18240 - Feedback in Low-metallicity Environments from Emerging sTar clusters (FLEET)

Cycle: 33, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*
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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	(2) NGC-625	WFC3/UVIS	3	14-May-2026 22:00:14.0	yes
02	(3) ESO245	WFC3/UVIS	1	14-May-2026 22:00:14.0	yes

4 Total Orbits Used

ABSTRACT

JWST has opened a unique window into the earliest phases of star formation where dust, ionized gas, and massive stars interact while consuming the gas reservoir. The duration of the emerging phase of star formation is among the most challenging to constrain. Analyses in metal-rich spirals find that the 3.3 micron PAH feature, a tracer of photo-dissociation regions (PDRs), remains associated with emerging young star clusters (eYSCs) for about 4 Myr, too long for large fractions of ionizing radiation to escape. At low metallicity, however, harder radiation fields and altered dust composition may change this picture. FLEET will target nine dwarf galaxies (3-8 Mpc) with vigorous star formation, spanning metallicities of 10-40% Zsun, to sample eYSCs (10^3-10^5 Msun) and their associated H II regions and PDRs at 1-5 pc resolution. From multiband NIRCam and MIRI imaging (complemented by HST observations), we will determine the timescales for clusters to emerge from their natal clouds as a function of

their mass. By controlling for proximity and cluster properties (emerging stage, mass, age), we will trace PAH grain composition and its evolution, testing model predictions (inhibited growth vs. destruction) that diverge at the probed metallicity range. We will calibrate the PAH and 21 micron emission as unobscured tracers of star formation. The results of the FLEET program will establish whether cluster emergence is sufficiently short (<<4 Myr) to allow ionizing photon escape, and provide a benchmark for studies of distant dwarf galaxies and simulations of emission and dust content in low-metallicity molecular clouds across a broad range of eYSC properties.

OBSERVING DESCRIPTION

The program will acquire 3 orbits with WFC3/UVIS to observe NGC625 in the F336W, F438W, F547M, F657N, F814W filters standard for optical studies. For Visit 1 (NGC625) we use as pattern WFC3-UVIS-GAP-LINE with 3 dithers which cover the gap while sampling the PSF(half px). We cover 1 dither step in each orbit, acquiring 5 exposures (one per filter). For the target ESO245 we use the WFC3-UVIS-MOS-DITH-LINE with 4 positions to cover the gap while appling small dither to better sample the gap. Single exposures include POSTFLASH to reduce CTE effects.

Visit

Proposal 18240, Visit 01, implementation Fri May 15 02:00:14 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 0D TO 45 D; ORIENT 90D TO 130 D; ORIENT 189D TO 225 D; ORIENT 270D TO 314 D

Diagnostics

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

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

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-GAP-LINE	Coordinate Frame=POS-TARG		(1-5)
	Purpose=MOSAIC	Pattern Orientation=85.759		
	Number Of Points=3	Angle Between Sides=		
	Point Spacing=2.414	Center Pattern=true		
	Line Spacing=			

Fixed Targets

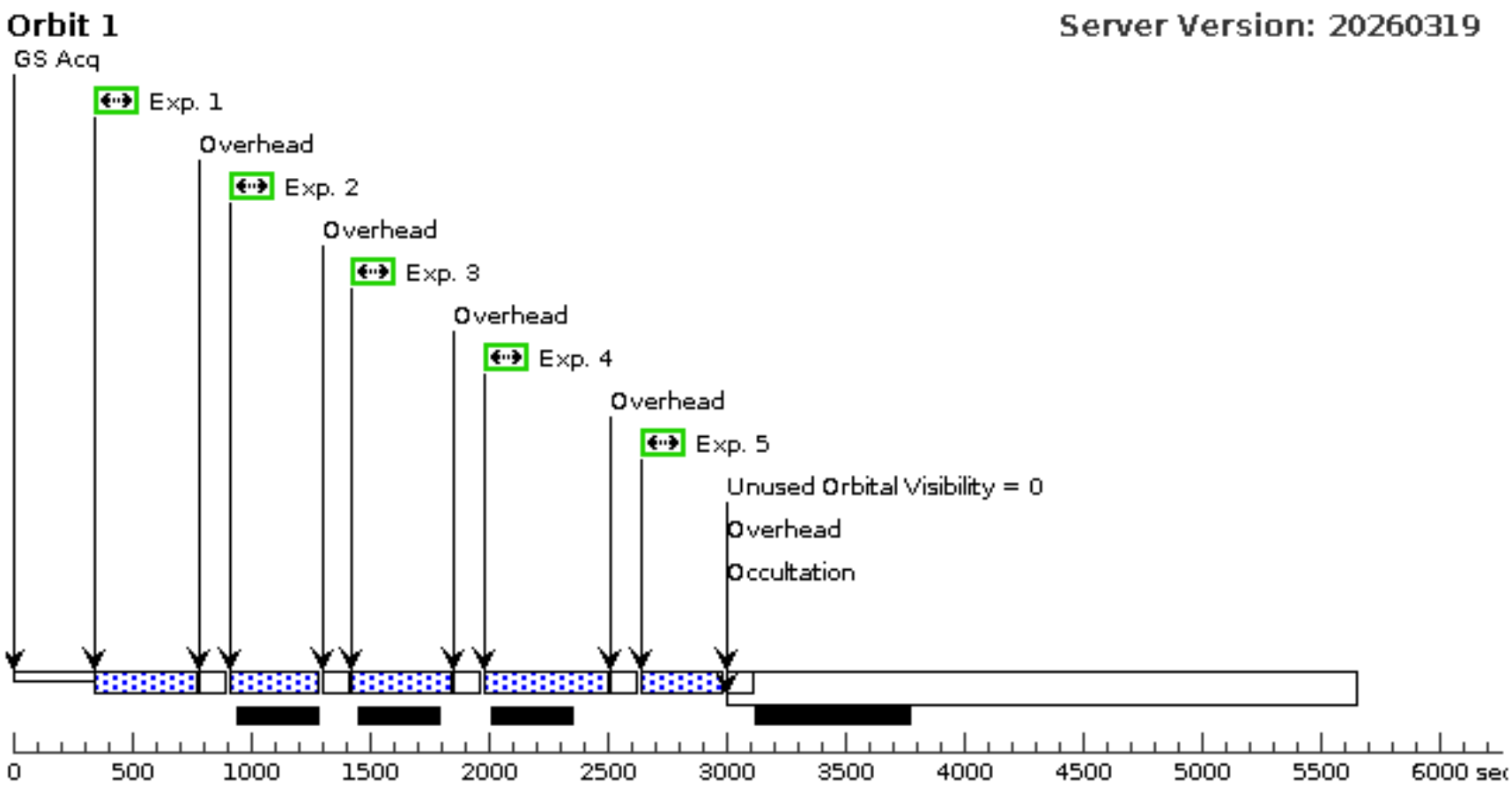
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	NGC-625	RA: 01 35 5.4108 (23.7725450d)	Epoch of Position: 2000	V=11.25	Reference Frame: ICRS
		Dec: -41 26 4.55 (-41.43460d)			
		Equinox: J2000			

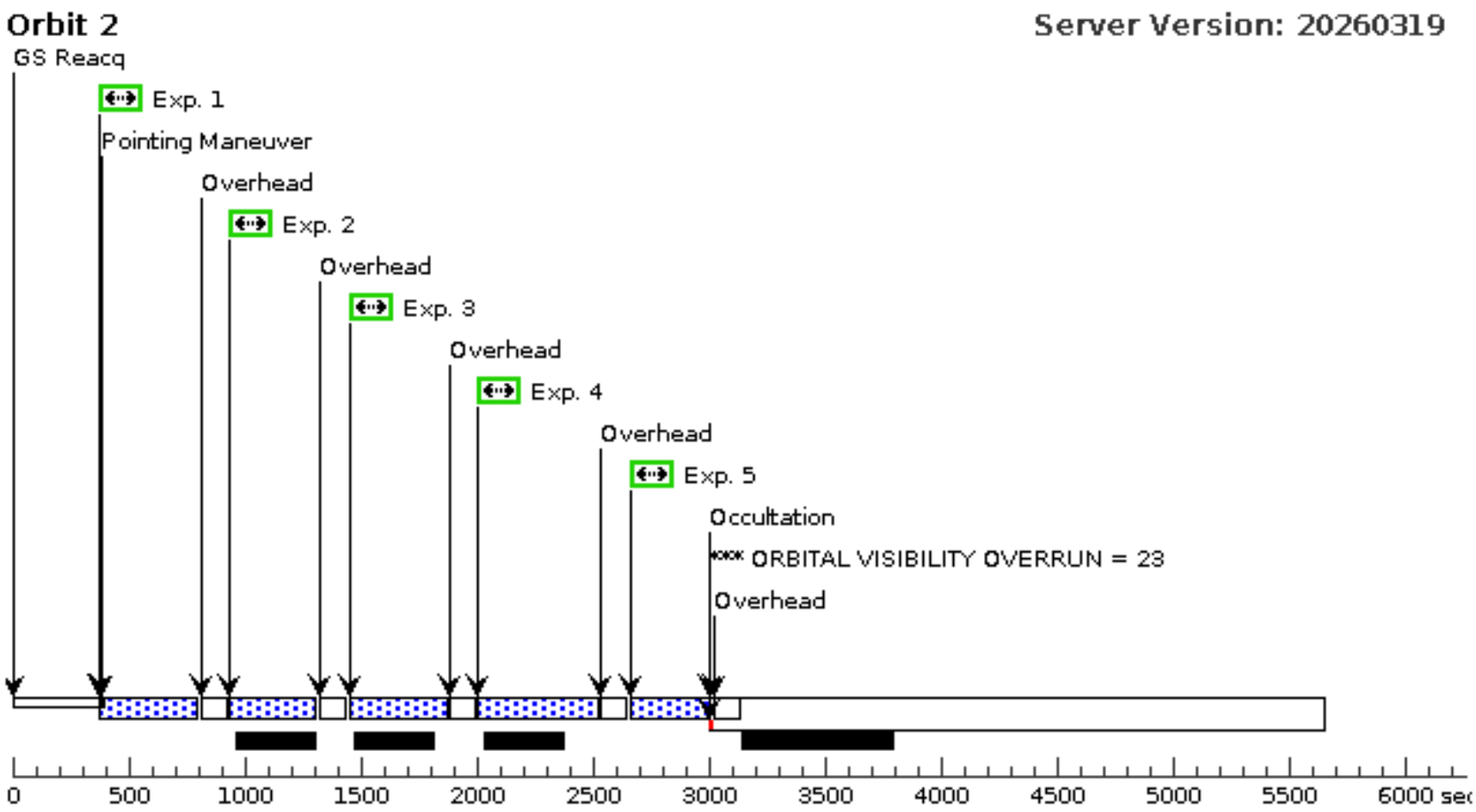
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[DWARF COMPACT, STAR FORMING REGION]

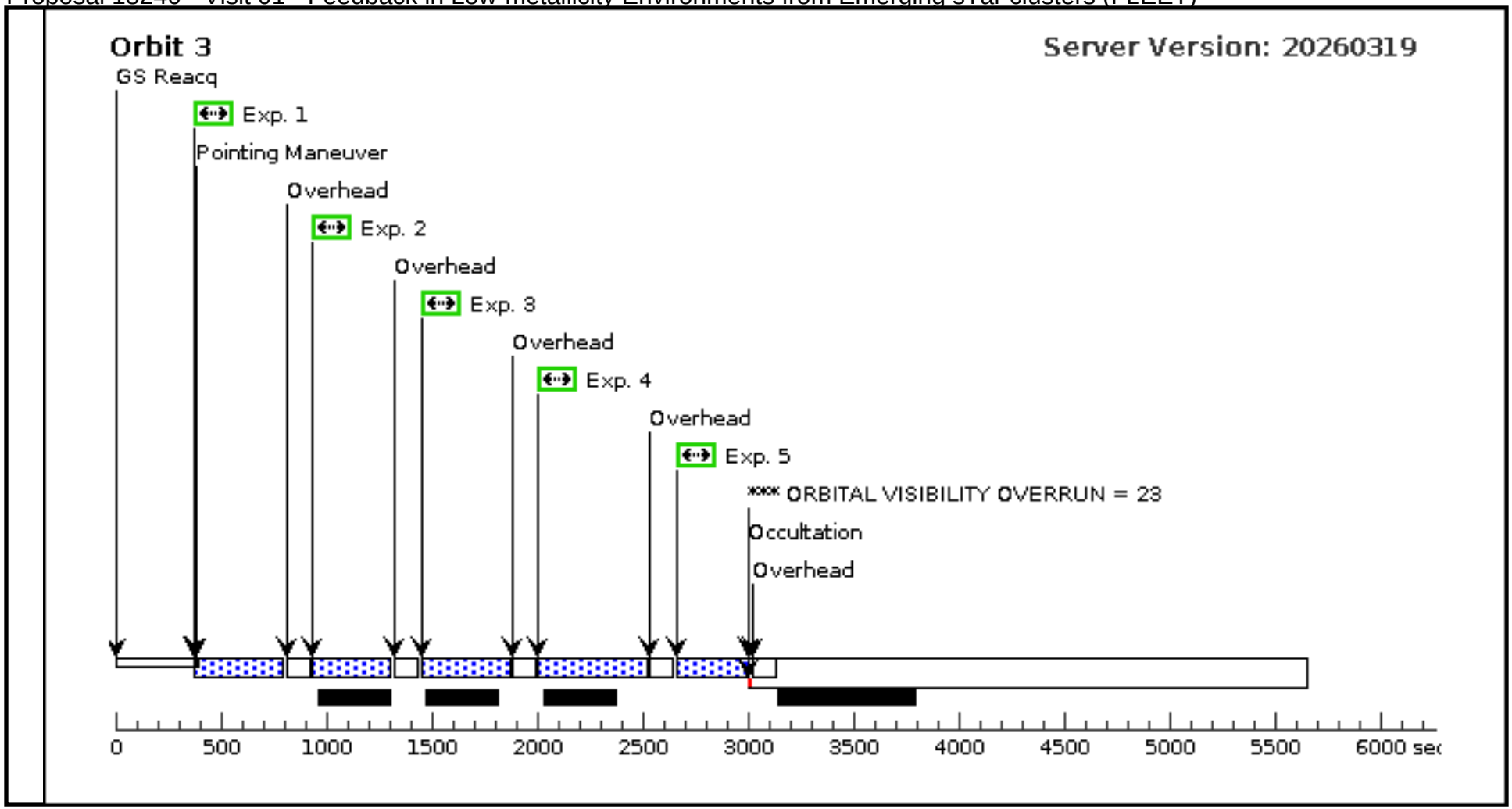
Exposures

#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	NGC625 (WFC3UVIS.im.2330563)	(2) NGC-625	WFC3/UVIS, ACCUM, UVIS-CENTER	F336W	FLASH=20		Pattern 1, Exps 1-5 in Visit 01 (1)	400 Secs (1200 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)]	***[3]***
2	NGC625 (WFC3UVIS.im.2330563)	(2) NGC-625	WFC3/UVIS, ACCUM, UVIS-CENTER	F438W	FLASH=20		Pattern 1, Exps 1-5 in Visit 01 (1)	350 Secs (1050 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)]	***[3]***
3	NGC625 (WFC3UVIS.im.2330563)	(2) NGC-625	WFC3/UVIS, ACCUM, UVIS-CENTER	F547M	FLASH=15		Pattern 1, Exps 1-5 in Visit 01 (1)	400 Secs (1200 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)]	***[3]***
4	NGC625 (WFC3UVIS.im.2330563)	(2) NGC-625	WFC3/UVIS, ACCUM, UVIS-CENTER	F657N	FLASH=20		Pattern 1, Exps 1-5 in Visit 01 (1)	500 Secs (1500 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)]	***[3]***
5	NGC625 (WFC3UVIS.im.2330563)	(2) NGC-625	WFC3/UVIS, ACCUM, UVIS-CENTER	F814W	FLASH=12		Pattern 1, Exps 1-5 in Visit 01 (1)	320 Secs (960 Secs)	
								[==>(Pattern 1)]	***[1]***
								[==>(Pattern 2)]	***[2]***
								[==>(Pattern 3)]	***[3]***

Orbit Structure




Orbit 2
Server Version: 20260319
GS Reacq
Exp. 1
Pointing Maneuver
Overhead
Exp. 2
Overhead
Exp. 3
Overhead
Exp. 4
Overhead
Exp. 5
Occultation
**** ORBITAL VISIBILITY OVERRUN = 23
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec


Orbit 3
Server Version: 20260319
GS Reacq
Exp. 1
Pointing Maneuver
Overhead
Exp. 2
Overhead
Exp. 3
Overhead
Exp. 4
Overhead
Exp. 5
*** ORBITAL VISIBILITY OVERRUN = 23
Occultation
Overhead
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000 sec

Visit

Proposal 18240, Visit 02, implementation Fri May 15 02:00:15 GMT 2026

Diagnostic Status: Warning

Scientific Instruments: WFC3/UVIS

Special Requirements: ORIENT 270D TO 290 D; ORIENT 175D TO 195 D; ORIENT 0D TO 25 D; ORIENT 84D TO 99 D

Diagnostics

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

Patterns

#	Primary Pattern		Secondary Pattern		Exposures
(2)	Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=MOSAIC Number Of Points=2 Point Spacing=2.4 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=85.754 Angle Between Sides= Center Pattern=true	Pattern Type=WFC3-UVIS-MOS-DITH-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.119 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=33.606 Angle Between Sides= Center Pattern=false	(1)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	ESO245	RA: 01 45 4.1019 (26.2670913d) Dec: -43 35 30.23 (-43.59173d) Equinox: J2000	Epoch of Position: 2000	V=12.63	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=GALAXY
Description=[DWARF COMPACT, STAR FORMING REGION]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	ESO245	(3) ESO245	WFC3/UVIS, ACCUM, UVIS-CENTER	F657N	FLASH=20		Pattern 2, Exps 1-1 in Visit 02 (2)	550 Secs (2200 Secs) *[==>(Pattern 1,1)]* *[==>(Pattern 1,2)]* *[==>(Pattern 2,1)]* *[==>(Pattern 2,2)]*	***[1]***

Orbit Structure