14726 - Ruprecht 106: Too small to succeed?

Cycle: 24, 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) RUPRECHT-106	WFC3/UVIS	1	02-Aug-2017 18:01:51.0	yes
02	(1) RUPRECHT-106	WFC3/UVIS	1	02-Aug-2017 18:01:52.0	yes
03	(1) RUPRECHT-106	WFC3/UVIS	1	02-Aug-2017 18:01:53.0	yes
04	(1) RUPRECHT-106	WFC3/UVIS	1	02-Aug-2017 18:01:53.0	yes
05	(1) RUPRECHT-106	WFC3/UVIS	1	02-Aug-2017 18:01:54.0	yes

5 Total Orbits Used

ABSTRACT

Photometric studies with HST have completely changed our understanding of globular clusters (GCs), to the point where features that were once considered anomalous (light-element abundance variations, multiple populations) are now part of the definition of the term 'globular cluster'.

With this proposal, we seek to establish some minimum requirements for the formation of multiple stellar populations in GCs. We will apply the unique UV and blue imaging capabilities of the Wide Field Camera 3 UVIS channel to search for multiple stellar sequences, or lack thereof, in the CMD of the peculiar GC Ruprecht 106. Ruprecht 106 is exceptional among the Galactic GC population in its primordial chemical composition, low mass, and (likely) extra-Galactic origin. The limited abundance information available from spectroscopy indicates a low oxygen abudance (average [O/Fe] ~ 0 at [Fe/H] ~ -1.5) with no significant star-to-star scatter in the light elements.

Light element abundance variations are one of the fundamental signatures of multiple stellar populations in GCs; the other is the presence of multiple stellar sequences in the CMD. The first line of inquiry, spectroscopy, suggests Ruprecht 106 may be a true simple stellar population. This proposal addresses the second line of inquiry, the photometric signature, which has never before been attempted. The unrivaled resolution and sensitivity of the Hubble Space Telescope will allow us to discover whether the CMD of Ruprecht 106 reveals multiple and/or broadened stellar sequences and, thus, hosts multiple stellar populations -- or not.

OBSERVING DESCRIPTION

The observing program is designed to image Ruprecht 106 in two WFC3/UVIS filters, F336W and F438W. These data will be combined with existing ACS/WFC data in F814W to make the "CUBI" index (F336W-F438W)-(F438W-F814W), which is sensitive to light-element abudance variations.

There are 4 1-orbit visits, each separated by approximately 90-degree change in the orientation angle. This allows for maximum sampling of the PSF.

Visit

Proposal 14726, Visit 01, failed Wed Aug 02 22:01:55 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: (none)

Diagnostics

(Visit 01) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

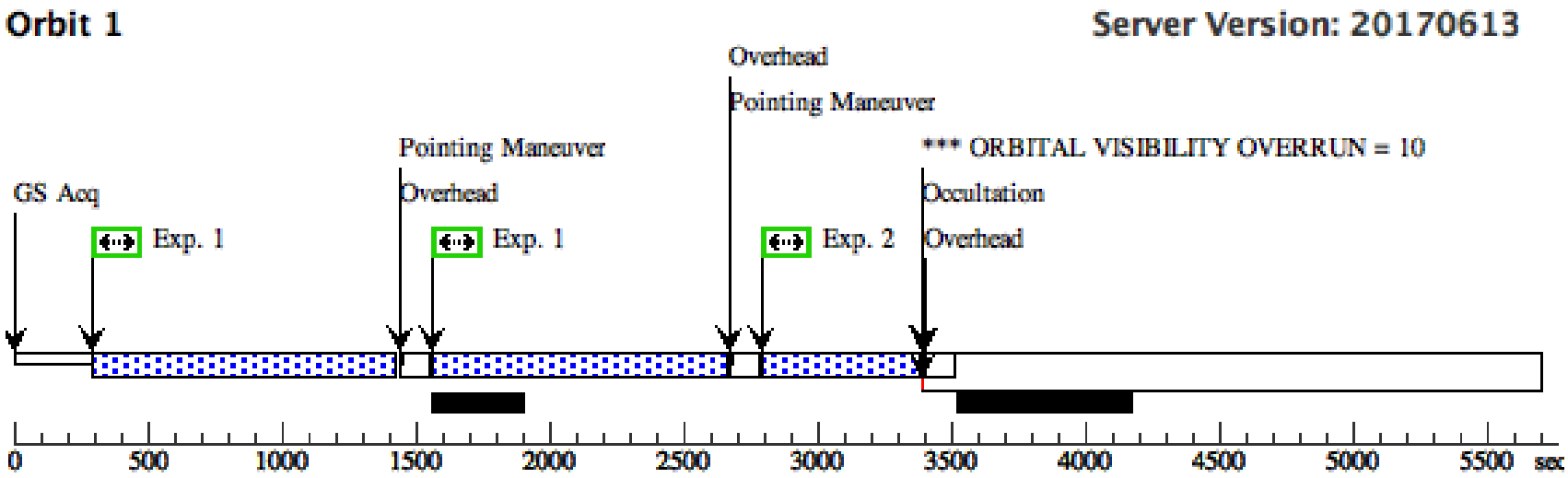
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	RUPRECHT-106	RA: 12 38 40.2000 (189.6675000d) Dec: -51 09 1.00 (-51.15028d) Equinox: J2000		V=10.9	Reference Frame: SIMBAD

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 (Total)/[Actual Dur.]	Orbit
1		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F336W	FLASH=9		Pattern 2, Exps 1-1 in Visit 01 (2)	1100 Secs (2200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F438W	FLASH=7			571 Secs (571 Secs) *[==>]*	***[1]***

Orbit Structure



Visit

Proposal 14726, Visit 02, completed Wed Aug 02 22:01:55 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT -90D TO -85D FROM 01

Diagnostics

(Visit 02) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

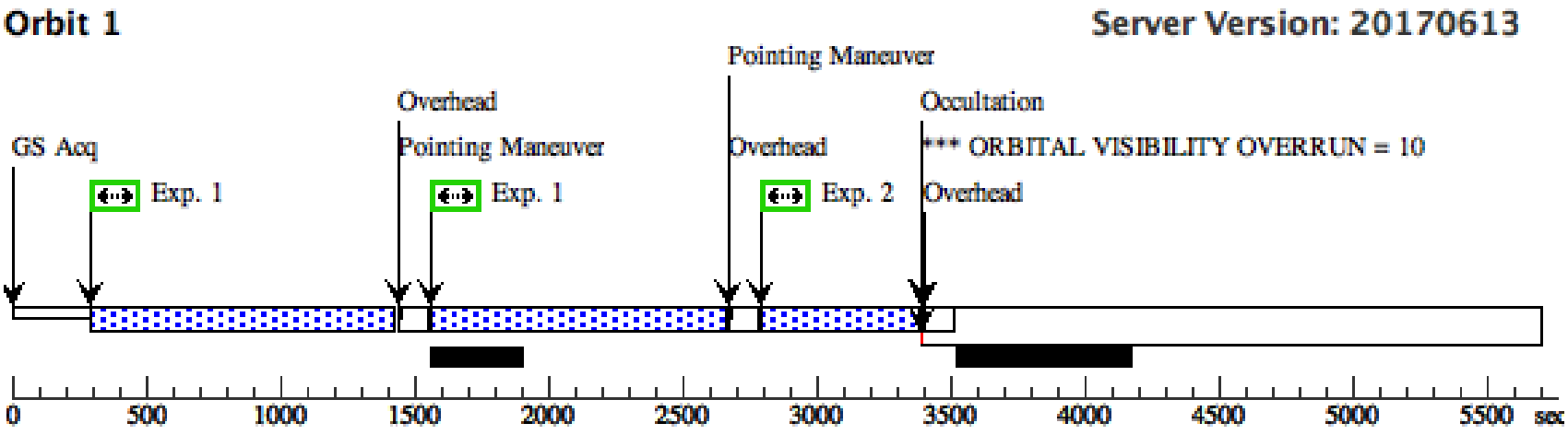
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	RUPRECHT-106	RA: 12 38 40.2000 (189.6675000d) Dec: -51 09 1.00 (-51.15028d) Equinox: J2000		V=10.9	Reference Frame: SIMBAD

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 (Total)/[Actual Dur.]	Orbit
1		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F336W	FLASH=9		Pattern 2, Exps 1-1 in Visit 02 (2)	1100 Secs (2200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F438W	FLASH=7			571 Secs (571 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 14726, Visit 03, completed Wed Aug 02 22:01:55 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 175D TO 180D FROM 02

Diagnostics

(Visit 03) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

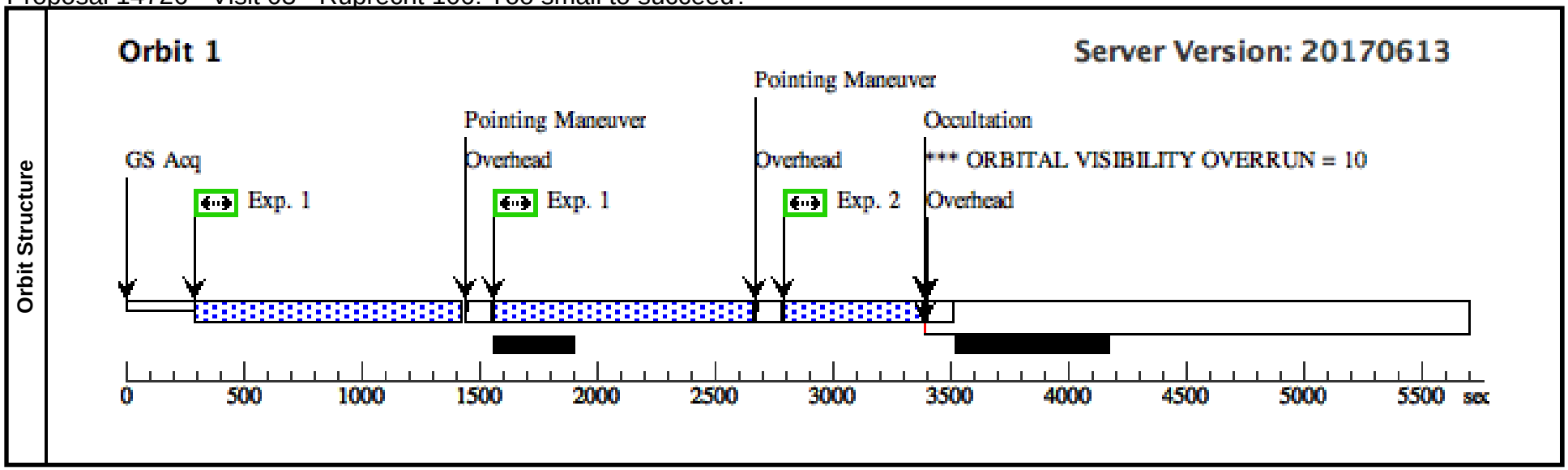
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	RUPRECHT-106	RA: 12 38 40.2000 (189.6675000d) Dec: -51 09 1.00 (-51.15028d) Equinox: J2000		V=10.9	Reference Frame: SIMBAD

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 (Total)/[Actual Dur.]	Orbit
1		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F336W	FLASH=9		Pattern 2, Exps 1-1 in Visit 03 (2)	1100 Secs (2200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	*[1]*
2		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F438W	FLASH=7			571 Secs (571 Secs) *[==>]*	*[1]*


Orbit Structure
Orbit 1
Server Version: 20170613
Pointing Maneuver
Pointing Maneuver
Occultation
GS Acq
Overhead
Overhead
*** ORBITAL VISIBILITY OVERRUN = 10
Exp. 1
Exp. 1
Exp. 2
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14726, Visit 04, implementation Wed Aug 02 22:01:55 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 170D TO 176 D

Diagnostics

(Visit 04) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

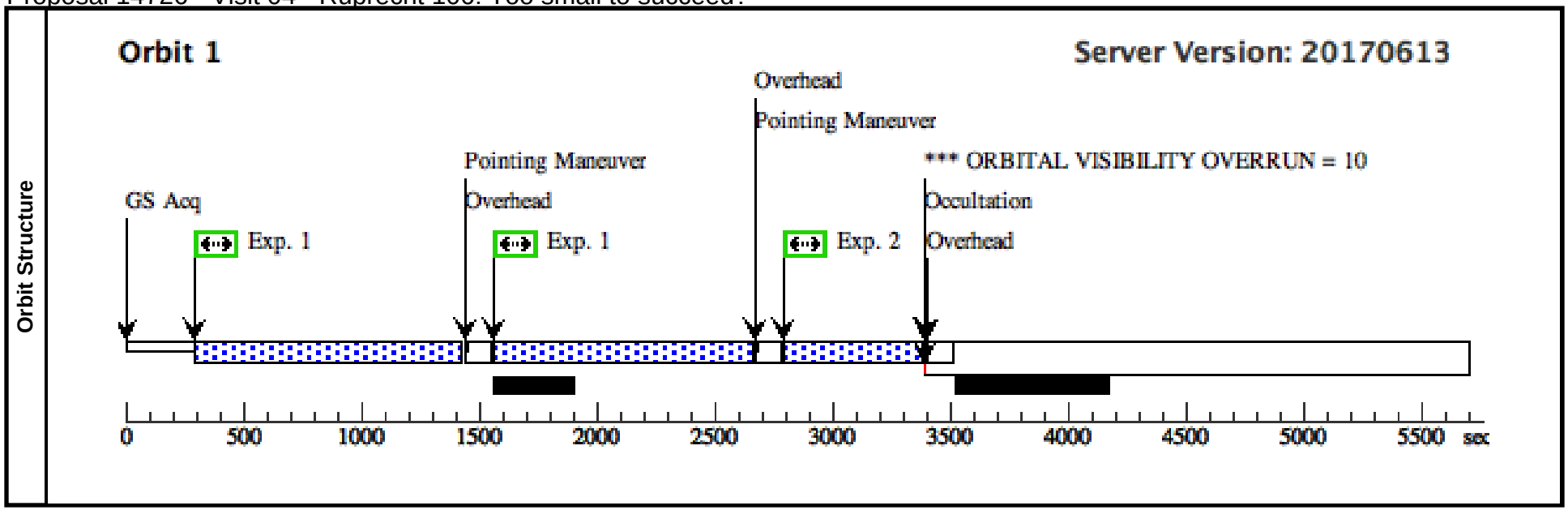
Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	RUPRECHT-106	RA: 12 38 40.2000 (189.6675000d) Dec: -51 09 1.00 (-51.15028d) Equinox: J2000		V=10.9	Reference Frame: SIMBAD

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 (Total)/[Actual Dur.]	Orbit
1		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F336W	FLASH=9		Pattern 2, Exps 1-1 in Visit 04 (2)	1100 Secs (2200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F438W	FLASH=7			571 Secs (571 Secs) *[==>]*	***[1]***


Orbit Structure
Orbit 1
Server Version: 20170613
Overhead
Pointing Maneuver
Pointing Maneuver
*** ORBITAL VISIBILITY OVERRUN = 10
GS Acq
Overhead
Occultation
Exp. 1
Exp. 1
Exp. 2
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec

Visit

Proposal 14726, Visit 05, implementation Wed Aug 02 22:01:55 GMT 2017

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 170D TO 176 D

Diagnostics

(Visit 05) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(2)	Pattern Type=WFC3-UVIS-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	RUPRECHT-106	RA: 12 38 40.2000 (189.6675000d) Dec: -51 09 1.00 (-51.15028d) Equinox: J2000		V=10.9	Reference Frame: SIMBAD

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 (Total)/[Actual Dur.]	Orbit
1		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F336W	FLASH=9	POS TARG 0.099,0.106	Pattern 2, Exps 1-1 in Visit 05 (2)	1100 Secs (2200 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[1]***
2		(1) RUPRECHT-106	WFC3/UVIS, ACCUM, UVIS-CENTER	F438W	FLASH=7	POS TARG 0.099,0.106		571 Secs (571 Secs) *[==>]*	***[1]***

Orbit Structure