11678 - Resolved H alpha star formation in two lensed galaxies at z=0.9

Cycle: 17, 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) A2390ARCS	WFC3/IR	2	22-May-2009 21:05:31.0	yes

2 Total Orbits Used

ABSTRACT

We will obtain H alpha narrow-band images of two galaxies at z=0.912 that have been gravitationally lensed by the galaxy cluster Abell 2390. H alpha falls squarely into the F126N filter, and both galaxies fit in a single WFC3 field of view. Because these two galaxies are magnified by factors of 6.7 (+-0.4) and 12.6 (+-0.8), WFC3 IR pixels probe spatial scales of 150 and 80 pc. (Without lensing, the WFC3 pixels probe 1 kpc scales at these redshifts.) Thus, these two galaxies provide a rare chance to examine, in detail and at high S/N, the spatial distribution of star formation in average galaxies at z=1.

After lensing deprojection, we will study the spatial distribution of star formation, the star-forming disk properties and nuclear contribution, as well as the distributioin of extinction (from the archival F55W to H-alpha ratio map). We will also compare integrated extinction--corrected H alpha to Spitzer-derived diagnostics of star formation rate.

OBSERVING DESCRIPTION

We use two filters: F126N to capture H-alpha at z=0.912, and F125W as continuum. Because the wide filter will continuum-subtract the narrow filter, identical dither positions are required. The two target galaxies are separated by just 19", and thus fit easily in a single WFC3 field of view.

Low background makes the F126N observations readnoise limited. To minimize readnoise, we use only 3 dither positions, and 3 long exposures in STEP200 mode. For pessimistic assumptions of H alpha distribution, the per-pixel F126N signal/noise ratios will be >4 and 6 for galaxies A and B. If H alpha is concentrated like the F814W light, then the S/N will be ~15 per pixel. We begin each orbit with an F126N exposure.

In F125W, we avoid saturation of the brighter (J=17.31) target by limiting exposures to <400s. As such, we use STEP50 sampling, a good compromise since it avoids saturation and comes close to the sky/readnoise equality point.

For each filter, we use 3 dither positions, separated by 7", with integer pixel steps, to step over bad pixels and other detector defects. In such a small program, we are not able to dither sufficiently to overcome the undersampled PSF. The benefits of 4-6 dither positions would be overwhelmed by the increased readnoise in F126N.

Visit

Proposal 11678, Visit 01, implementation Sat May 23 01:05:35 GMT 2009

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

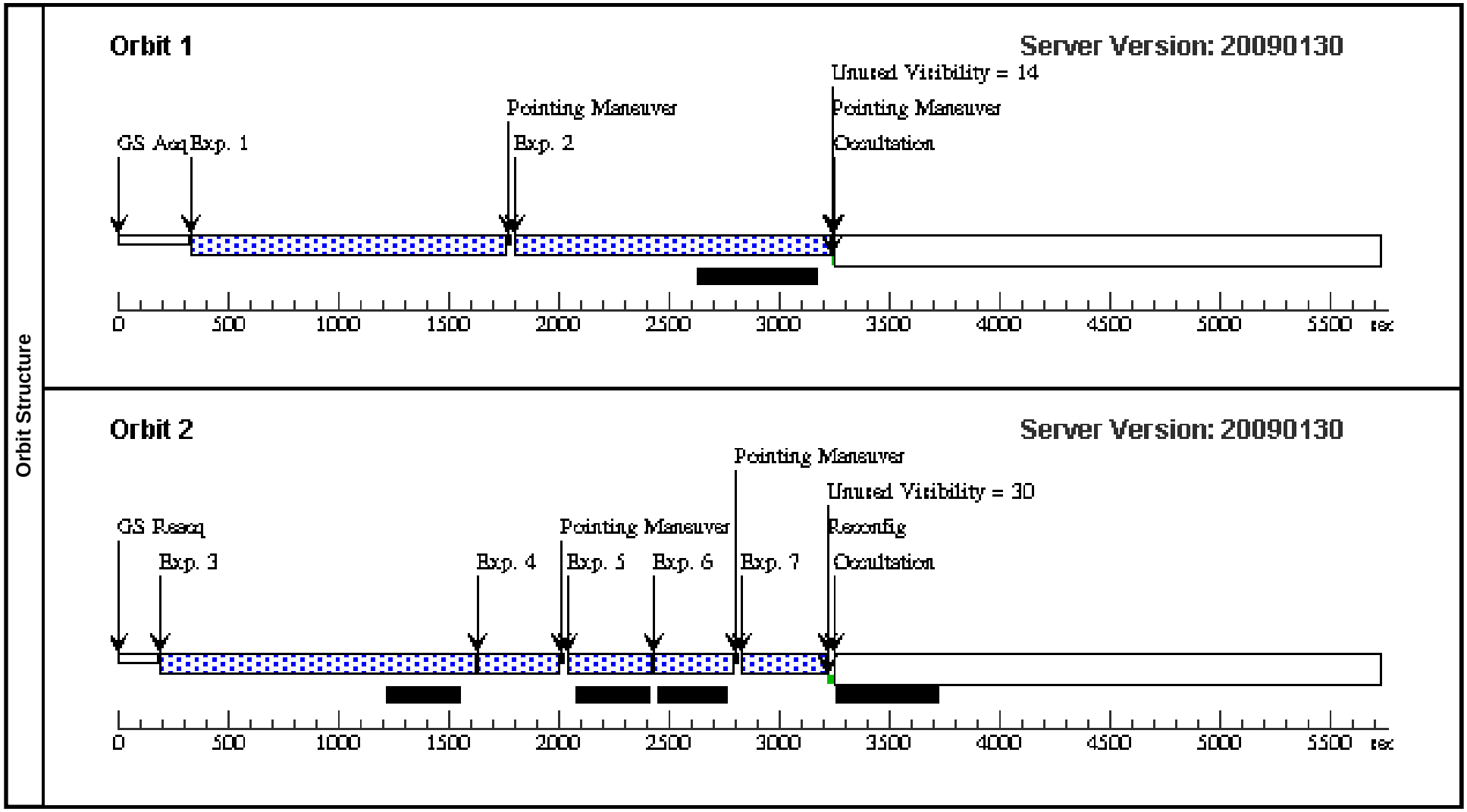
Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	A2390ARCS	RA: 21 53 34.4600 (328.3935833d) Dec: +17 42 9.37 (17.70260d) Equinox: J2000	Redshift: 0.912	V=(?) J=17.31 and J=20.1	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	F126N 1	(1) A2390ARCS	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=14; SAMP-SEQ=STEP200	POS TARG -4.995,-4.961		*[==>]*	***[1]***
2	F126N 2	(1) A2390ARCS	WFC3/IR, MULTIACCUM, IR	F126N	NSAMP=14; SAMP-SEQ=STEP200	POS TARG 0.0,0.0		*[==>]*	***[1]***
3	F126N 3	(1) A2390ARCS	WFC3/IR, MULTIACCUM, IR	F126N	SAMP-SEQ=STEP200; NSAMP=14	POS TARG 4.995,4.961		*[==>]*	***[2]***
4	F125W 1	(1) A2390ARCS	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=STEP50; NSAMP=12	SAME POS AS 3		*[==>]*	***[2]***
5	F125W 2	(1) A2390ARCS	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=STEP50; NSAMP=12	SAME POS AS 2		*[==>]*	***[2]***
6	F125W 3	(1) A2390ARCS	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=STEP50; NSAMP=12	SAME POS AS 2		*[==>]*	***[2]***
7	F125W 4	(1) A2390ARCS	WFC3/IR, MULTIACCUM, IR	F125W	SAMP-SEQ=STEP50; NSAMP=12	SAME POS AS 1		*[==>]*	***[2]***


Orbit Structure
Orbit 1
Server Version: 20090130
Unused Visibility = 14
Pointing Maneuver
Pointing Maneuver
GS Acq
Exp. 1
Exp. 2
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec
Orbit 2
Server Version: 20090130
Pointing Maneuver
Unused Visibility = 30
GS Reacq
Pointing Maneuver
Reconfig
Exp. 3
Exp. 4
Exp. 5
Exp. 6
Exp. 7
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec