



15997 - The growth of supermassive black holes in the first massive structures

Cycle: 27, 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) SPT0348-62	WFC3/IR	1	20-Sep-2019 10:00:17.0	yes
02	(1) SPT0348-62	WFC3/IR	1	20-Sep-2019 10:00:18.0	yes
03	(1) SPT0348-62	WFC3/IR	1	20-Sep-2019 10:00:19.0	yes
04	(1) SPT0348-62	WFC3/IR	1	20-Sep-2019 10:00:20.0	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	(1) SPT0348-62	WFC3/IR	1	20-Sep-2019 10:00:20.0	yes
06	(2) SPT0348-62-OFFSET	WFC3/IR	1	20-Sep-2019 10:00:21.0	yes
07	(2) SPT0348-62-OFFSET	WFC3/IR	1	20-Sep-2019 10:00:22.0	yes
08	(2) SPT0348-62-OFFSET	WFC3/IR	1	20-Sep-2019 10:00:22.0	yes

8 Total Orbits Used

ABSTRACT

We propose joint Chandra 250 ks and 8 orbit HST WFC3/F160W imaging of SPT0348-62, the highest-redshift ($z=5.7$), densest, massive proto-cluster yet. The sources so far confirmed to be in the SPT0348-62 protocluster are both remarkable, in mass and source density, and yet are only the tip of the iceberg. We propose observations which will identify and characterize all bright AGN which may be present within this rapidly forming structure, their host galaxy stellar masses and specific star formation rates.

OBSERVING DESCRIPTION

8 orbits in one filter WFC3/IR/F160W

Each visit - F160W, SPARS50 sequence, NSAMP=14, wide 4-pt dither to mitigate artifacts

5 orbits in central location with a slightly larger offset for the remaining three orbits to make sure to probe the full structure. This offset has been specified as a second target coord.

Proposal 15997 - Visit 01 (01) - The growth of supermassive black holes in the first massive structures

Visit	Proposal 15997, Visit 01 (01)										Fri Sep 20 14:00:23 GMT 2019	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR											
	Special Requirements: (none)											
Patterns	#	Primary Pattern					Secondary Pattern				Exposures	
	(1)	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				(1)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	SPT0348-62		RA: 03 48 42.1050 (57.1754375d) Dec: -62 20 51.22 (-62.34756d) Equinox: J2000				V=25		Reference Frame: ICRS		
	Comments: Category=CLUSTER OF GALAXIES Description=[HIGH REDSHIFT CLUSTER, STAR FORMING REGION]											
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	Orbit_1_F16 0W	(1) SPT0348-62	WFC3/IR, MULTIACCUM, IR		F160W	NSAMP=14; SAMP-SEQ=SPAR S50		Pattern 1, Exps 1-1 in Visit 01 (01) (1)	652.938154 Secs (2611.753 Secs)		
										[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]		[1]
Orbit Structure	Orbit 1 Server Version: 20190514 The diagram illustrates the timeline for Orbit 1, spanning from 0 to 6000 seconds. Key events include: GS Acq: Ground Station Acquisition at approximately 100 seconds. Exp. 1: Four exposure periods, each lasting approximately 100 seconds, occurring at roughly 300, 1000, 1700, and 2400 seconds. Pointing Maneuver: Three maneuvers, each lasting approximately 100 seconds, occurring at roughly 1000, 1700, and 2400 seconds. Reconfig: A reconfiguration period lasting approximately 100 seconds, occurring at roughly 3200 seconds. Occultation: A period of occultation lasting approximately 100 seconds, occurring at roughly 3300 seconds. Unused Orbital Visibility: A period of approximately 238 seconds, occurring at the end of the orbit.											

Proposal 15997 - Visit 02 (02) - The growth of supermassive black holes in the first massive structures

Visit	Proposal 15997, Visit 02 (02)										Fri Sep 20 14:00:23 GMT 2019	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR											
	Special Requirements: (none)											
Patterns	#	Primary Pattern					Secondary Pattern				Exposures	
	(1)	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				(1)	
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	SPT0348-62		RA: 03 48 42.1050 (57.1754375d) Dec: -62 20 51.22 (-62.34756d) Equinox: J2000				V=25		Reference Frame: ICRS		
	Comments: Category=CLUSTER OF GALAXIES Description=[HIGH REDSHIFT CLUSTER, STAR FORMING REGION]											
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	Orbit_1_F16 0W	(1) SPT0348-62	WFC3/IR, MULTIACCUM, IR		F160W	NSAMP=14; SAMP-SEQ=SPAR S50			Pattern 1, Exps 1-1 in Visit 02 (02) (1)	652.938154 Secs (2611.753 Secs) [==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)] [==>(Pattern 4)]	[1]
Orbit Structure	Orbit 1 Server Version: 20190514 The diagram illustrates the timeline for Orbit 1, spanning from 0 to 6000 seconds. Key events include: GS Acq: Ground Station Acquisition at approximately 100 seconds. Exp. 1: Four exposure periods, each lasting about 100 seconds, occurring at approximately 300, 1000, 1700, and 2400 seconds. Pointing Maneuver: Three maneuvers, each lasting about 100 seconds, occurring at approximately 1000, 1700, and 2400 seconds. Reconfig: A reconfiguration period lasting about 100 seconds, occurring at approximately 3200 seconds. Occultation: A period of occultation lasting about 100 seconds, occurring at approximately 3300 seconds. Unused Orbital Visibility: A period of unused orbital visibility lasting 238 seconds, occurring at approximately 3400 seconds.											

Proposal 15997 - Visit 03 (03) - The growth of supermassive black holes in the first massive structures

Visit	Proposal 15997, Visit 03 (03)										Fri Sep 20 14:00:23 GMT 2019				
	Diagnostic Status: No Diagnostics														
	Scientific Instruments: WFC3/IR														
	Special Requirements: (none)														
Patterns	#	Primary Pattern					Secondary Pattern					Exposures			
	(1)	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					(1)			
Fixed Targets	#	Name		Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous					
	(1)	SPT0348-62		RA: 03 48 42.1050 (57.1754375d) Dec: -62 20 51.22 (-62.34756d) Equinox: J2000				V=25		Reference Frame: ICRS					
Comments: Category=CLUSTER OF GALAXIES Description=[HIGH REDSHIFT CLUSTER, STAR FORMING REGION]															
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.		Opt. Params.		Special Reqs.		Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	
	1	Orbit_1_F160W	(1) SPT0348-62	WFC3/IR, MULTIACCUM, IR		F160W		NSAMP=14; SAMP-SEQ=SPAR S50				Pattern 1, Exps 1-1 in Visit 03 (03) (1)	652.938154 Secs (2611.753 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]	
Orbit Structure	Orbit 1													Server Version: 20190514	

Proposal 15997 - Visit 04 (04) - The growth of supermassive black holes in the first massive structures

Visit	Proposal 15997, Visit 04 (04)										Fri Sep 20 14:00:23 GMT 2019			
	Diagnostic Status: No Diagnostics													
	Scientific Instruments: WFC3/IR													
	Special Requirements: (none)													
Patterns	#	Primary Pattern				Secondary Pattern				Exposures				
	(1)	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				(1)				
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous					
	(1)	SPT0348-62	RA: 03 48 42.1050 (57.1754375d) Dec: -62 20 51.22 (-62.34756d) Equinox: J2000				V=25		Reference Frame: ICRS					
	Comments:													
	Category=CLUSTER OF GALAXIES													
Description=[HIGH REDSHIFT CLUSTER, STAR FORMING REGION]														
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit		
	1	Orbit_1_F16 0W	(1) SPT0348-62	WFC3/IR, MULTIACCUM, IR		F160W	NSAMP=14; SAMP-SEQ=SPAR S50		Pattern 1, Exps 1-1 in Visit 04 (04) (1)	652.938154 Secs (2611.753 Secs)				
											[=>(Pattern 1)]		[1]	
											[=>(Pattern 2)]			
										[=>(Pattern 3)]				
										[=>(Pattern 4)]				
Orbit Structure	Orbit 1												Server Version: 20190514	
	The diagram illustrates the timeline for Orbit 1, spanning from 0 to 6000 seconds. Key events include: GS Acq: Ground Station Acquisition at approximately 100 seconds. Exp. 1: Four exposure periods, each lasting approximately 100 seconds, occurring at roughly 400, 1000, 1700, and 2400 seconds. Pointing Maneuver: Three maneuvers, each lasting approximately 100 seconds, occurring at roughly 1000, 1700, and 2400 seconds. Reconfig: A reconfiguration period lasting approximately 100 seconds, occurring at roughly 3200 seconds. Occultation: A period of occultation lasting approximately 100 seconds, occurring at roughly 3300 seconds. Unused Orbital Visibility: A period of unused orbital visibility lasting approximately 238 seconds, occurring at roughly 3400 seconds.													

Proposal 15997 - Visit 05 (05) - The growth of supermassive black holes in the first massive structures

Visit	Proposal 15997, Visit 05 (05) Fri Sep 20 14:00:23 GMT 2019				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	
	(1)	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	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(1)	SPT0348-62	RA: 03 48 42.1050 (57.1754375d) Dec: -62 20 51.22 (-62.34756d) Equinox: J2000		V=25
Exposures	Comments: Category=CLUSTER OF GALAXIES Description=[HIGH REDSHIFT CLUSTER, STAR FORMING REGION]				
	#	Label	Target	Config,Mode,Aperture	Spectral Els.
	1	Orbit_1_F16 0W	(1) SPT0348-62	WFC3/IR, MULTIACCUM, IR	F160W
					Opt. Params. NSAMP=14; SAMP-SEQ=SPAR S50
				Special Reqs.	Groups
					Pattern 1, Exps 1-1 in Visit 05 (05) (1)
				Exp. Time (Total)/[Actual Dur.]	Orbit
				652.938154 Secs (2611.753 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]	[1]
Orbit Structure	Orbit 1 Server Version: 20190514				

Proposal 15997 - Visit 06 (06) - The growth of supermassive black holes in the first massive structures

Visit	Proposal 15997, Visit 06 (06)										Fri Sep 20 14:00:23 GMT 2019						
	Diagnostic Status: No Diagnostics																
	Scientific Instruments: WFC3/IR																
	Special Requirements: (none)																
Patterns	#	Primary Pattern					Secondary Pattern					Exposures					
	(1)	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					(1)					
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Fluxes		Miscellaneous						
	(2)	SPT0348-62-OFFSET	RA: 03 49 0.0000 (57.2500000d) Dec: -62 20 59.70 (-62.34992d) Equinox: J2000						V=25		Reference Frame: ICRS						
	Comments: Category=CLUSTER OF GALAXIES Description=[HIGH REDSHIFT CLUSTER, STAR FORMING REGION]																
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.		Opt. Params.		Special Reqs.		Groups	Exp. Time (Total)/[Actual Dur.]		Orbit		
	1	Orbit_1_F160W	(2) SPT0348-62-OFFSET	WFC3/IR, MULTIACCUM, IR		F160W		NSAMP=14; SAMP-SEQ=SPAR S50				Pattern 1, Exps 1-1 in Visit 06 (06) (1)	652.938154 Secs (2611.753 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]		[1]		
Orbit Structure	Orbit 1															Server Version: 20190514	

Proposal 15997 - Visit 07 (07) - The growth of supermassive black holes in the first massive structures

Visit	Proposal 15997, Visit 07 (07)										Fri Sep 20 14:00:23 GMT 2019				
	Diagnostic Status: No Diagnostics														
	Scientific Instruments: WFC3/IR														
	Special Requirements: (none)														
Patterns	#	Primary Pattern					Secondary Pattern				Exposures				
	(1)	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				(1)				
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous					
	(2)	SPT0348-62-OFFSET	RA: 03 49 0.0000 (57.2500000d) Dec: -62 20 59.70 (-62.34992d) Equinox: J2000					V=25		Reference Frame: ICRS					
	Comments: Category=CLUSTER OF GALAXIES Description=[HIGH REDSHIFT CLUSTER, STAR FORMING REGION]														
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.		Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit		
	1	Orbit_1_F160W	(2) SPT0348-62-OFFSET	WFC3/IR, MULTIACCUM, IR FSET		F160W	NSAMP=14; SAMP-SEQ=SPAR S50			Pattern 1, Exps 1-1 in Visit 07 (07) (1)	652.938154 Secs (2611.753 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]		[1]		
Orbit Structure	Orbit 1													Server Version: 20190514	

Proposal 15997 - Visit 08 (08) - The growth of supermassive black holes in the first massive structures

Visit	Proposal 15997, Visit 08 (08) Fri Sep 20 14:00:23 GMT 2019				
	Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)				
Patterns	#	Primary Pattern		Secondary Pattern	
	(1)	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	
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes
	(2)	SPT0348-62-OFFSET	RA: 03 49 0.0000 (57.2500000d) Dec: -62 20 59.70 (-62.34992d) Equinox: J2000		V=25
	Comments: Category=CLUSTER OF GALAXIES Description=[HIGH REDSHIFT CLUSTER, STAR FORMING REGION]				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.
	1	Orbit_1_F160W	(2) SPT0348-62-OFFSET	WFC3/IR, MULTIACCUM, IR	F160W
				Opt. Params.	Special Reqs.
				NSAMP=14; SAMP-SEQ=SPAR S50	
				Groups	Exp. Time (Total)/[Actual Dur.]
				Pattern 1, Exps 1-1 in Visit 08 (08) (1)	652.938154 Secs (2611.753 Secs)
					[=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)] [=>(Pattern 4)]
					[1]
Orbit Structure	Orbit 1 Server Version: 20190514				