15089 - Identify the signature of neutron star mergers through rapid Hubble observations of a short GRB

Cycle: 25, 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) GRB	WFC3/IR	1	29-Sep-2022 16:00:13.0	yes
02	(1) GRB	WFC3/IR	1	29-Sep-2022 16:00:14.0	yes
03	(1) GRB	WFC3/IR	1	29-Sep-2022 16:00:15.0	yes
04	(1) GRB	WFC3/IR	1	29-Sep-2022 16:00:16.0	yes

4 Total Orbits Used

ABSTRACT

The afterglow of some short GRBs displays a late-time rebrightening, visible a few days after the gamma-ray burst. Recent HST observations provided tantalizing evidence that such late-time bump could be explained as the emergence of the underlying kilonova emission. This would represent the incontrovertible signature of a neutron star merger, and the first direct link between short GRBs and their progenitors. Here we ask for a rapid HST follow-up observation of a short duration GRB in order to detect the expected kilonova bump, and to constrain the origin of the observed emission.

OBSERVING DESCRIPTION

Below we provide an illustrative description of our observational strategy. Given the broad range of short GRB redshifts, afterglow and host properties, the exact details of the observations (response time, cadence, and filters) will be determined on a case by case basis.

We request four epochs of observations, the exact times will be scaled according to the observed afterglow decay, the GRB distance scale, and the total time span of the ground-based data. We will plan our observations in order to require a reaction time >2 days. Each epoch will consist of three orbits in order to image the target in different colors. In case of a rare nearby z~0.1 event we may request to perform spectroscopic observations. We remark that the choice of UVIS and IR filters reported in this observing form is preliminary, and the final selection will be made at the time of the ToO in order to match the best sampled light curves from the ground.

Visit

Proposal 15089, V1 (01), completed Thu Sep 29 20:00:16 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; ORIENT 290D TO 320 D; BETWEEN 28-SEP-2019:00:00:00 AND 04-OCT-2019:00:00:00; SEQ 01,02 WITHIN 2 Orbits

Diagnostics

(V1 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)
(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		(2)

Fixed Targets

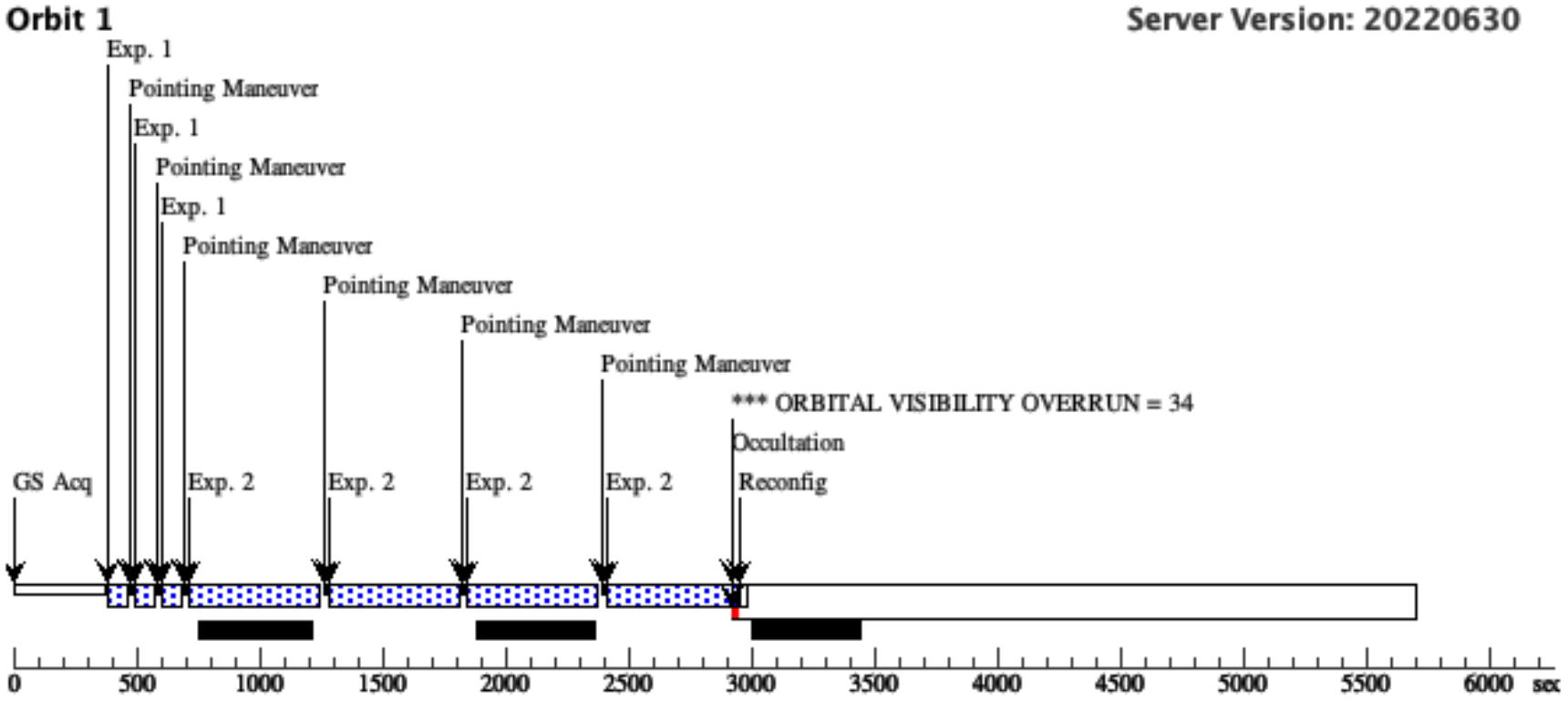
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB	RA: 02 58 10.5800 (44.5440833d) Dec: -08 57 29.82 (-8.95828d) Equinox: J2000		V=21	Reference Frame: XRT

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	IR imaging	(1) GRB	WFC3/IR, MULTIACCUM, GRISM1024	F110W	NSAMP=6; SAMP-SEQ=STEP50	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in V1 (01) (1)	49.230226 Secs (147.691 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(1) GRB	WFC3/IR, MULTIACCUM, GRISM1024	G102	NSAMP=11; SAMP-SEQ=SPARS50		Pattern 2, Exps 2-2 in V1 (01) (2)	502.936801 Secs (2011.747 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15089, V2 (02), completed Thu Sep 29 20:00:16 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; SAME ORIENT AS 01

Diagnostics

(V2 (02)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)
(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		(2)

Fixed Targets

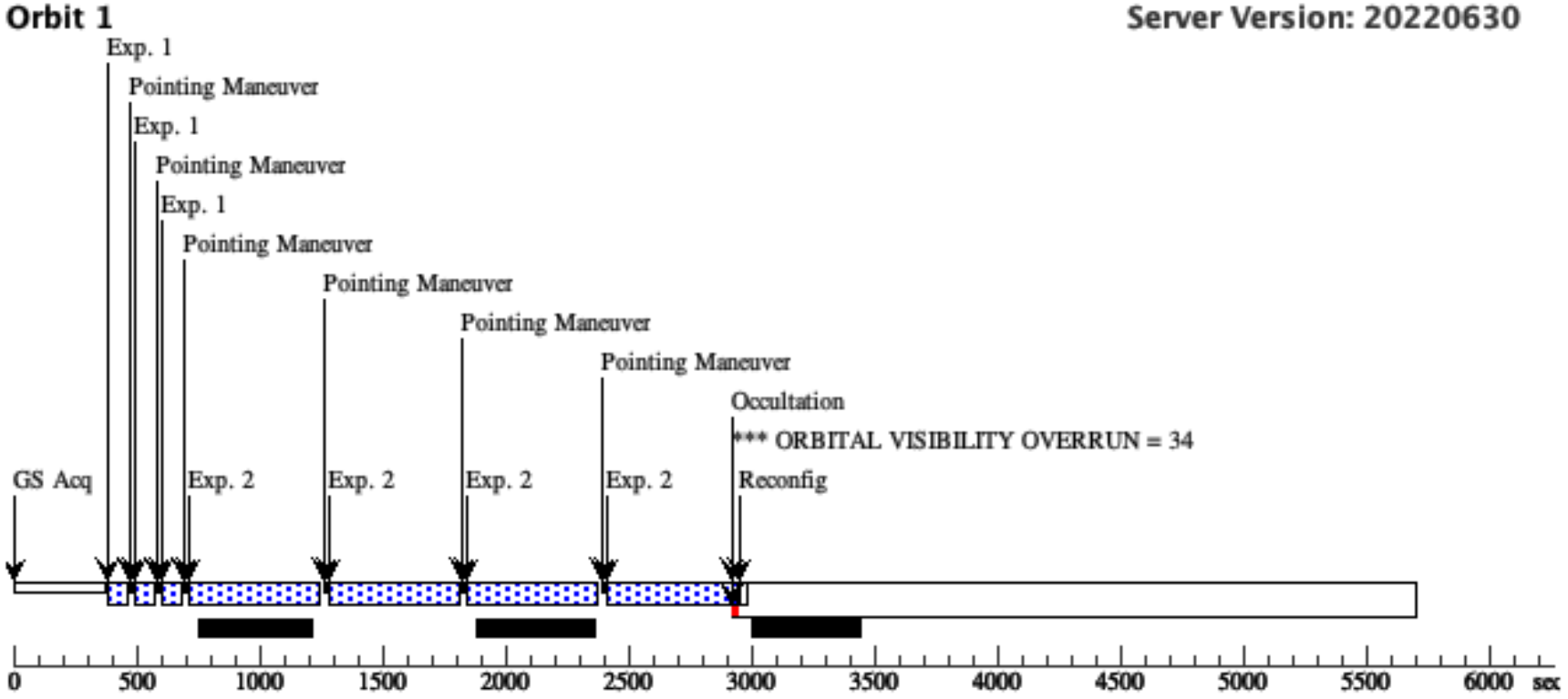
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB	RA: 02 58 10.5800 (44.5440833d) Dec: -08 57 29.82 (-8.95828d) Equinox: J2000		V=21	Reference Frame: XRT

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	IR imaging	(1) GRB	WFC3/IR, MULTIACCUM, GRISM1024	F160W	NSAMP=6; SAMP-SEQ=STEP50	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in V2 (02) (1)	49.230226 Secs (147.691 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(1) GRB	WFC3/IR, MULTIACCUM, GRISM1024	G141	NSAMP=11; SAMP-SEQ=SPARS50		Pattern 2, Exps 2-2 in V2 (02) (2)	502.936801 Secs (2011.747 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15089, V3 (03), completed Thu Sep 29 20:00:16 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; ORIENT 290D TO 320 D; AFTER 01 BY 25 D TO 35 D; SEQ 03,04 WITHIN 2 Orbits; ON HOLD FOR 01

On Hold Comments: Execute ~30 d after V1

Diagnostics

(V3 (03)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)
(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		(2)

Fixed Targets

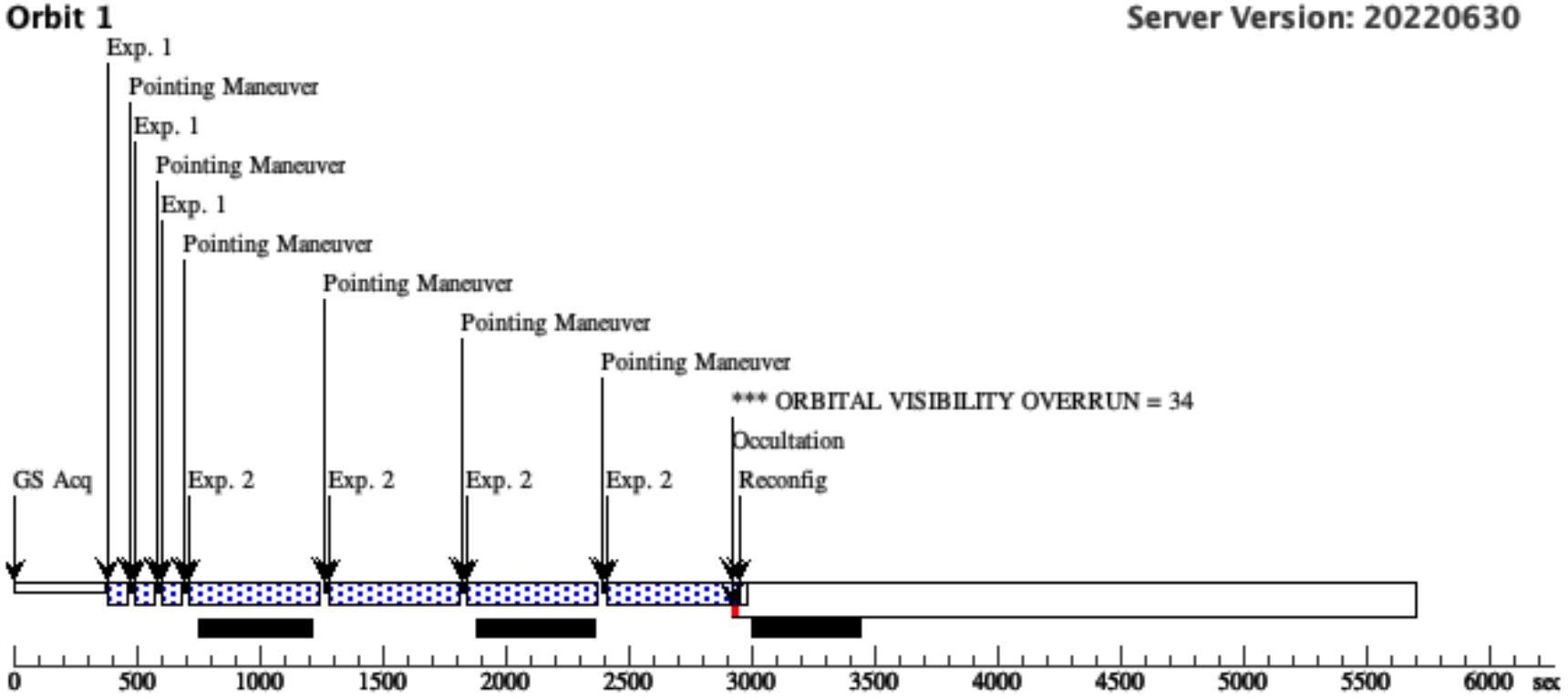
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB	RA: 02 58 10.5800 (44.5440833d) Dec: -08 57 29.82 (-8.95828d) Equinox: J2000		V=21	Reference Frame: XRT

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	IR imaging	(1) GRB	WFC3/IR, MULTIACCUM, GRISM1024	F110W	NSAMP=6; SAMP-SEQ=STEP50	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in V3 (03) (1)	49.230226 Secs (147.691 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(1) GRB	WFC3/IR, MULTIACCUM, GRISM1024	G102	NSAMP=11; SAMP-SEQ=SPARS50		Pattern 2, Exps 2-2 in V3 (03) (2)	502.936801 Secs (2011.747 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***

Orbit Structure



Visit

Proposal 15089, V4 (04), completed Thu Sep 29 20:00:16 GMT 2022

Diagnostic Status: Warning

Scientific Instruments: WFC3/IR

Special Requirements: SCHED 100%; SAME ORIENT AS 03; AFTER 02 BY 25 D TO 35 D; ON HOLD FOR 02

On Hold Comments: Execute ~30 days after V2

Diagnostics

(V4 (04)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)
(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		(2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	GRB	RA: 02 58 10.5800 (44.5440833d) Dec: -08 57 29.82 (-8.95828d) Equinox: J2000		V=21	Reference Frame: XRT

Comments:
Category=EXT-STAR
Description=[GAMMA RAY BURSTER]
Extended=NO

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	IR imaging	(1) GRB	WFC3/IR, MULTIACCUM, GRISM1024	F160W	NSAMP=6; SAMP-SEQ=STEP50	GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in V4 (04) (1)	49.230226 Secs (147.691 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	 ***[1]***
2		(1) GRB	WFC3/IR, MULTIACCUM, GRISM1024	G141	NSAMP=11; SAMP-SEQ=SPARS50		Pattern 2, Exps 2-2 in V4 (04) (2)	502.936801 Secs (2011.747 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	 ***[1]***

Orbit Structure