d) Dec: +64 09 22.00 (64.15611d) Equinox: J2000	Proper Motion RA: 0.03s/yr Proper Motion Dec: 0"/yr Epoch of Position: 2004.0	V=(?) 4.5e-16 ergs/(cm <sup>2</sup> s arcsec <sup>2</sup> )	Reference Frame: ICRS					
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1	Exposure 1	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO			2700.0 Secs [=>]	[1]	
	2	Exposure 2	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO	POS TARG 0.498,0.249		2828.0 Secs [=>2600.0 Secs]	[2]	
	3	Exposure 3	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO	POS TARG 0.747,0.747		2700.0 Secs [=>2700.0 Secs]	[3]	
<b>Orbit Structure</b>	<p><b>Orbit 1</b> <span style="float: right;">Server Version: 20071214</span></p> <p>Timeline labels: GS Acq, Exp. 1, Occultation, Unused Visibility = 8</p> <p>X-axis: 0, 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 5500 sec.</p>										



Proposal 11184 - Visit 02 - Imaging the Shock Precursor in Tycho's SNR

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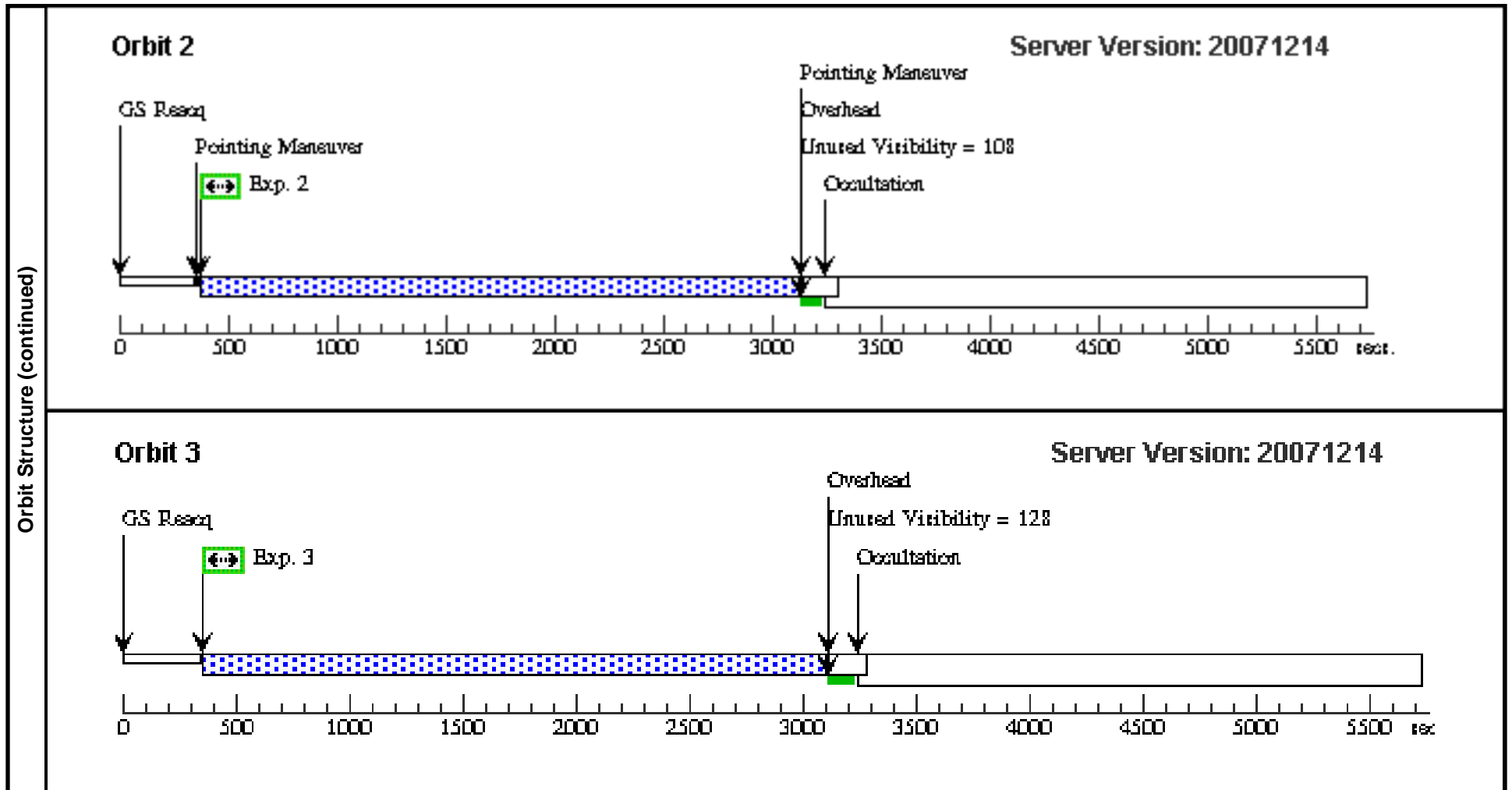
<b>Visit</b>	<b>Proposal 11184, Visit 02</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFPC2 Special Requirements: (none) <i>Comments: This is the second set of exposures in H alpha. It begins with the fourth POS-TARG of the box pattern.</i>										
	<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>	<b>Targ. Coord. Corrections</b>	<b>Fluxes</b>	<b>Miscellaneous</b>				
(1)		TYCHO-KNOT-G	RA: 00 25 52.9000 (6.4704167d) Dec: +64 09 22.00 (64.15611d) Equinox: J2000	Proper Motion RA: 0.03s/yr Proper Motion Dec: 0"/yr Epoch of Position: 2004.0	V=(?) 4.5e-16 ergs/(cm2 s arcsec2)	Reference Frame: ICRS					
<b>Exposures</b>	<b>#</b>	<b>Label</b>	<b>Target</b>	<b>Config,Mode,Aperture</b>	<b>Spectral Els.</b>	<b>Opt. Params.</b>	<b>Special Reqs.</b>	<b>Groups</b>	<b>Exp. Time/[Actual Dur.]</b>	<b>Orbit</b>	
	1	Exposure 4	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO	POS TARG 0.249,0.498		2700.0 Secs [==>]	[1]	
	2	Exposure 5	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO			2700.0 Secs [==>2600.0 Secs]	[2]	
	3	Exposure 6	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO	POS TARG 0.498,0.249		2700.0 Secs [==>2600.0 Secs]	[3]	
<b>Orbit Structure</b>	<p><b>Orbit 1</b> <span style="float: right;"><b>Server Version: 20071214</b></span></p> <p>Unused Visibility = 8</p> <p>Overhead</p> <p>Occultation</p> <p>GS Acq</p> <p>Exp. 1</p> <p>0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 sec.</p>										



Proposal 11184 - Visit 03 - Imaging the Shock Precursor in Tycho's SNR

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<b>Visit</b>	<b>Proposal 11184, Visit 03</b> <b>Diagnostic Status: No Diagnostics</b> Scientific Instruments: WFPC2 Special Requirements: (none) <i>Comments: This is the third set of 3 orbits imaging Tycho's knot g in H alpha</i>										
	<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
(1)		TYCHO-KNOT-G	RA: 00 25 52.9000 (6.4704167d) Dec: +64 09 22.00 (64.15611d) Equinox: J2000	Proper Motion RA: 0.03s/yr Proper Motion Dec: 0"/yr Epoch of Position: 2004.0	V=(?) 4.5e-16 ergs/(cm <sup>2</sup> s arcsec <sup>2</sup> )	Reference Frame: ICRS					
<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit	
	1	Exposure 7	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO	POS TARG 0.747,0.747		2700.0 Secs [==>]	[1]	
	2	Exposure 8	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO	POS TARG 0.249,0.498		2700.0 Secs [==>2600.0 Secs]	[2]	
	3	Exposure 9	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO			2700.0 Secs [==>2600.0 Secs]	[3]	
<b>Orbit Structure</b>	<p><b>Orbit 1</b> <span style="float: right;"><b>Server Version: 20071214</b></span></p> <p>GS Acq    Exp. 1    Occultation    Overhead    Unused Visibility = 8</p> <p>0    500    1000    1500    2000    2500    3000    3500    4000    4500    5000    5500 sec.</p>										



<b>Visit</b>	<b>Proposal 11184, Visit 04</b>				
	<b>Diagnostic Status: No Diagnostics</b>				
	Scientific Instruments: WFPC2				
	Special Requirements: (none)				

<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	TYCHO-KNOT-G	RA: 00 25 52.9000 (6.4704167d) Dec: +64 09 22.00 (64.15611d) Equinox: J2000	Proper Motion RA: 0.03s/yr Proper Motion Dec: 0"/yr Epoch of Position: 2004.0	V=(?) 4.5e-16 ergs/(cm <sup>2</sup> s arcsec <sup>2</sup> )	Reference Frame: ICRS

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	Exposure 10	(1) TYCHO-KNOT-G	WFPC2, IMAGE, WF3	F656N	CR-SPLIT=NO	POS TARG 0.498,0.249		2700.0 Secs [==>]	[1]

