12267 - Dissecting star formation, extinction, and stellar populations in the brightest lensed galaxy

Cycle: 18, 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) RCS0327-1326	WFC3/IR WFC3/UVIS	4	06-Jul-2010 23:04:32.0	yes

4 Total Orbits Used

ABSTRACT

Gravitational lensing provides rare chances to study high-redshift galaxies in otherwise unobtainable ways. We propose to survey star formation in a spectacular lensed galaxy, the brightest yet discovered. We propose to map, at ~100 pc scales, the star formation (via H beta) and the extinction (via the H-beta to H-alpha ratio) using narrow-band filters, and to map the UV spectral slope and the Balmer break using broad-band filters. In a typical

galaxy at the epoch when most of the Universe's stars formed, these maps will show where stars are forming within the galaxy; the range of extinction and its morphology; and the performance of multiple diagnostics of star formation rate on a pixel-by-pixel basis. [Note: we proposed H alpha imaging with NICMOS, but NICMOS will not be turned on in Cycle 18. Instead, we will map star formation with Hbeta, and obtain a ground-based map of Ha/Hb.]

OBSERVING DESCRIPTION

We pack 7 WFC3 filters into 4 orbits: the UVIS filters F390W, F606W, and F814W, and the IR channel filters F098M, F125W, F160W, and F132N. There are 4 dither positions, to reconstruct the PSF, reject cosmic rays, and compensate for the chip-gap. We use only one visit, so that the roll angles will be the same, to aid comparison among filters.

In the WFC3-IR channel, we choose to be readnoise limited rather than skynoise limited, because the target is fairly bright (integrated g-band magnitude of 19.1, extended over 38 arcsec), because our science goals demand a large filterset, and because multiple dither positions are needed. We choose SPARS50 as the timing sequence for all IR-channel observations, as it provides flexible orbit-packing and provides an adequate number of readouts per exposure.

These wide-band IR filters become skynoise--dominated in about 400-600s (tab 7.12 of the instrument manual), compared to our per-dither exposures of 200-300s. Thus, these exposures will be mildly readnoise limited. The total integration times of 1212, 862, 862s (F098M, F125W, F160W) exceed the signal-to-noise requirements we calculated in Phase 1.

Our narrow-band W3 F132N exposure time is a total of 2210s, meeting the required depth calculated in Phase 1. Because the background is so low in this narrow band, the individual dithered exposures are readnoise limited.

We adjust the UVIS exposure times to fill the orbits. The integration in each filter exceeds the requirements we calculated in Phase 1.

Visit

Proposal 12267, Visit 01 Wed Jul 07 03:04:41 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: ORIENT 330D TO 210 D

Fixed Targets

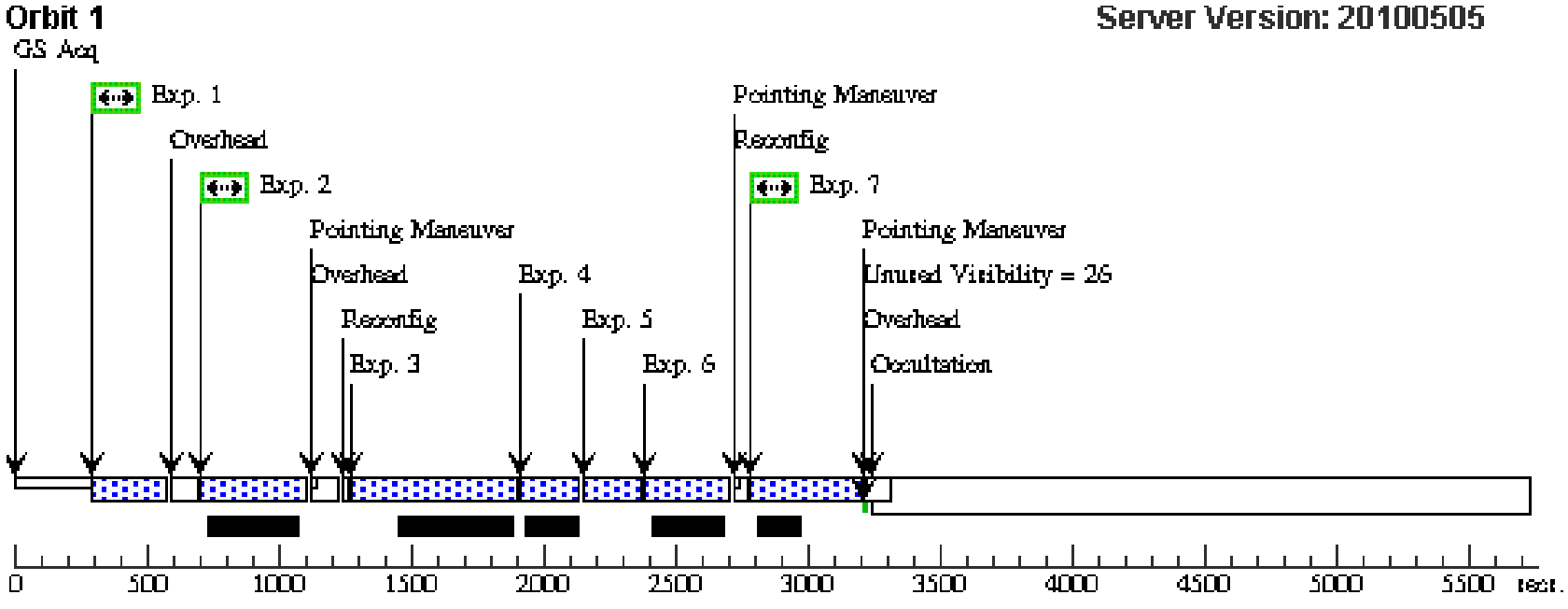
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	RCS0327-1326	RA: 03 27 27.2000 (51.8633333d) Dec: -13 26 24.00 (-13.44000d) Equinox: J2000		V=19.1+/-0.2	Reference Frame: ICRS

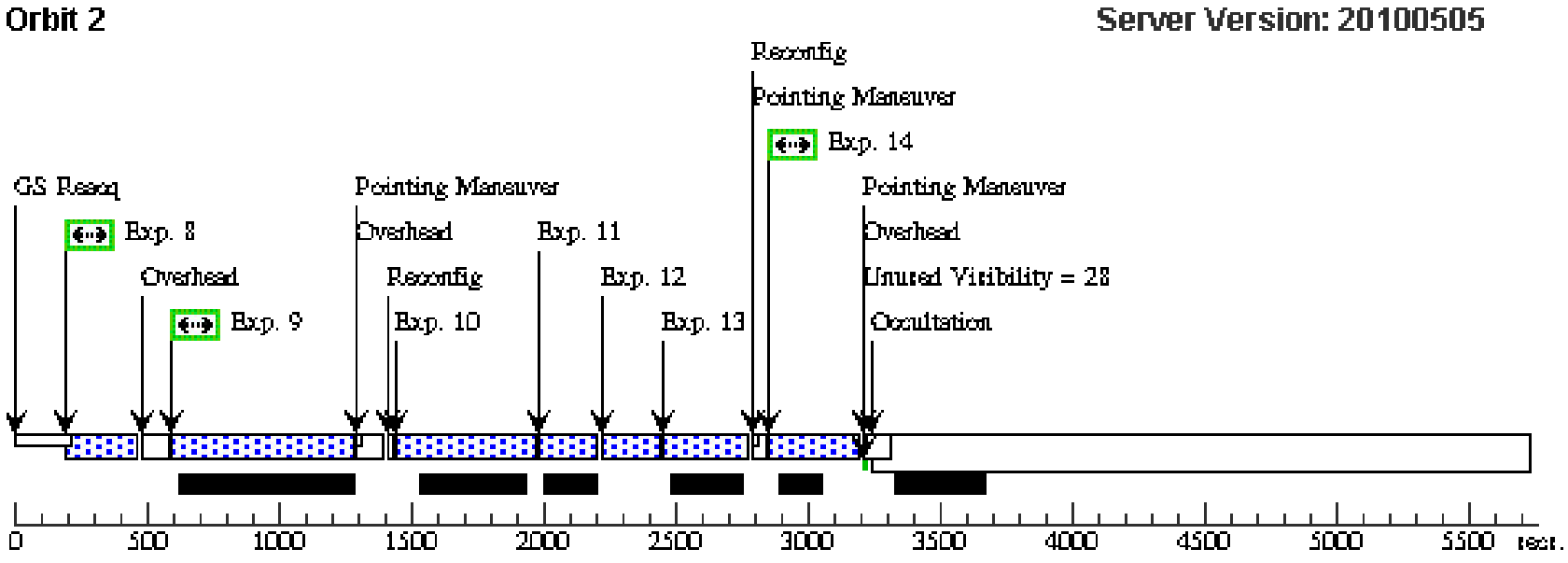
Exposures

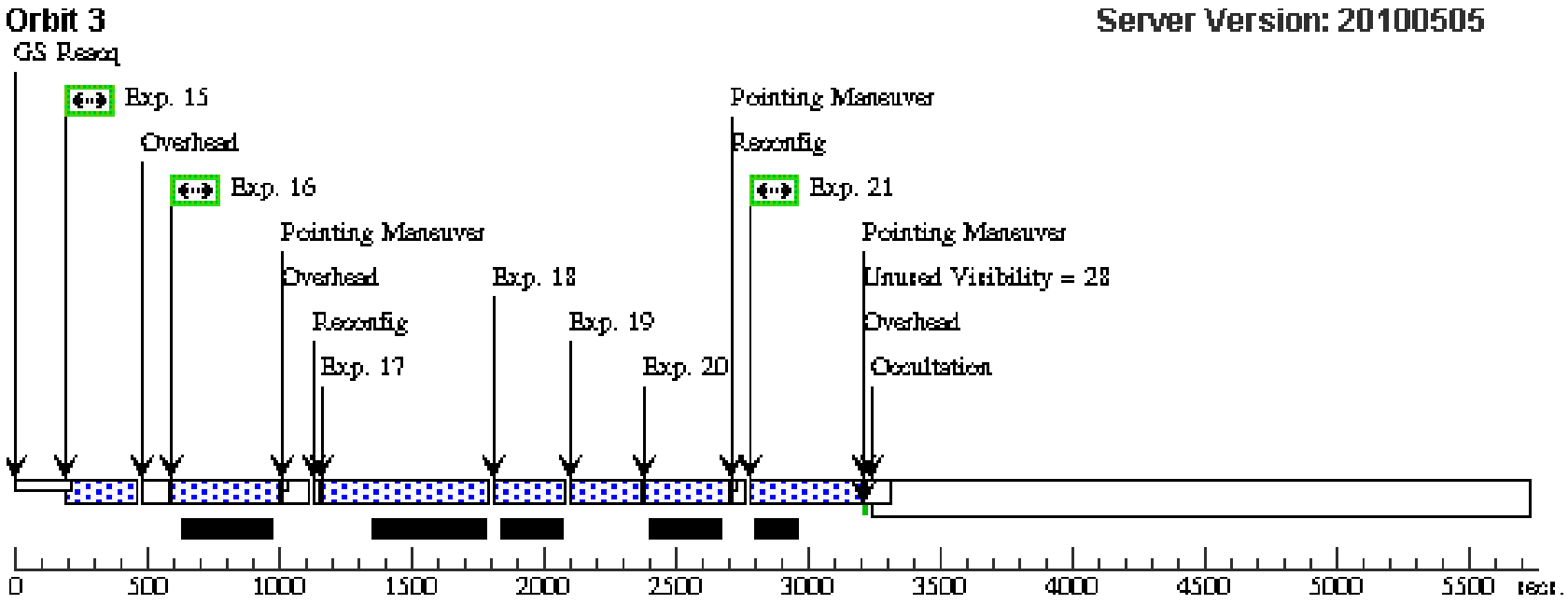
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 0,-2		250 Secs *[==>]*	*[1]*
2		(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO	POS TARG 0,-2		379 Secs *[==>]*	*[1]*
3		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F132N	NSAMP=13; SAMP-SEQ=SPARS50	POS TARG 0,21		*[==>]*	*[1]*
4		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=5; SAMP-SEQ=SPARS50	POS TARG 0,21		*[==>]*	*[1]*
5		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=5; SAMP-SEQ=SPARS50	POS TARG 0,21		*[==>]*	*[1]*
6		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F098M	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 0,21		*[==>]*	*[1]*
7		(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO	POS TARG 0,-2		400 Secs *[==>]*	*[1]*
8		(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 0.099,-1.894		250 Secs *[==>]*	*[2]*
9		(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO	POS TARG 0.099,-1.894		665 Secs *[==>]*	*[2]*
10		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F132N	NSAMP=11; SAMP-SEQ=SPARS50	POS TARG 0.474,21.424		*[==>]*	*[2]*
11		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=5; SAMP-SEQ=SPARS50	POS TARG 0.474,21.424		*[==>]*	*[2]*
12		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=5; SAMP-SEQ=SPARS50	POS TARG 0.474,21.424		*[==>]*	*[2]*
13		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F098M	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 0.474,21.424		*[==>]*	*[2]*
14		(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO	POS TARG 0.099,-1.894		320 Secs *[==>]*	*[2]*
15		(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 1.446,0.926		250 Secs *[==>253.0 Secs]*	*[3]*
16		(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO	POS TARG 1.446,0.926		379 Secs *[==>382.0 Secs]*	*[3]*
17		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F132N	NSAMP=13; SAMP-SEQ=SPARS50	POS TARG 1.446,23.926		*[==>]*	*[3]*
18		(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=6; SAMP-SEQ=SPARS50	POS TARG 1.446,23.926		*[==>]*	*[3]*

	19	(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=6; SAMP-SEQ=SPARS50	POS TARG 1.446,23.926	*[==>]*	***[3]***
	20	(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F098M	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 1.446,23.926	*[==>]*	***[3]***
	21	(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO	POS TARG 1.446,0.926	400 Secs *[==>403.0 Secs]*	 ***[3]***
	22	(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F606W	CR-SPLIT=NO	POS TARG 1.545,1.032	250 Secs *[==>]*	 ***[4]***
	23	(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F814W	CR-SPLIT=NO	POS TARG 1.545,1.032	665 Secs *[==>]*	 ***[4]***
	24	(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F132N	NSAMP=11; SAMP-SEQ=SPARS50	POS TARG 1.92,24.35	*[==>]*	***[4]***
	25	(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F125W	NSAMP=5; SAMP-SEQ=SPARS50	POS TARG 1.92,24.35	*[==>]*	***[4]***
	26	(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F160W	NSAMP=5; SAMP-SEQ=SPARS50	POS TARG 1.92,24.35	*[==>]*	***[4]***
	27	(1) RCS0327-1326	WFC3/IR, MULTIACCUM, IR-FIX	F098M	NSAMP=7; SAMP-SEQ=SPARS50	POS TARG 1.92,24.35	*[==>]*	***[4]***
	28	(1) RCS0327-1326	WFC3/UVIS, ACCUM, UVIS1	F390W	CR-SPLIT=NO	POS TARG 1.545,1.032	320 Secs *[==>]*	 ***[4]***

Orbit Structure



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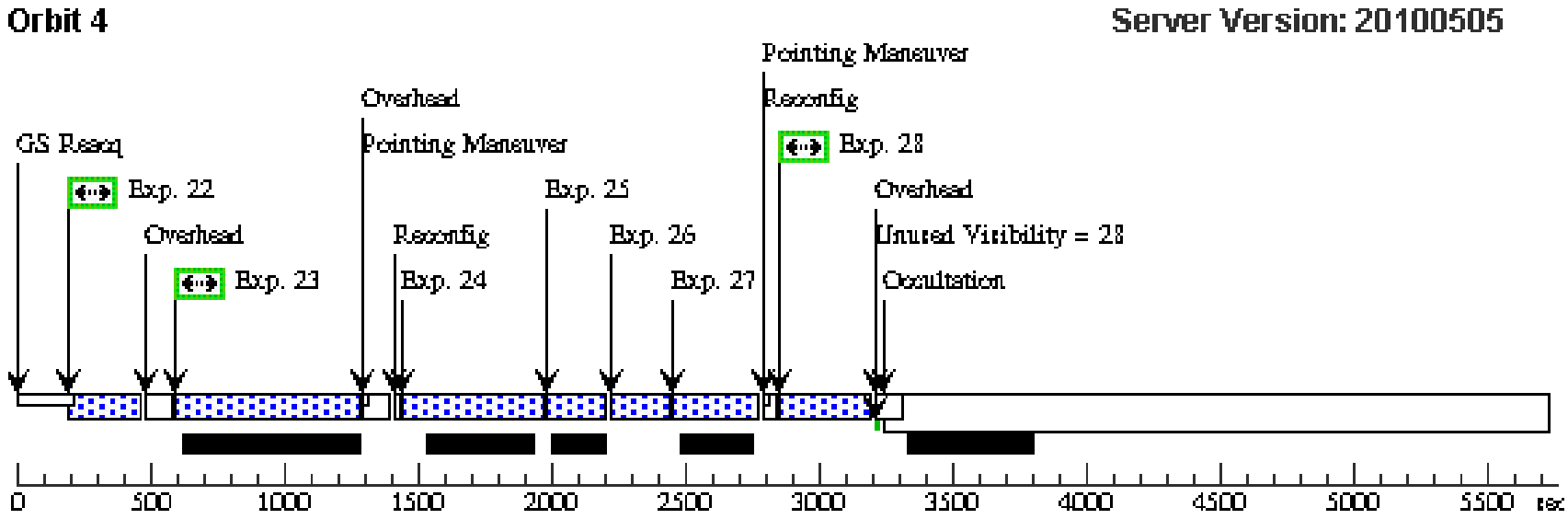
Server Version: 20100505
GS Reacq
Exp. 15
Overhead
Exp. 16
Pointing Maneuver
Overhead
Reconfig
Exp. 17
Exp. 18
Exp. 19
Exp. 20
Pointing Maneuver
Reconfig
Exp. 21
Pointing Maneuver
Unused Visibility = 28
Overhead
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec.


Orbit 4
Server Version: 20100505
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Overhead
Exp. 23
Overhead
Pointing Maneuver
Reconfig
Exp. 24
Exp. 25
Exp. 26
Exp. 27
Pointing Maneuver
Reconfig
Exp. 28
Overhead
Unused Visibility = 28
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec