



12964 - Probing the outermost halo in a giant galaxy: is it metal-poor and where does it end?

Cycle: 20, Proposal Category: GO
(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) NGC-5128-F5	ACS/WFC WFC3/UVIS	2	29-Jun-2012 22:04:18.0	yes
02	(2) NGC-5128-F6	ACS/WFC WFC3/UVIS	2	29-Jun-2012 22:04:34.0	yes
03	(3) NGC-5128-F7	ACS/WFC WFC3/UVIS	2	29-Jun-2012 22:04:48.0	yes
04	(4) NGC-5128-F8	ACS/WFC WFC3/UVIS	2	29-Jun-2012 22:05:00.0	yes

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
05	(5) NGC-5128-F9	ACS/WFC WFC3/UVIS	2	29-Jun-2012 22:05:13.0	yes

10 Total Orbits Used

ABSTRACT

Centaurus A (NGC 5128), the nearest gE/S0 galaxy is taking up an increasingly important role in stellar population and galaxy evolution studies with the potential to rival the Local Group members. From our previous HST-based studies of its red-giant population, we know that ~80% of its halo stars are old (11-13 Gyr), and relatively metal-rich ([Fe/H] ~ -0.5). In contrast, new measurements of the outer-halo of NGC 3379 (Leo group), and of M31 revealed the classically metal-poor component (as the Milky Way halo) at radii beyond $R \sim 10 R_{\text{eff}}$ where the metal-rich stars disappear. This extremely extended "outermost halo" -- which has long been suspected to exist in giant galaxies but has been hard to isolate -- may be the evolutionary relic of the first stars formed in the extended dark-matter potential well of the galaxy at its earliest stages. This triggers the question whether such an extended halo also exists around NGC 5128 and what is its composition?

We propose to use WFC3 and ACS in parallel to probe the NGC 5128 halo to its outermost detectable limits beyond 15 effective radii, in search for its oldest, most metal-poor stars. Combined with our earlier HST work, which has sampled the metallicity distribution function (MDF) from 10 to 38 kpc (1.5-7 R_{eff}), we will obtain a complete MDF profile extending from the outer bulge to the farthest limits of the halo. This study will be the first for any gE galaxy, and it will add entirely new constraints to understanding its formation history. We will be able to assess the relative importance of halo stars produced by protogalactic dwarfs at the beginning of hierarchical merging vs. late accretion from dwarf satellites.

OBSERVING DESCRIPTION

This is an imaging program with WFC3 and ACS/WFC in Coordinated Parallel mode on 5 target fields surveying the outer halo of NGC 5128. Each field is imaged in F814W and F606W filters. The parallel observations with ACS/WFC use the same filters and essentially augment the total field size. Very accurate pointing is not necessary and the orientation angle is set to avoid the bright stars in the ACS parallel, and could also be slightly more relaxed accepting some loss of area due to bright stars if necessary for scheduling. The two orbits for each target are placed within a visit in order to obtain the two filters for each pointing for the same field orientation.

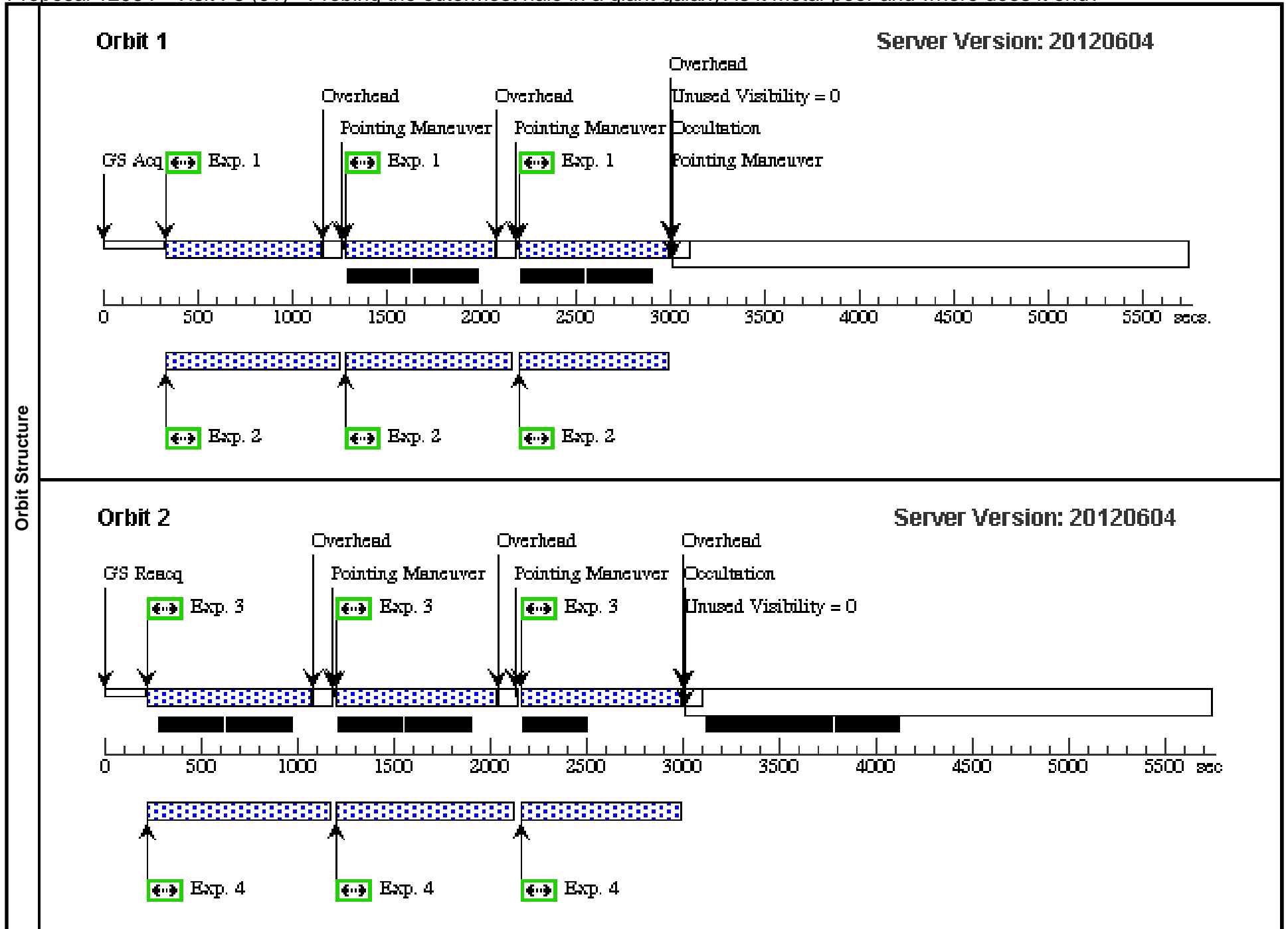
Each field is imaged with 2 orbits, one orbit per filter. Within each orbit a set of 3 dithered observations using WFC3-UVIS-DITHER-LINE-3PT

pattern are taken for each filter, for both primary and the parallel instrument in the same filter. The 3 primary (WFC3) exposures are packed within each orbit such that the overheads are minimized and the total exposure time maximized.

Proposal 12964 - Visit F5 (01) - Probing the outermost halo in a giant galaxy: is it metal-poor and where does it end?

Sat Jun 30 02:05:22 GMT 2012

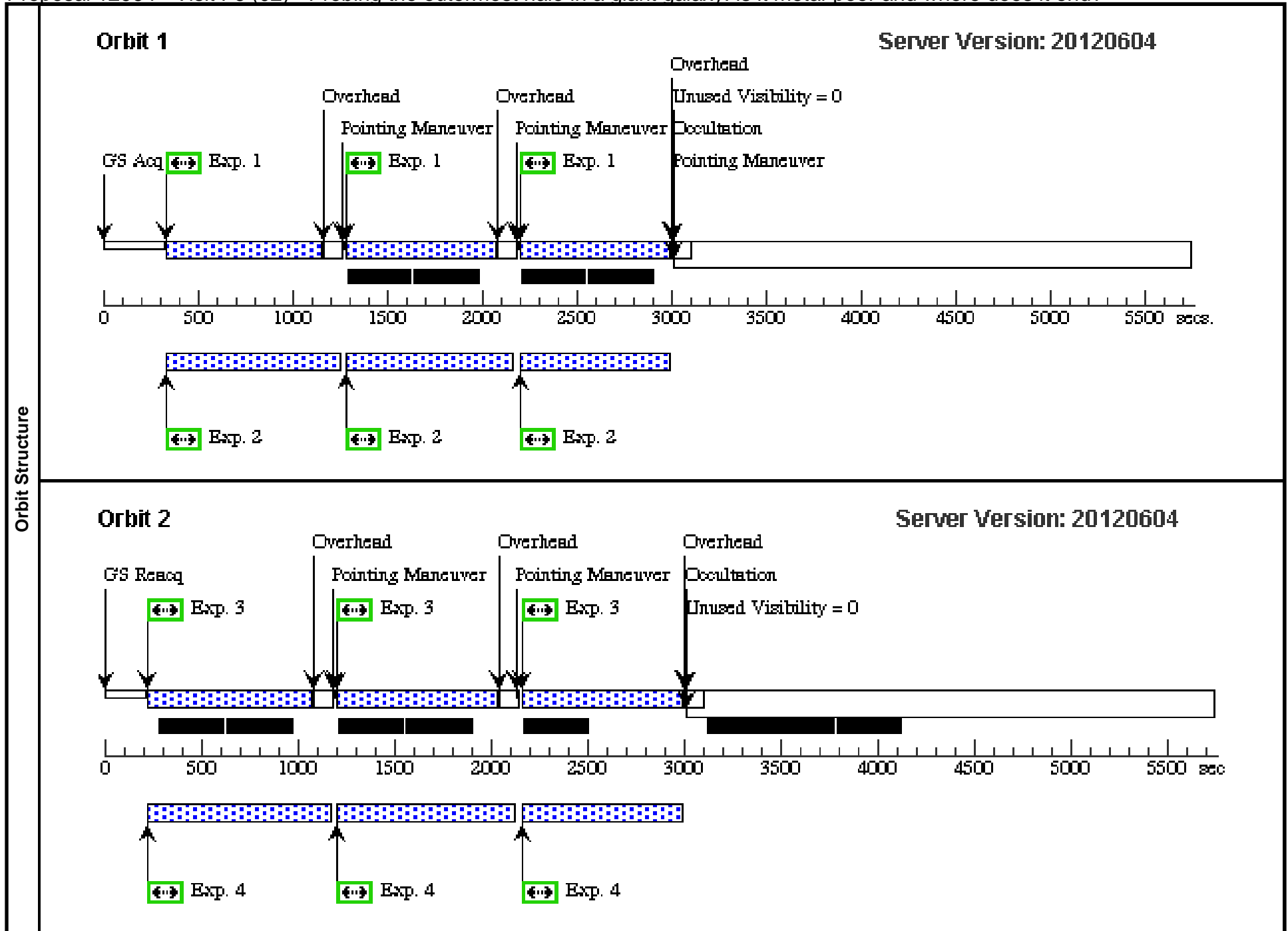
Visit	Proposal 12964, Visit F5 (01) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SCHED 100%; ORIENT 35D TO 88 D; ORIENT 125D TO 226 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(3)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-2), (3-4)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	NGC-5128-F5	RA: 13 28 0.5500 (202.0022917d) Dec: -42 14 37.40 (-42.24372d) Equinox: J2000		V=25.0+/-0.2 V magnitude is tip of red-giant branch in NGC 5128	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W WF C3	(1) NGC-5128-F5	WFC3/UVIS, ACCUM, UVIS	F814W			Pattern 3, Exps 1-2 in Visit F5 (01) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F5 (01)	2380 Secs [==>792 Secs (Pattern 1)] [==>792 Secs (Pattern 2)] [==>792 Secs (Pattern 3)]	[1]
	2	F814W ACS	(1) NGC-5128-F5	ACS/WFC, ACCUM, WFC	F814W			Pattern 3, Exps 1-2 in Visit F5 (01) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F5 (01)	2100 Secs [==>710 Secs (Pattern 1)] [==>760 Secs (Pattern 2)] [==>667 Secs (Pattern 3)]	[1]
	3	F606W WF C3	(1) NGC-5128-F5	WFC3/UVIS, ACCUM, UVIS	F606W			Pattern 3, Exps 3-4 in Visit F5 (01) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F5 (01)	2490 Secs [==>832 Secs (Pattern 1)] [==>832 Secs (Pattern 2)] [==>832 Secs (Pattern 3)]	[2]
	4	F606W ACS	(1) NGC-5128-F5	ACS/WFC, ACCUM, WFC	F606W			Pattern 3, Exps 3-4 in Visit F5 (01) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F5 (01)	2270 Secs [==>768 Secs (Pattern 1)] [==>795 Secs (Pattern 2)] [==>707 Secs (Pattern 3)]	[2]



Proposal 12964 - Visit F6 (02) - Probing the outermost halo in a giant galaxy: is it metal-poor and where does it end?

Sat Jun 30 02:05:25 GMT 2012

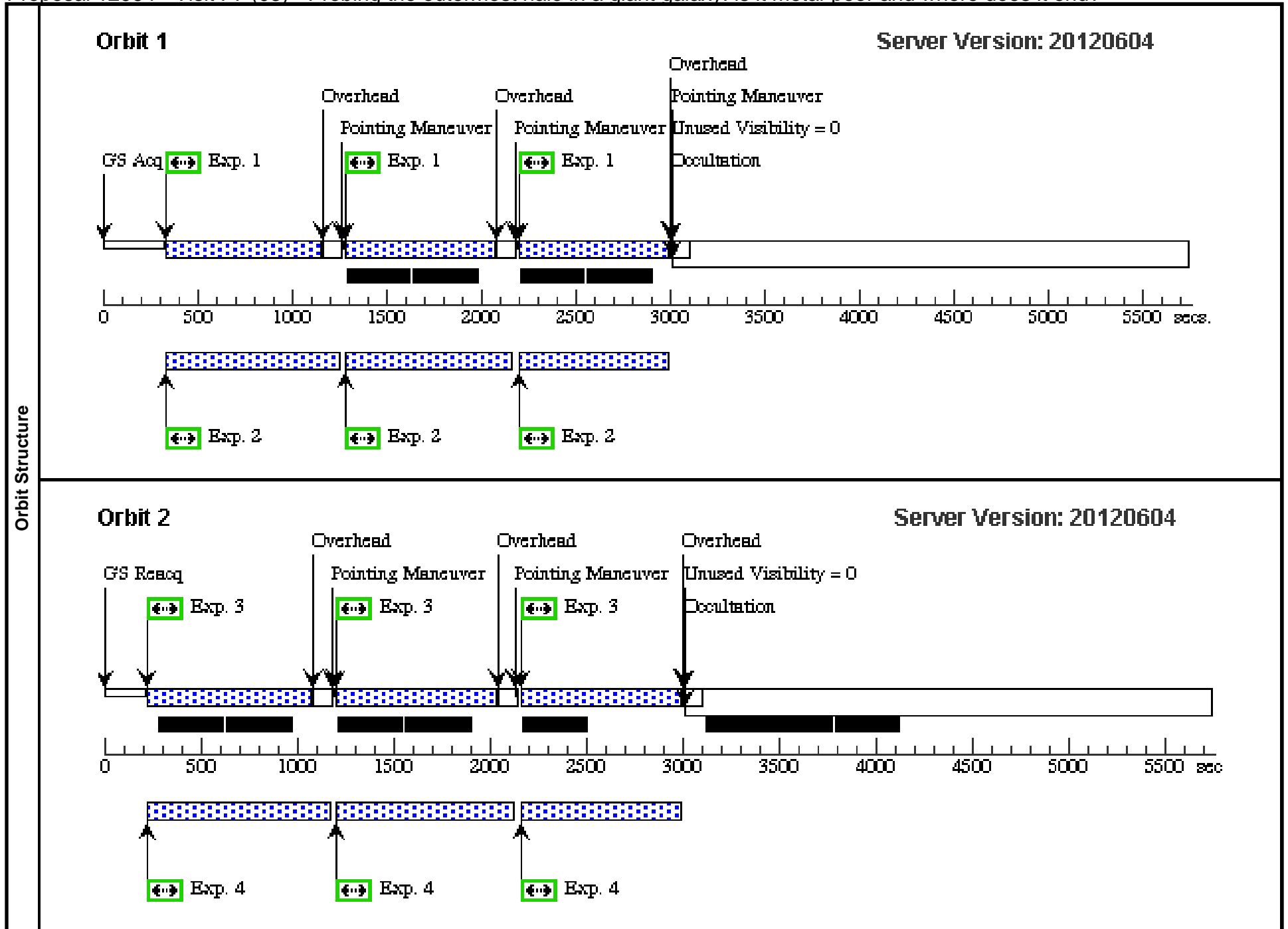
Visit	Proposal 12964, Visit F6 (02) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SCHED 100%; ORIENT 160D TO 190 D; ORIENT 265D TO 360 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(3)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-2), (3-4)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	NGC-5128-F6	RA: 13 29 10.0200 (202.2917500d) Dec: -41 51 21.40 (-41.85594d) Equinox: J2000		V=25.0+/-0.2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W WF C3	(2) NGC-5128-F6	WFC3/UVIS, ACCUM, UVIS	F814W			Pattern 3, Exps 1-2 in Visit F6 (02) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F6 (02)	2380 Secs [==>792 Secs (Pattern 1)] [==>792 Secs (Pattern 2)] [==>792 Secs (Pattern 3)]	[1]
	2	F814W ACS	(2) NGC-5128-F6	ACS/WFC, ACCUM, WFC	F814W			Pattern 3, Exps 1-2 in Visit F6 (02) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F6 (02)	2100 Secs [==>710 Secs (Pattern 1)] [==>760 Secs (Pattern 2)] [==>667 Secs (Pattern 3)]	[1]
	3	F606W WF C3	(2) NGC-5128-F6	WFC3/UVIS, ACCUM, UVIS	F606W			Pattern 3, Exps 3-4 in Visit F6 (02) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F6 (02)	2490 Secs [==>832 Secs (Pattern 1)] [==>832 Secs (Pattern 2)] [==>832 Secs (Pattern 3)]	[2]
	4	F606W ACS	(2) NGC-5128-F6	ACS/WFC, ACCUM, WFC	F606W			Pattern 3, Exps 3-4 in Visit F6 (02) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F6 (02)	2270 Secs [==>768 Secs (Pattern 1)] [==>795 Secs (Pattern 2)] [==>707 Secs (Pattern 3)]	[2]



Proposal 12964 - Visit F7 (03) - Probing the outermost halo in a giant galaxy: is it metal-poor and where does it end?

Sat Jun 30 02:05:29 GMT 2012

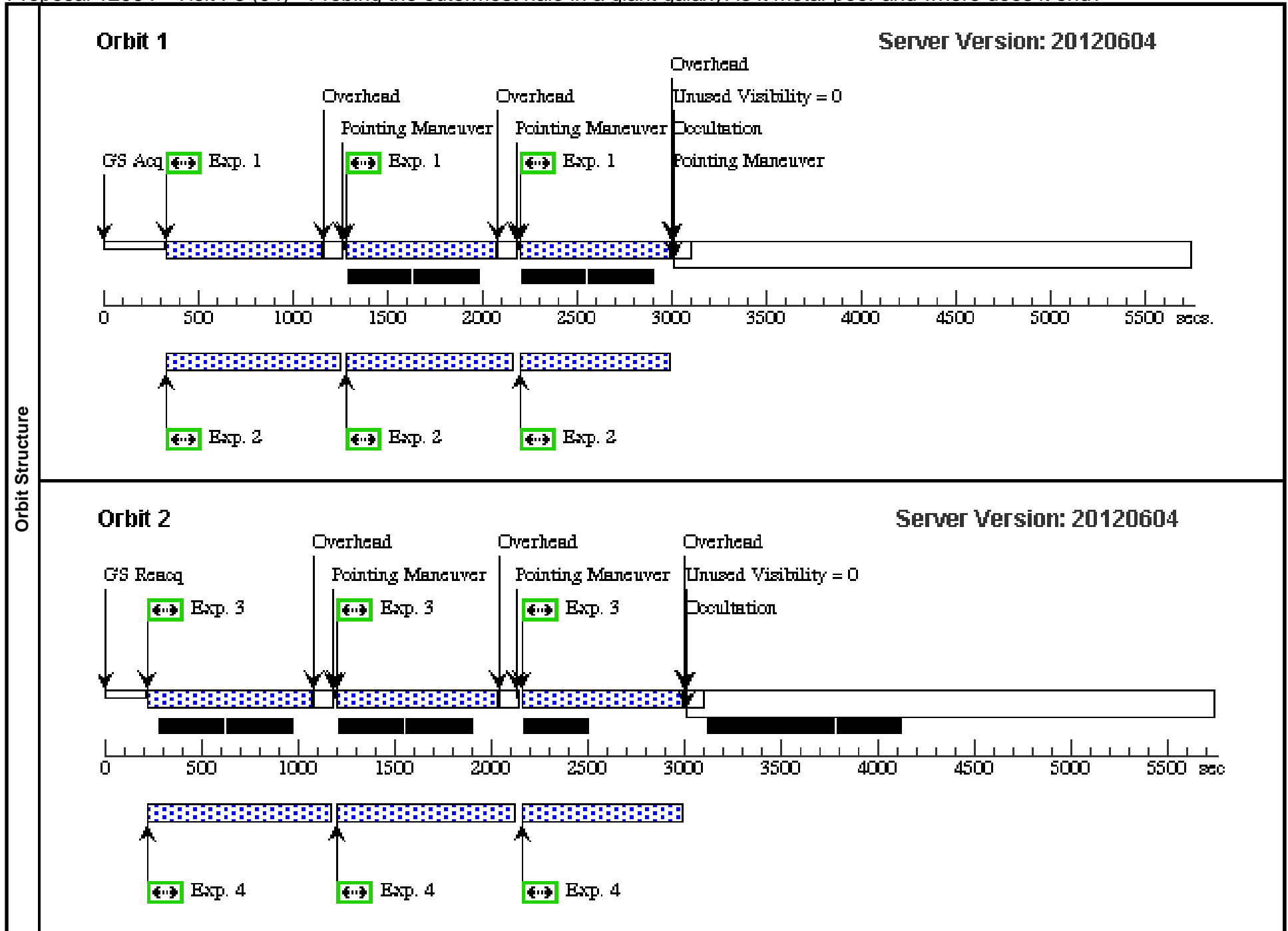
Visit	Proposal 12964, Visit F7 (03) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SCHED 100%; ORIENT 0D TO 110 D; ORIENT 177D TO 359 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
	(3)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-2), (3-4)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(3)	NGC-5128-F7	RA: 13 31 28.7300 (202.8697083d) Dec: -41 16 44.60 (-41.27906d) Equinox: J2000		V=25.0+/-0.2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W WF C3	(3) NGC-5128-F7	WFC3/UVIS, ACCUM, UVIS	F814W			Pattern 3, Exps 1-2 in Visit F7 (03) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F7 (03)	2380 Secs [==>792 Secs (Pattern 1)] [==>792 Secs (Pattern 2)] [==>792 Secs (Pattern 3)]	[1]
	2	F814W ACS	(3) NGC-5128-F7	ACS/WFC, ACCUM, WFC	F814W			Pattern 3, Exps 1-2 in Visit F7 (03) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F7 (03)	2100 Secs [==>710 Secs (Pattern 1)] [==>760 Secs (Pattern 2)] [==>667 Secs (Pattern 3)]	[1]
	3	F606W WF C3	(3) NGC-5128-F7	WFC3/UVIS, ACCUM, UVIS	F606W			Pattern 3, Exps 3-4 in Visit F7 (03) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F7 (03)	2490 Secs [==>832 Secs (Pattern 1)] [==>832 Secs (Pattern 2)] [==>832 Secs (Pattern 3)]	[2]
	4	F606W ACS	(3) NGC-5128-F7	ACS/WFC, ACCUM, WFC	F606W			Pattern 3, Exps 3-4 in Visit F7 (03) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F7 (03)	2270 Secs [==>768 Secs (Pattern 1)] [==>795 Secs (Pattern 2)] [==>707 Secs (Pattern 3)]	[2]



Proposal 12964 - Visit F8 (04) - Probing the outermost halo in a giant galaxy: is it metal-poor and where does it end?

Sat Jun 30 02:05:31 GMT 2012

Visit	Proposal 12964, Visit F8 (04) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SCHED 100%; ORIENT 50D TO 320 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(3)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-2), (3-4)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(4)	NGC-5128-F8	RA: 13 23 20.3000 (200.8345833d) Dec: -42 47 10.30 (-42.78619d) Equinox: J2000		V=25.0+/-0.2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W WF C3	(4) NGC-5128-F8	WFC3/UVIS, ACCUM, UVIS	F814W			Pattern 3, Exps 1-2 in Visit F8 (04) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F8 (04)	2380 Secs [==>792 Secs (Pattern 1)] [==>792 Secs (Pattern 2)] [==>792 Secs (Pattern 3)]	[1]
	2	F814W ACS	(4) NGC-5128-F8	ACS/WFC, ACCUM, WFC	F814W			Pattern 3, Exps 1-2 in Visit F8 (04) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F8 (04)	2100 Secs [==>710 Secs (Pattern 1)] [==>760 Secs (Pattern 2)] [==>667 Secs (Pattern 3)]	[1]
	3	F606W WF C3	(4) NGC-5128-F8	WFC3/UVIS, ACCUM, UVIS	F606W			Pattern 3, Exps 3-4 in Visit F8 (04) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F8 (04)	2490 Secs [==>832 Secs (Pattern 1)] [==>832 Secs (Pattern 2)] [==>832 Secs (Pattern 3)]	[2]
	4	F606W ACS	(4) NGC-5128-F8	ACS/WFC, ACCUM, WFC	F606W			Pattern 3, Exps 3-4 in Visit F8 (04) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F8 (04)	2270 Secs [==>768 Secs (Pattern 1)] [==>795 Secs (Pattern 2)] [==>707 Secs (Pattern 3)]	[2]



Proposal 12964 - Visit F9 (05) - Probing the outermost halo in a giant galaxy: is it metal-poor and where does it end?

Sat Jun 30 02:05:33 GMT 2012

Visit	Proposal 12964, Visit F9 (05) Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/UVIS, ACS/WFC Special Requirements: SCHED 100%; ORIENT 130D TO 206 D; ORIENT 240D TO 290 D									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(3)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1-2), (3-4)				
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(5)	NGC-5128-F9	RA: 13 20 30.0000 (200.125000d) Dec: -42 30 0.00 (-42.50000d) Equinox: J2000		V=25.0+/-0.2	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	F814W WF C3	(5) NGC-5128-F9	WFC3/UVIS, ACCUM, UVIS	F814W			Pattern 3, Exps 1-2 in Visit F9 (05) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F9 (05)	2380 Secs [==>792 Secs (Pattern 1)] [==>792 Secs (Pattern 2)] [==>792 Secs (Pattern 3)]	[1]
	2	F814W ACS	(5) NGC-5128-F9	ACS/WFC, ACCUM, WFC	F814W			Pattern 3, Exps 1-2 in Visit F9 (05) (3) Prime + Parallel Group 1-2 in Pattern 3, Exps 1-2 in Visit F9 (05)	2100 Secs [==>710 Secs (Pattern 1)] [==>760 Secs (Pattern 2)] [==>667 Secs (Pattern 3)]	[1]
	3	F606W WF C3	(5) NGC-5128-F9	WFC3/UVIS, ACCUM, UVIS	F606W			Pattern 3, Exps 3-4 in Visit F9 (05) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F9 (05)	2490 Secs [==>832 Secs (Pattern 1)] [==>832 Secs (Pattern 2)] [==>832 Secs (Pattern 3)]	[2]
	4	F606W ACS	(5) NGC-5128-F9	ACS/WFC, ACCUM, WFC	F606W			Pattern 3, Exps 3-4 in Visit F9 (05) (3) Prime + Parallel Group 3-4 in Pattern 3, Exps 3-4 in Visit F9 (05)	2270 Secs [==>768 Secs (Pattern 1)] [==>795 Secs (Pattern 2)] [==>707 Secs (Pattern 3)]	[2]

