11232 - Determination of Angular Expansion Velocities in the Ring Nebula

Cycle: 16, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
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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) NGC6720	WFPC2	1	25-Apr-2008 22:07:43.0	yes
02	(1) NGC6720	WFPC2	1	25-Apr-2008 22:07:47.0	yes
03	(1) NGC6720	WFPC2	1	25-Apr-2008 22:07:49.0	yes

3 Total Orbits Used

ABSTRACT

The Ring Nebula (NGC 6720) represents an important stage in the evolution of planetary nebulae, being large enough that it has entered the post fast-wind stage yet has not reached the late ballistic phase of objects like the Helix Nebula. Understanding this nebula well presents the opportunity to determine how nebulae transition from their creation phase into the form they have as their material enters the interstellar medium.

A recent study based on ground-based spectroscopy has derived a new and accurate model for the Ring Nebula. A well defined characteristic of this

model is that it predicts a tangential velocity of 20 km/s whereas the application of its quite uncertain trigonometric parallax distance of 700 (+450/-200) pc with the angular expansion velocity determined from HST observations with a 2 year time base indicates a tangential velocity of 69 (+45/-20) km/s. This disagreement indicates that either the distance is even more uncertain than thought or that the earlier angular velocity is incorrect.

We propose to make a new set of observations of the Ring Nebula in the diagnostic emission line filters F469N (HeII), F502N ([OIII]), and F658N ([NII]) that will produce much more accurate angular velocities than the previous study by having a time base of 8.8 years and imaging the nebula entirely within a single CCD of the WFPC2. The primary result from this study will be an accurate distance to this important nebula and from this to be able to use this object to refine our picture of how planetary nebulae evolve during middle-age.

OBSERVING DESCRIPTION

We will make WFPC2 observations of the Ring Nebula (NGC 6720) in the F502N and F658N filters for the purpose of determining the tangential expansion velocities within this nebula.

Visit

Proposal 11232, Visit 01, completed Sat Apr 26 02:07:52 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: ORIENT 258.0D TO 260.0 D

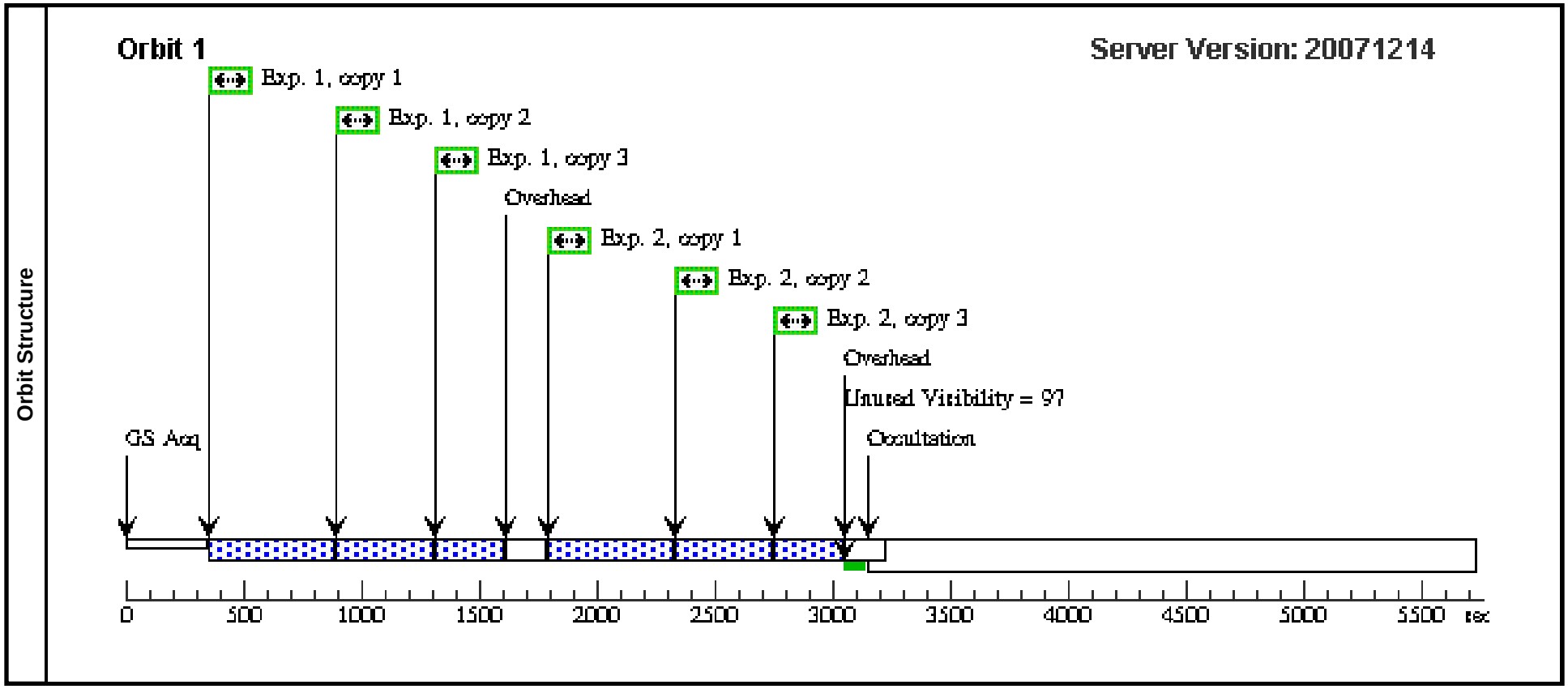
Comments: This visit uses the same target and orientation as the PI's Visit 1 of program 11231 and optimally would be executed immediately after Visit 1 of program 11231. If that is done, then the exposure times of this program (11232) should be increased to take advantage of not having to do a new guidestar acquisition.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC6720	RA: 18 53 35.5400 (283.3980833d) Dec: +33 01 48.00 (33.03000d) Equinox: J2000		V=15+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) NGC6720	WFPC2, IMAGE, WF3-FIX	F502N	CR-SPLIT=NO			260.0 Secs X 3	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]*	***[1]***
2		(1) NGC6720	WFPC2, IMAGE, WF3-FIX	F658N	CR-SPLIT=NO			260.0 Secs X 3	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20071214
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Overhead
Exp. 2, copy 1
Exp. 2, copy 2
Exp. 2, copy 3
Overhead
Unused Visibility = 97
GS Acq
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11232, Visit 02 Sat Apr 26 02:07:53 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: ORIENT 258.0D TO 260.0 D

Comments: This visit uses the same target and orientation as the PI's Visit 1 of program 11231 and optimally would be executed immediately after Visit 1 of program 11231. If that is done, then the exposure times of this program (11232) should be increased to take advantage of not having to do a new guidestar acquisition.

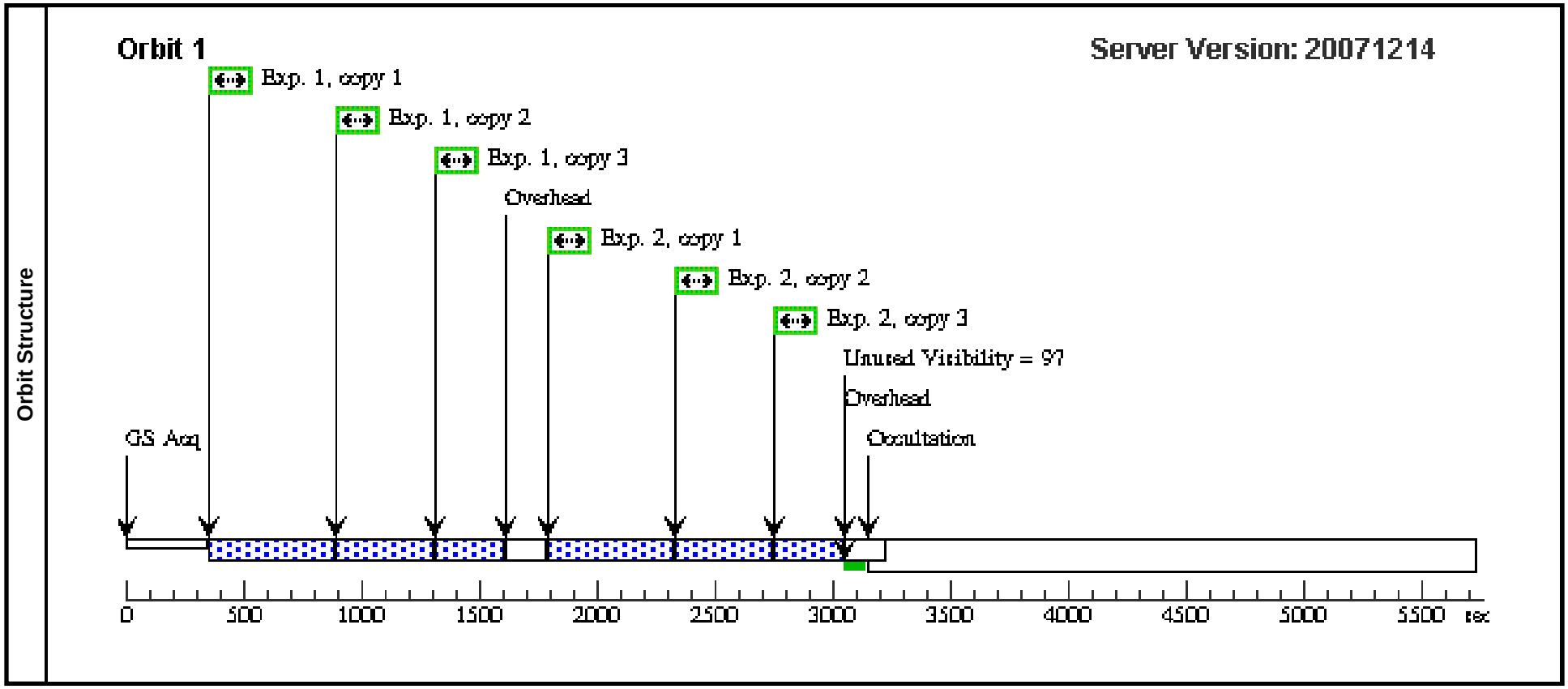
Repeat of visit 1

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC6720	RA: 18 53 35.5400 (283.3980833d) Dec: +33 01 48.00 (33.03000d) Equinox: J2000		V=15+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) NGC6720	WFPC2, IMAGE, WF3-FIX	F502N	CR-SPLIT=NO			260.0 Secs X 3	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]*	***[1]***
2		(1) NGC6720	WFPC2, IMAGE, WF3-FIX	F658N	CR-SPLIT=NO			260.0 Secs X 3	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20071214
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Overhead
Exp. 2, copy 1
Exp. 2, copy 2
Exp. 2, copy 3
Unused Vitibility = 97
Overhead
Occultation
GS Acq
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 11232, Visit 03 Sat Apr 26 02:07:53 GMT 2008

Diagnostic Status: No Diagnostics

Scientific Instruments: WFPC2

Special Requirements: (none)

Comments: This visit uses the same target and orientation as the PI's Visit 1 of program 11231 and optimally would be executed immediately after Visit 1 of program 11231. If that is done, then the exposure times of this program (11232) should be increased to take advantage of not having to do a new guidestar acquisition.

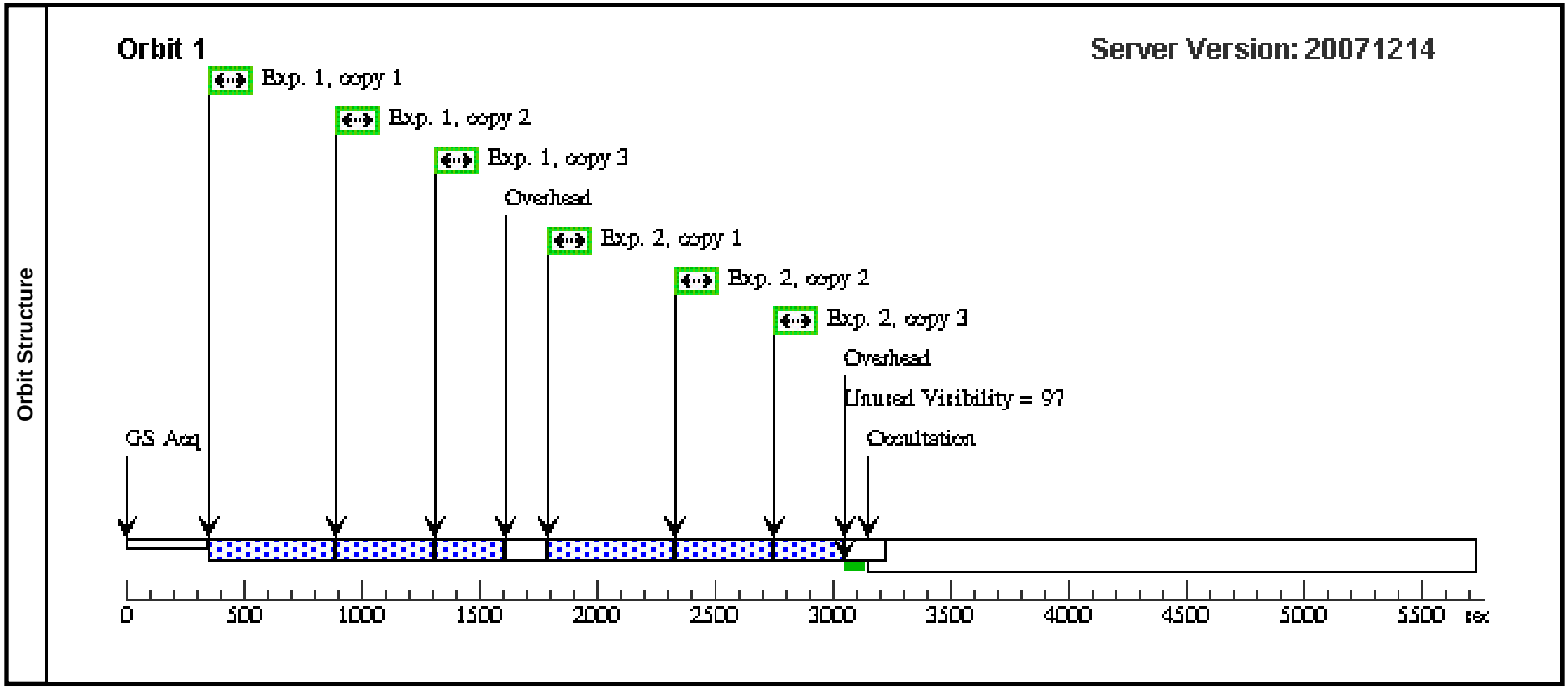
Repeat of visit 1 - no orient

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC6720	RA: 18 53 35.5400 (283.3980833d) Dec: +33 01 48.00 (33.03000d) Equinox: J2000		V=15+/-1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) NGC6720	WFPC2, IMAGE, WF3-FIX	F502N	CR-SPLIT=NO			260.0 Secs X 3	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]*	***[1]***
2		(1) NGC6720	WFPC2, IMAGE, WF3-FIX	F658N	CR-SPLIT=NO			260.0 Secs X 3	
								[==>(Copy 1)] *[==>(Copy 2)]* *[==>(Copy 3)]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20071214
Exp. 1, copy 1
Exp. 1, copy 2
Exp. 1, copy 3
Overhead
Exp. 2, copy 1
Exp. 2, copy 2
Exp. 2, copy 3
Overhead
Unused Visibility = 97
GS Acq
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec