13337 - Resolving the Cluster-Lensed Sextuple Quasar SDSSJ2222+2745

Cycle: 21, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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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) SDSSJ2222+2745	ACS/WFC	2	24-Jun-2013 22:23:38.0	yes
02	(1) SDSSJ2222+2745	ACS/WFC	2	24-Jun-2013 22:23:48.0	yes
03	(1) SDSSJ2222+2745	ACS/WFC	2	24-Jun-2013 22:23:57.0	yes
04	(1) SDSSJ2222+2745	WFC3/IR	1	24-Jun-2013 22:24:06.0	yes

7 Total Orbits Used

ABSTRACT

We propose deep multiband imaging of the newly discovered large separation lensed quasar, SDSSJ2222+2745. This system is only the third known of its kind, and uniquely features the largest observed image multiplicity (at least 6), three known images close to the cluster core, and the highest redshift quasar (z=2.8). The cluster also lenses a galaxy at z=2.3 into a giant arc. With the proposed imaging we will precisely measure the three demagnified images of the quasar close to the center of the cluster, detect the 7th image predicted by the lens model, identify additional lensed

galaxies, resolve the star formation in the giant arc and the quasar host, measure an upper limit for the mass of the black hole at the centers of the cluster galaxies, and compute a precise and accurate lens model that will form the foundation of many future studies.

OBSERVING DESCRIPTION

Total of 5 bands of imaging in 7 orbits - 3 optical filters with ACS (2 orbits each) and two WFC3IR filters in a single orbit.

ACS observations programmed as 3 2-orbit visits, with each visit a single filter. A total of 6 frames taken per filter, three per orbit with a gap-crossing dither step between each frame. Target aperture position is WFC1 on the first orbit, and WFC2 in the second orbit, with a slight Y POSTARG. This gives full depth in the center of the field, but maximal field area coverage otherwise. Three frames per orbit gives decent PSF sampling and CR rejection even in regions not only hit in a single orbit. I have slightly adjusted the pattern point spacing from 3.011 arcsec (giving nominally a 61.5 pixel step) to 3.00284 arcsec (giving a nominally 61.33 pixel step and hence yielding a 1/3 pixel grid in three images, of course absent field distortion...). We have restricted the roll angles for the first visit of the ACS images to avoid a brightish (12 mag) star which would otherwise be in the image or at the edge, potentially creating diffratictive/scattered light issues or saturated charge bleeding. Visit 2 and 3 are to be executed at the same angle as visit 1.

WFC3-IR images are as per program GO13003. A total of 8 images - 4 per filter with small box dithers for PSF reconstruction. Straight forward.

Visit

Proposal 13337, Visit 01 Tue Jun 25 02:24:14 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: ORIENT 55D TO 120 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.00284 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1), (2)

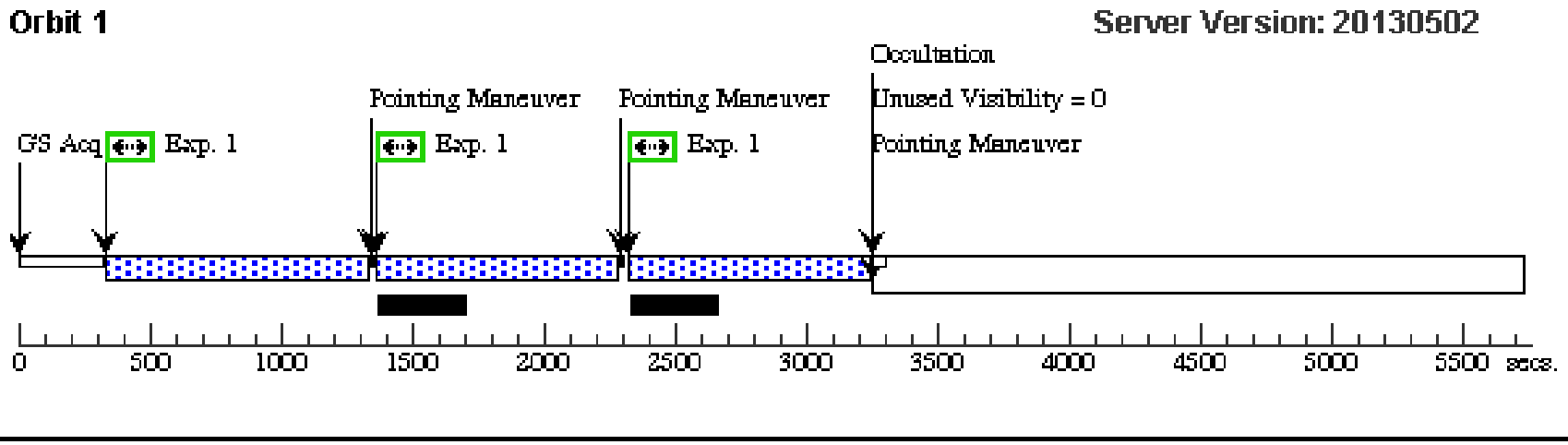
Fixed Targets

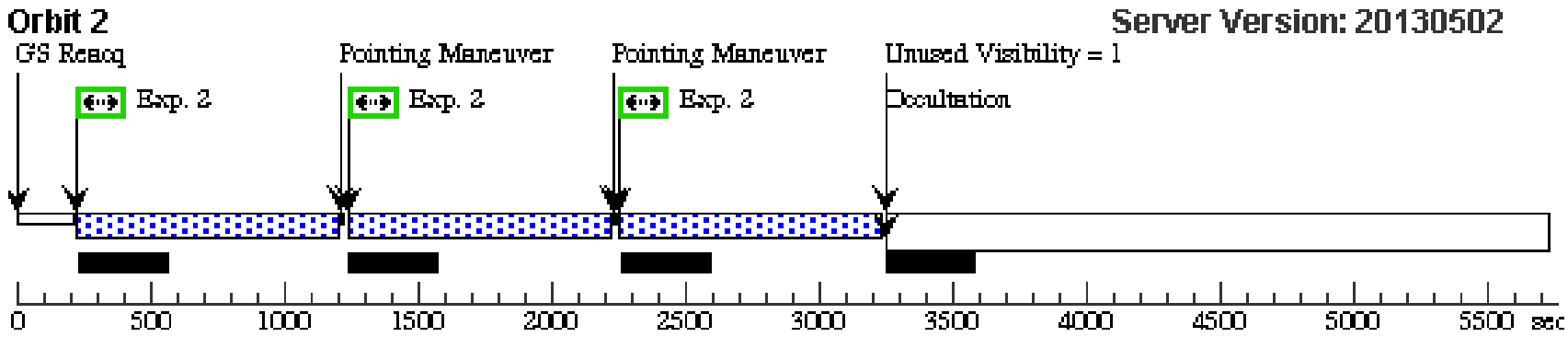
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ2222+2745	RA: 22 22 8.5700 (335.5357083d) Dec: +27 45 34.00 (27.75944d) Equinox: J2000		V=19.8+/-0.05 brightest cluster galaxy: sdss i=18.05+/-0.02; QSO: sdss i=20.87 +/-0.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SDSSJ2222+2745	ACS/WFC, ACCUM, WFC1	F435W		POS TARG null,-4	Pattern 1, Exps 1-1 in Visit 01 (1)	700 Secs (2376 Secs)	
								[==>792.0 Secs (Pattern 1)]	***[1]***
								[==>792.0 Secs (Pattern 2)]	
								[==>792.0 Secs (Pattern 3)]	
2		(1) SDSSJ2222+2745	ACS/WFC, ACCUM, WFC2	F435W		POS TARG null,4	Pattern 1, Exps 2-2 in Visit 01 (1)	700 Secs (2568 Secs)	
								[==>856.0 Secs (Pattern 1)]	***[2]***
								[==>856.0 Secs (Pattern 2)]	
								[==>856.0 Secs (Pattern 3)]	

Orbit Structure





Visit

Proposal 13337, Visit 02 Tue Jun 25 02:24:17 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: SAME ORIENT AS 01

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.00284 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1), (2)

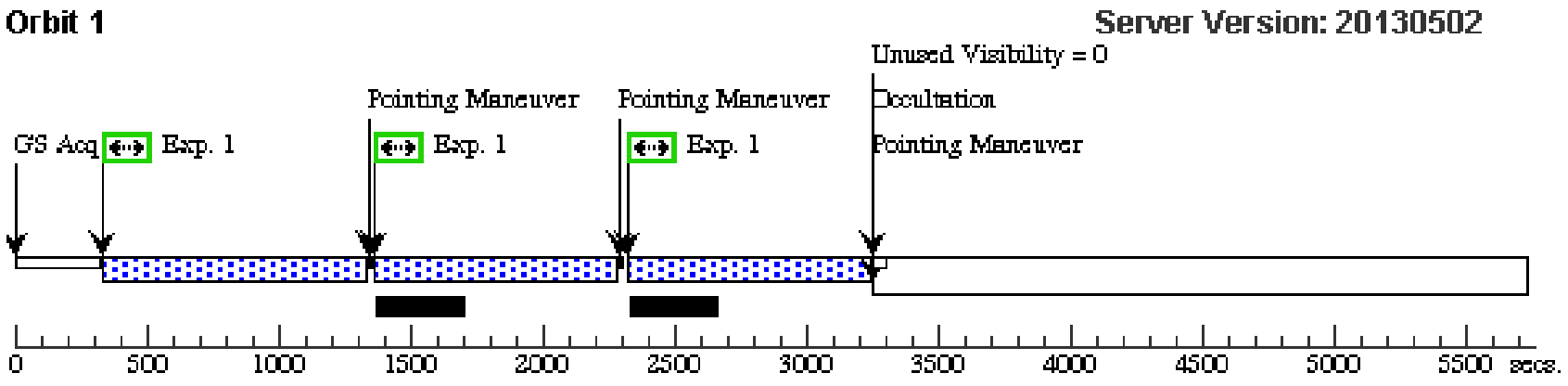
Fixed Targets

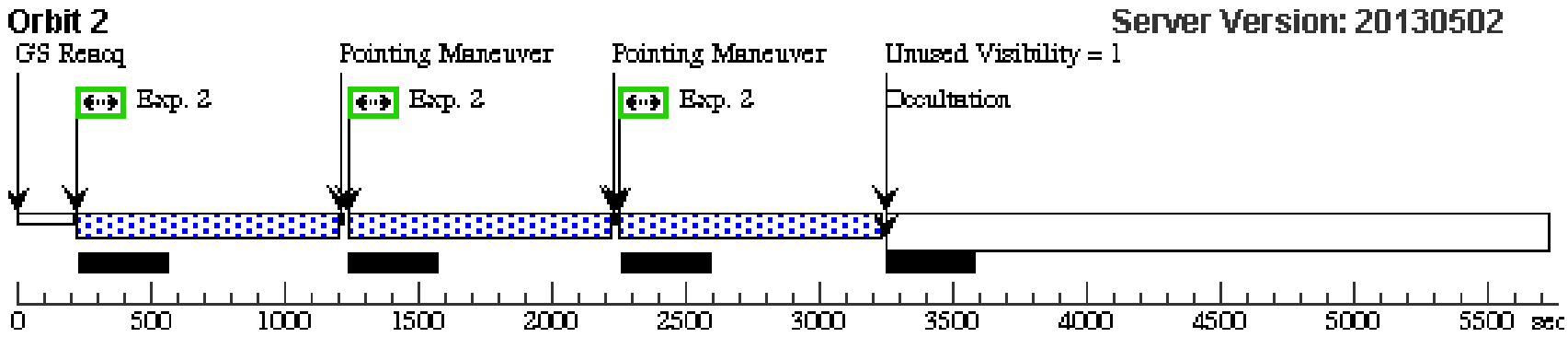
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ2222+2745	RA: 22 22 8.5700 (335.5357083d) Dec: +27 45 34.00 (27.75944d) Equinox: J2000		V=19.8+/-0.05 brightest cluster galaxy: sdss i=18.05+/-0.02; QSO: sdss i=20.87 +/-0.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SDSSJ2222+2745	ACS/WFC, ACCUM, WFC1	F606W		POS TARG null,-4	Pattern 1, Exps 1-1 in Visit 02 (1)	700 Secs (2376 Secs)	
								[==>792.0 Secs (Pattern 1)]	***[1]***
								[==>792.0 Secs (Pattern 2)]	
								[==>792.0 Secs (Pattern 3)]	
2		(1) SDSSJ2222+2745	ACS/WFC, ACCUM, WFC2	F606W		POS TARG null,4	Pattern 1, Exps 2-2 in Visit 02 (1)	700 Secs (2568 Secs)	
								[==>856.0 Secs (Pattern 1)]	***[2]***
								[==>856.0 Secs (Pattern 2)]	
								[==>856.0 Secs (Pattern 3)]	

Orbit Structure





Visit

Proposal 13337, Visit 03 Tue Jun 25 02:24:19 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: SAME ORIENT AS 01

Patterns

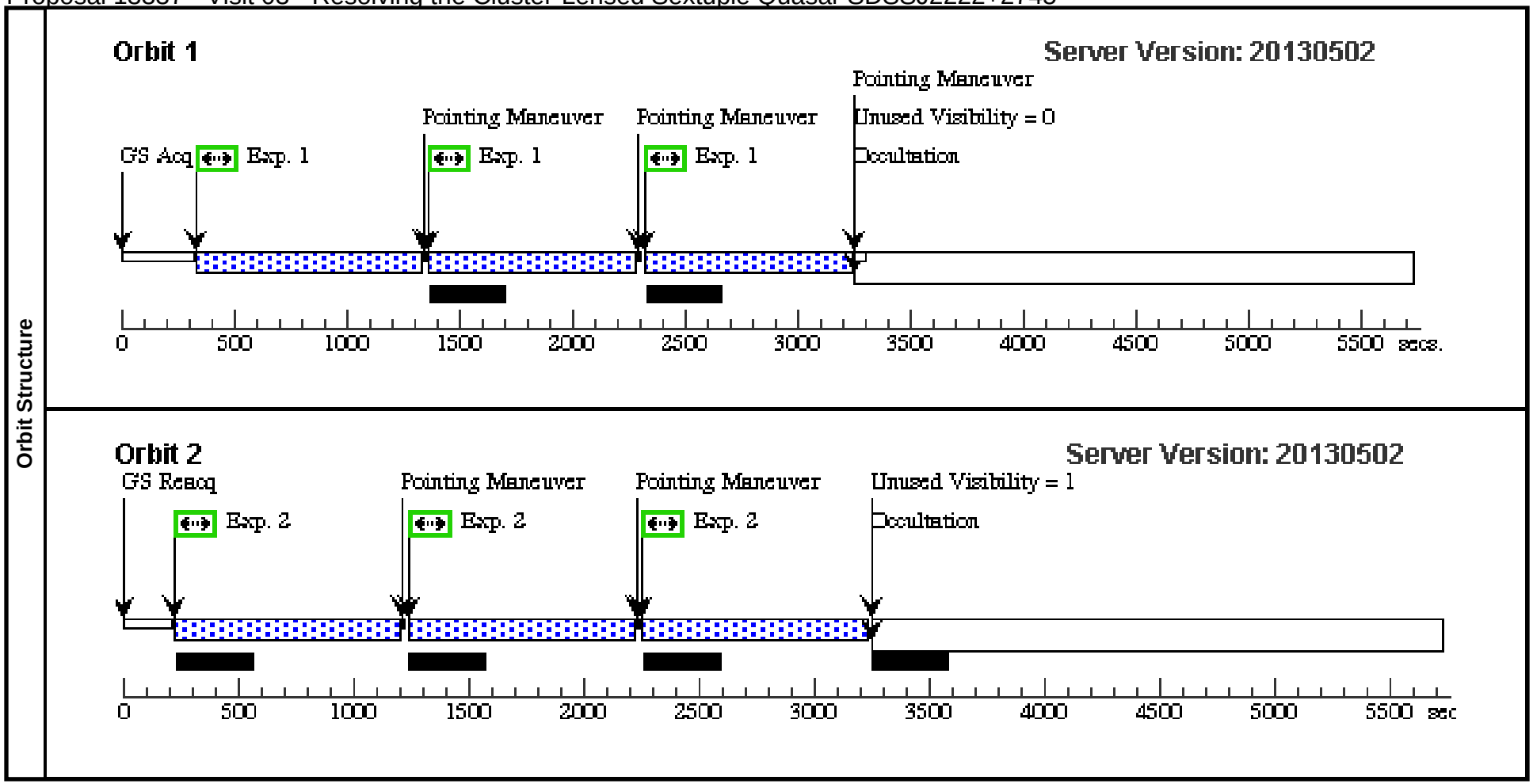
#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=3 Point Spacing=3.00284 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.28 Angle Between Sides= Center Pattern=false		(1), (2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ2222+2745	RA: 22 22 8.5700 (335.5357083d) Dec: +27 45 34.00 (27.75944d) Equinox: J2000		V=19.8+/-0.05 brightest cluster galaxy: sdss i=18.05+/-0.02; QSO: sdss i=20.87 +/-0.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SDSSJ2222+2745	ACS/WFC, ACCUM, WFC1	F814W		POS TARG null,-4	Pattern 1, Exps 1-1 in Visit 03 (1)	700 Secs (2376 Secs)	
								[==>792.0 Secs (Pattern 1)]	***[1]***
								[==>792.0 Secs (Pattern 2)]	
								[==>792.0 Secs (Pattern 3)]	
2		(1) SDSSJ2222+2745	ACS/WFC, ACCUM, WFC2	F814W		POS TARG null,4	Pattern 1, Exps 2-2 in Visit 03 (1)	700 Secs (2568 Secs)	
								[==>856.0 Secs (Pattern 1)]	***[2]***
								[==>856.0 Secs (Pattern 2)]	
								[==>856.0 Secs (Pattern 3)]	


Orbit Structure
Orbit 1
Server Version: 20130502
Pointing Maneuver
Pointing Maneuver
Pointing Maneuver
Unused Visibility = 0
GS Acq
Exp. 1
Exp. 1
Exp. 1
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
secs.
Orbit 2
Server Version: 20130502
GS Reacq
Pointing Maneuver
Pointing Maneuver
Unused Visibility = 1
Exp. 2
Exp. 2
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 13337, Visit 04 Tue Jun 25 02:24:21 GMT 2013

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(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		(1-2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	SDSSJ2222+2745	RA: 22 22 8.5700 (335.5357083d) Dec: +27 45 34.00 (27.75944d) Equinox: J2000		V=19.8+/-0.05 brightest cluster galaxy: sdss i=18.05+/-0.02; QSO: sdss i=20.87+/-0.07	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) SDSSJ2222+2745	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=14; SAMP-SEQ=SPARS25	POS TARG null,-4	Pattern 2, Exps 1-2 in Visit 04 (2)	327.938986 Secs (1311.756 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	 ***[1]***
2		(1) SDSSJ2222+2745	WFC3/IR, MULTIACCUM, IR-FIX	F110W	NSAMP=13; SAMP-SEQ=SPARS25	POS TARG null,-4	Pattern 2, Exps 1-2 in Visit 04 (2)	302.938471 Secs (1211.754 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	 ***[1]***

Orbit Structure