



2567 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar systems in the Virgo cluster.

Cycle: 1, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				

Folder	Observation	Label	Observing Template	Science Target
	6	UCD-453	NIRSpec IFU Spectroscopy	(5) UCD-453
	24	UCD-761	NIRSpec IFU Spectroscopy	(23) UCD-761
	35	UCD-395	NIRSpec IFU Spectroscopy	(34) UCD-395
	36	UCD-218	NIRSpec IFU Spectroscopy	(35) UCD-218
	37	UCD-736	NIRSpec IFU Spectroscopy	(36) UCD-736
	38	UCD-504	NIRSpec IFU Spectroscopy	(37) UCD-504
	32	UCDe-372	NIRSpec IFU Spectroscopy	(31) UCDE-372
	33	UCDe-374	NIRSpec IFU Spectroscopy	(32) UCDE-374
	34	UCDe-444	NIRSpec IFU Spectroscopy	(33) UCDE-444
	20	cE-VCC1192	NIRSpec IFU Spectroscopy	(19) CE-VCC1192
	21	cE-VCC1199	NIRSpec IFU Spectroscopy	(20) CE-VCC1199
	22	cE-VCC1297	NIRSpec IFU Spectroscopy	(21) CE-VCC1297
	23	cE-VCC1627	NIRSpec IFU Spectroscopy	(22) CE-VCC1627
	26	NSC-VCC1261	NIRSpec IFU Spectroscopy	(26) NSC-VCC1261
	27	NSC-VCC1910	NIRSpec IFU Spectroscopy	(27) NSC-VCC1910
	28	NSC-VCC1661	NIRSpec IFU Spectroscopy	(28) NSC-VCC1661
	29	NSC-VCC1539	NIRSpec IFU Spectroscopy	(29) NSC-VCC1539
	30	NSC-VCC1075	NIRSpec IFU Spectroscopy	(30) NSC-VCC1075
	39	M49 Sky Background	NIRSpec IFU Spectroscopy	(38) M49-SKYBACKGROUND
	41	M87 Sky Background	NIRSpec IFU Spectroscopy	(40) M87-SKYBACKGROUND

ABSTRACT

The black hole (BH) mass function (MF) in the local universe - a fundamental measure of the origin and growth of BHs over Cosmic time - remains poorly constrained at intermediate masses. The very existence of BHs in this mass range is debated, but likely hosts include low-mass dwarf galaxies, for which the occupation fraction of BHs is an important ingredient for competing theories on supermassive BH (SMBH) formation. Observational challenges limit available avenues to search for BHs in dwarfs, but one under-utilized strategy is to infer the presence of central BHs by their dynamical influence on the cores of compact stellar systems (CSSs) including globular clusters, nuclear star clusters, ultra-compact dwarf galaxies (UCDs), and compact elliptical galaxies. CSSs have interconnected (often galactic) formation histories, and this technique has recently been successful in detecting SMBHs in several nearby UCDs, thereby proving their galactic origins as the remnant nuclei of former dwarf galaxies tidally stripped of their outer stellar sheaths. With the launch of JWST a systematic census of BHs in CSSs possible, as similar studies are prohibitively expensive using current ground or space-based facilities. To capitalize on JWST's capabilities we propose to use NIRSpec+IFU to obtain spatially-

resolved stellar kinematics of 18 carefully selected CSSs crossing nearly four decades in mass, and located in a single cluster environment (Virgo). The $R \sim 2700$ spectral datacubes will reveal dynamical fingerprints of BHs with masses $> \sim 10^{5.5} M_{\text{sun}}$, providing new insights into the occupation fraction of BHs in low-mass systems, and critical information on the origin of both CSSs and SMBHs.

OBSERVING DESCRIPTION

We propose to use NIRSpec in IFU mode at its highest resolution with the G235H/F170LP grating/filter combination to study black hole (BHs) in a selection of 18 compact stellar systems (CSSs) in the Virgo galaxy cluster ($D=16.7$ Mpc). These datacubes will provide $R \sim 2700$ spectral resolution across the 1.66-3.17 μm wavelength range, including several CO bandheads near 2.35 μm . We will measure spatially resolved stellar kinematics from these and other prominent absorption features to search for the dynamical influence of central massive black holes (BHs) residing in the CSS cores. In most cases, the dynamical influence of the BHs is expected to boost the stellar velocity dispersions above ~ 50 km/s, similar to the velocity FWHM of NIRSpec/IFU in our adopted instrumental setup.

We have carried out several simulations for our targets that include measured structural parameters, to determine that reliable kinematics can be recovered with spectral quality of $S/N \sim 15-20$ per resolution element. Due to the compact natures of many of our targets, we will use a two-point in-scene nod where possible (i.e. CSSs with sizes smaller than 0.2-0.3") and for the rest a four-point dither strategy will be sufficient to model the sky background and/or host galaxy spheroid light. This strategy helps to keep our observations efficient, and minimizes overheads. Furthermore, while our observations will achieve our required S/N in the CSS core regions, we will use an adaptive Voronoi tessellation spatial binning strategy to boost the S/N in the outskirts and thereby construct 2D kinematic maps of our targets so that our science goals can be realized.

Proposal 2567 - Targets - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar systems in th...

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(5)	UCD-453	RA: 12 31 11.8810 (187.7995042d) Dec: +12 41 1.09 (12.68364d) Equinox: J2000 Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]		
	(19)	CE-VCC1192	RA: 12 29 30.2500 (187.3760417d) Dec: +07 59 34.30 (7.99286d) Equinox: J2000 Comments: Category=Galaxy Description=[Compact galaxies] Extended=YES		
	(20)	CE-VCC1199	RA: 12 29 34.9900 (187.3957917d) Dec: +08 03 28.80 (8.05800d) Equinox: J2000 Comments: Category=Galaxy Description=[Compact galaxies]		
	(21)	CE-VCC1297	RA: 12 30 31.9700 (187.6332083d) Dec: +12 29 24.60 (12.49017d) Equinox: J2000 Comments: Category=Galaxy Description=[Compact galaxies]		
	(22)	CE-VCC1627	RA: 12 35 37.2500 (188.9052083d) Dec: +12 22 55.40 (12.38206d) Equinox: J2000 Comments: Category=Galaxy Description=[Compact galaxies]		
	(23)	UCD-761	RA: 12 43 52.4180 (190.9684083d) Dec: +11 25 34.20 (11.42617d) Equinox: J2000 Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]		
	(26)	NSC-VCC1261	RA: 12 30 10.3300 (187.5430417d) Dec: +10 46 46.20 (10.77950d) Equinox: J2000 Comments: Category=Galaxy Description=[Galaxy nuclei]		
	(27)	NSC-VCC1910	RA: 12 42 8.6700 (190.5361250d) Dec: +11 45 15.40 (11.75428d) Equinox: J2000 Comments: Category=Galaxy Description=[Galaxy nuclei]		

Proposal 2567 - Targets - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar systems in th...

(28)	NSC-VCC1661	RA: 12 36 24.7800 (189.1032500d) Dec: +10 23 4.80 (10.38467d) Equinox: J2000 <i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Galaxy nuclei]</i>
(29)	NSC-VCC1539	RA: 12 34 6.7400 (188.5280833d) Dec: +12 44 29.70 (12.74158d) Equinox: J2000 <i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Galaxy nuclei]</i>
(30)	NSC-VCC1075	RA: 12 28 12.3100 (187.0512917d) Dec: +10 17 51.50 (10.29764d) Equinox: J2000 <i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Galaxy nuclei]</i>
(31)	UCDE-372	RA: 12 30 18.0570 (187.5752375d) Dec: +07 50 24.89 (7.84025d) Equinox: J2000 <i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Ultracompact dwarf galaxies]</i>
(32)	UCDE-374	RA: 12 30 20.0460 (187.5835250d) Dec: +11 55 18.68 (11.92186d) Equinox: J2000 <i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Ultracompact dwarf galaxies]</i>
(33)	UCDE-444	RA: 12 31 4.4780 (187.7686583d) Dec: +11 56 36.43 (11.94345d) Equinox: J2000 <i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Ultracompact dwarf galaxies]</i>
(34)	UCD-395	RA: 12 30 33.4320 (187.6393000d) Dec: +12 29 54.33 (12.49842d) Equinox: J2000 <i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Ultracompact dwarf galaxies]</i>
(35)	UCD-218	RA: 12 26 36.4240 (186.6517667d) Dec: +12 55 12.88 (12.92024d) Equinox: J2000 <i>Comments:</i> <i>Category=Galaxy</i> <i>Description=[Ultracompact dwarf galaxies]</i>

Proposal 2567 - Targets - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar systems in th...

(36)	UCD-736	RA: 12 42 51.1210 (190.7130042d) Dec: +11 37 16.04 (11.62112d) Equinox: J2000 Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]
(37)	UCD-504	RA: 12 32 14.5780 (188.0607417d) Dec: +12 03 5.35 (12.05149d) Equinox: J2000 Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]
(38)	M49-SKYBACKGROUND	RA: 12 29 4.2400 (187.2676667d) Dec: +08 06 24.40 (8.10678d) Equinox: J2000 Comments: Category=Calibration Description=[Telescope/sky background] Extended=NO
(40)	M87-SKYBACKGROUND	RA: 12 35 1.0000 (188.7541667d) Dec: +12 22 48.70 (12.38019d) Equinox: J2000 Comments: Category=Calibration Description=[Telescope/sky background] Extended=NO

Proposal 2567 - Observation 6 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 6: UCD-453												Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning												
	Observing Template: NIRSpec IFU Spectroscopy												
Diagnostics	(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections				Miscellaneous		
	(5)	UCD-453	RA: 12 31 11.8810 (187.7995042d) Dec: +12 41 1.09 (12.68364d) Equinox: J2000										
	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]												
Template	TA Method												
	NONE												
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points			
	1	4-POINT-DITHER											
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
	1	G235H/F170LP	NRSIRS2RAPID	50	1	false	true	NONE	4	4	2976.134	59865.1	
Special Requirements	Aperture PA Range 115 to 130 Degrees (V3 336.02746582 to 351.02746582) Aperture PA Range 150 to 90 Degrees (V3 11.02746582 to 311.02746582)												

Proposal 2567 - Observation 24 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 24: UCD-761											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSpec IFU Spectroscopy											
Diagnostics	(Visit 24:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous		
	(23)	UCD-761	RA: 12 43 52.4180 (190.9684083d) Dec: +11 25 34.20 (11.42617d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points		
	1	4-POINT-DITHER										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2RAPID	32	2	false	true	NONE	4	8	3851.467	59865.2
Special Requirements	Aperture PA Range 125 to 40 Degrees (V3 346.02746582 to 261.02746582)											

Proposal 2567 - Observation 35 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 35: UCD-395												Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning												
Diagnostics	Observing Template: NIRSpec IFU Spectroscopy												
	(Visit 35:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous			
	(34)	UCD-395	RA: 12 30 33.4320 (187.6393000d) Dec: +12 29 54.33 (12.49842d) Equinox: J2000										
Template	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]												
	TA Method												
Dithers	NONE												
	#	Dither Type		Size		Starting Point		Number of Points		Points			
Spectral Elements	1	4-POINT-DITHER											
	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
Special Requirements	1	G235H/F170LP	NRSIRS2	19	2	false	true	NONE	4	8	11204.268	59865.3	
	Aperture PA Range 70 to 80 Degrees (V3 291.02746582 to 301.02746582) Aperture PA Range 120 to 160 Degrees (V3 341.02746582 to 21.02746582) Aperture PA Range 180 to 200 Degrees (V3 41.02746582 to 61.02746582) Aperture PA Range 220 to 30 Degrees (V3 81.02746582 to 251.02746582)												

Proposal 2567 - Observation 36 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 36: UCD-218											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSspec IFU Spectroscopy											
Diagnostics	(Visit 36:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous			
	(35)	UCD-218	RA: 12 26 36.4240 (186.6517667d) Dec: +12 55 12.88 (12.92024d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points		
	1	4-POINT-DITHER										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2RAPID	64	1	false	true	NONE	4	4	3793.111	59865.4

Proposal 2567 - Observation 37 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 37: UCD-736												Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning												
	Observing Template: NIRSpec IFU Spectroscopy												
Diagnostics	(Visit 37:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
	(Visit 37:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.												
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous			
	(36)	UCD-736	RA: 12 42 51.1210 (190.7130042d) Dec: +11 37 16.04 (11.62112d) Equinox: J2000										
	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]												
Template	TA Method												
	NONE												
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points			
	1	4-POINT-DITHER											
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
	1	G235H/F170LP	NRSIRS2RAPID	52	1	false	true	NONE	4	4	3092.845	59865.5	
Special Requirements	Aperture PA Range 170 to 190 Degrees (V3 31.02746582 to 51.02746582)												
	Aperture PA Range 280 to 85 Degrees (V3 141.02746582 to 306.02746582)												

Proposal 2567 - Observation 38 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 38: UCD-504												Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning												
	Observing Template: NIRSspec IFU Spectroscopy												
Diagnostics	(Visit 38:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Fixed Targets	#	Name		Target Coordinates			Targ. Coord. Corrections			Miscellaneous			
	(37)	UCD-504		RA: 12 32 14.5780 (188.0607417d)									
				Dec: +12 03 5.35 (12.05149d)									
	Equinox: J2000												
	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]												
Template	TA Method												
	NONE												
Dithers	#	Dither Type			Size		Starting Point		Number of Points		Points		
	1	4-POINT-DITHER											
Spectral Elements	#	Grating/Filter		Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP		NRSIRS2	12	2	false	true	NONE	4	8	7119.378	59865.6
Special Requirements	Aperture PA Range 30 to 60 Degrees (V3 251.02746582 to 281.02746582) Aperture PA Range 150 to 300 Degrees (V3 11.02746582 to 161.02746582)												

Proposal 2567 - Observation 32 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 32: UCDe-372											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSpec IFU Spectroscopy											
Diagnostics	(Visit 32:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous		
	(31)	UCDE-372	RA: 12 30 18.0570 (187.5752375d) Dec: +07 50 24.89 (7.84025d) Equinox: J2000									
Template	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]											
	TA Method											
	NONE											
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points		
	1	4-POINT-DITHER										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wbkk.Calc ID
	1	G235H/F170LP	NRSIRS2	20	2	false	true	NONE	4	8	11787.823	57565.14
Special Requirements	Aperture PA Range 296 to 305 Degrees (V3 157.02746582 to 166.02746582) Aperture PA Range 336 to 260 Degrees (V3 197.02746582 to 121.02746582)											

Proposal 2567 - Observation 33 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 33: UCDe-374											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSspec IFU Spectroscopy											
Diagnostics	(Visit 33:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous			
	(32)	UCDE-374	RA: 12 30 20.0460 (187.5835250d) Dec: +11 55 18.68 (11.92186d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points		
	1	4-POINT-DITHER										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2	15	2	false	true	NONE	4	8	8870.045	57565.10

Proposal 2567 - Observation 34 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 34: UCDe-444												Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning												
	Observing Template: NIRSpec IFU Spectroscopy												
Diagnostics	(Visit 34:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous			
	(33)	UCDE-444	RA: 12 31 4.4780 (187.7686583d) Dec: +11 56 36.43 (11.94345d) Equinox: J2000										
	Comments: Category=Galaxy Description=[Ultracompact dwarf galaxies]												
Template	TA Method												
	NONE												
Dithers	#	Dither Type		Size		Starting Point			Number of Points		Points		
	1	4-POINT-DITHER											
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
	1	G235H/F170LP	NRSIRS2	12	2	false	true	NONE	4	8	7119.378	57565.15	
Special Requirements	Aperture PA Range 20 to 45 Degrees (V3 241.02746582 to 266.02746582) Aperture PA Range 62 to 125 Degrees (V3 283.02746582 to 346.02746582) Aperture PA Range 210 to 260 Degrees (V3 71.02746582 to 121.02746582) Aperture PA Range 275 to 283 Degrees (V3 136.02746582 to 144.02746582) Aperture PA Range 310 to 322 Degrees (V3 171.02746582 to 183.02746582) Aperture PA Range 347 to 358 Degrees (V3 208.02746582 to 219.02746582)												

Proposal 2567 - Observation 20 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 20: cE-VCC1192 Sun Nov 20 17:03:09 GMT 2022																																															
	Diagnostic Status: Warning Observing Template: NIRSpect IFU Spectroscopy Background Observations:[M49 Sky Background (Obs 39)]																																															
Diagnostics	(Visit 20:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.																																															
Fixed Targets	<table border="1"> <thead> <tr> <th>#</th><th>Name</th><th>Target Coordinates</th><th>Targ. Coord. Corrections</th><th>Miscellaneous</th></tr> </thead> <tbody> <tr> <td>(19)</td><td>CE-VCC1192</td><td>RA: 12 29 30.2500 (187.3760417d) Dec: +07 59 34.30 (7.99286d) Equinox: J2000</td><td></td><td></td></tr> </tbody> </table>												#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(19)	CE-VCC1192	RA: 12 29 30.2500 (187.3760417d) Dec: +07 59 34.30 (7.99286d) Equinox: J2000																												
	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous																																											
(19)	CE-VCC1192	RA: 12 29 30.2500 (187.3760417d) Dec: +07 59 34.30 (7.99286d) Equinox: J2000																																														
Comments: Category=Galaxy Description=[Compact galaxies] Extended=YES																																																
Template	TA Method																																															
	NONE																																															
Dithers	<table border="1"> <thead> <tr> <th>#</th><th>Dither Type</th><th>Size</th><th>Starting Point</th><th>Number of Points</th><th>Points</th></tr> </thead> <tbody> <tr> <td>1</td><td>4-POINT-DITHER</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>												#	Dither Type	Size	Starting Point	Number of Points	Points	1	4-POINT-DITHER																												
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Spectral Elements	<table border="1"> <thead> <tr> <th>#</th><th>Grating/Filter</th><th>Readout Pattern</th><th>Groups/Int</th><th>Integrations/Exp</th><th>Leakcal</th><th>Dither</th><th>Autocal</th><th>Total Dithers</th><th>Total Integrations</th><th>Total Exposure Time</th><th>ETC Wkbk.Calc ID</th></tr> </thead> <tbody> <tr> <td>1</td><td>G235H/F170LP</td><td>NRSIRS2RAPID</td><td>12</td><td>1</td><td>true</td><td>false</td><td>NONE</td><td>1</td><td>1</td><td>189.656</td><td></td></tr> <tr> <td>2</td><td>G235H/F170LP</td><td>NRSIRS2RAPID</td><td>12</td><td>1</td><td>false</td><td>true</td><td>NONE</td><td>4</td><td>4</td><td>758.622</td><td>54099.2</td></tr> </tbody> </table>												#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	1	G235H/F170LP	NRSIRS2RAPID	12	1	true	false	NONE	1	1	189.656		2	G235H/F170LP	NRSIRS2RAPID	12	1	false	true	NONE	4	4	758.622	54099.2
	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID																																				
	1	G235H/F170LP	NRSIRS2RAPID	12	1	true	false	NONE	1	1	189.656																																					
2	G235H/F170LP	NRSIRS2RAPID	12	1	false	true	NONE	4	4	758.622	54099.2																																					
Special Requirements	Sequence Observations 20, 21, 39, Non-interruptible																																															

Proposal 2567 - Observation 21 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 21: cE-VCC1199											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSpect IFU Spectroscopy											
	Background Observations:[M49 Sky Background (Obs 39)]											
Diagnostics	(Visit 21:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous		
	(20)	CE-VCC1199	RA: 12 29 34.9900 (187.3957917d) Dec: +08 03 28.80 (8.05800d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Compact galaxies]											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size		Starting Point			Number of Points		Points	
	1	4-POINT-DITHER										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2RAPID	12	1	true	false	NONE	1	1	189.656	
	2	G235H/F170LP	NRSIRS2RAPID	12	1	false	true	NONE	4	4	758.622	54099.6
Special Requirements	Sequence Observations 20, 21, 39, Non-interruptible											

Proposal 2567 - Observation 22 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 22: cE-VCC1297											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSpec IFU Spectroscopy											
	Background Observations:[M87 Sky Background (Obs 41)]											
Diagnostics	(Visit 22:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous		
	(21)	CE-VCC1297	RA: 12 30 31.9700 (187.6332083d) Dec: +12 29 24.60 (12.49017d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Compact galaxies]											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points		
	1	4-POINT-DITHER										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2RAPID	12	1	false	true	NONE	4	4	758.622	54099.1
Special Requirements	Aperture PA Range 125 to 45 Degrees (V3 346.02746582 to 266.02746582)											
	Sequence Observations 22, 23, 41, Non-interruptible											

Proposal 2567 - Observation 23 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 23: cE-VCC1627												Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning												
	Observing Template: NIRSpec IFU Spectroscopy												
	Background Observations:[M87 Sky Background (Obs 41)]												
Diagnostics	(Visit 23:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous			
	(22)	CE-VCC1627	RA: 12 35 37.2500 (188.9052083d) Dec: +12 22 55.40 (12.38206d) Equinox: J2000										
	Comments: Category=Galaxy Description=[Compact galaxies]												
Template	TA Method												
	NONE												
Dithers	#	Dither Type		Size		Starting Point			Number of Points		Points		
	1	4-POINT-DITHER											
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	
	1	G235H/F170LP	NRSIRS2RAPID	12	1	false	true	NONE	4	4	758.622	54099.4	
Special Requirements	Aperture PA Range 58 to 65 Degrees (V3 279.02746582 to 286.02746582) Aperture PA Range 118 to 125 Degrees (V3 339.02746582 to 346.02746582) Aperture PA Range 153 to 20 Degrees (V3 14.02746582 to 241.02746582) Sequence Observations 22, 23, 41, Non-interruptible												

Proposal 2567 - Observation 26 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 26: NSC-VCC1261											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
Observing Template: NIRSspec IFU Spectroscopy												
Diagnostics	(Visit 26:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous		
	(26)	NSC-VCC1261	RA: 12 30 10.3300 (187.5430417d) Dec: +10 46 46.20 (10.77950d) Equinox: J2000									
Comments: Category=Galaxy Description=[Galaxy nuclei]												
Template	TA Method											
	NONE											
Dithers	#	Dither Type			Size	Starting Point			Number of Points		Points	
	1	4-POINT-DITHER										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2RAPID	24	1	true	false	NONE	1	1	364.722	
	2	G235H/F170LP	NRSIRS2RAPID	24	1	false	true	NONE	4	4	1458.889	54100.1

Proposal 2567 - Observation 27 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 27: NSC-VCC1910												Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning												
	Observing Template: NIRSpec IFU Spectroscopy												
Diagnostics	(Visit 27:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous			
	(27)	NSC-VCC1910	RA: 12 42 8.6700 (190.5361250d) Dec: +11 45 15.40 (11.75428d) Equinox: J2000										
	Comments: Category=Galaxy Description=[Galaxy nuclei]												
Template	TA Method												
	NONE												
Dithers	#	Dither Type			Size		Starting Point		Number of Points		Points		
	1	4-POINT-DITHER											
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wbk. Calc ID	
	1	G235H/F170LP	NRSIRS2RAPID	24	1	true	true	NONE	4	4	1458.889		
	2	G235H/F170LP	NRSIRS2RAPID	24	1	false	true	NONE	4	4	1458.889	54100.3	

Proposal 2567 - Observation 28 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 28: NSC-VCC1661											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSpec IFU Spectroscopy											
Diagnostics	(Visit 28:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous			
	(28)	NSC-VCC1661	RA: 12 36 24.7800 (189.1032500d) Dec: +10 23 4.80 (10.38467d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Galaxy nuclei]											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size	Starting Point			Number of Points		Points		
	1	4-POINT-NOD										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2RAPID	24	2	false	true	NONE	4	8	2917.778	54100.5

Proposal 2567 - Observation 29 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 29: NSC-VCC1539											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSpec IFU Spectroscopy											
Diagnostics	(Visit 29:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous		
	(29)	NSC-VCC1539	RA: 12 34 6.7400 (188.5280833d) Dec: +12 44 29.70 (12.74158d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Galaxy nuclei]											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points		
	1	4-POINT-NOD										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2	20	2	false	true	NONE	4	8	11787.823	54100.7

Proposal 2567 - Observation 30 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 30: NSC-VCC1075											Sun Nov 20 17:03:09 GMT 2022
	Diagnostic Status: Warning											
	Observing Template: NIRSspec IFU Spectroscopy											
Diagnostics	(Visit 30:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
Fixed Targets	#	Name	Target Coordinates				Targ. Coord. Corrections			Miscellaneous		
	(30)	NSC-VCC1075	RA: 12 28 12.3100 (187.0512917d) Dec: +10 17 51.50 (10.29764d) Equinox: J2000									
	Comments: Category=Galaxy Description=[Galaxy nuclei]											
Template	TA Method											
	NONE											
Dithers	#	Dither Type		Size		Starting Point		Number of Points		Points		
	1	4-POINT-NOD										
Spectral Elements	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	G235H/F170LP	NRSIRS2RAPID	28	3	false	true	NONE	4	12	5076.934	54100.9
Special Requirements	Aperture PA Range 30 to 50 Degrees (V3 251.02746582 to 271.02746582) Aperture PA Range 70 to 10 Degrees (V3 291.02746582 to 231.02746582)											

Proposal 2567 - Observation 39 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 39: M49 Sky Background Sun Nov 20 17:03:09 GMT 2022																																			
	Diagnostic Status: Warning Observing Template: NIRSpec IFU Spectroscopy Background Observation For: [cE-VCC1192 (Obs 20), cE-VCC1199 (Obs 21)]																																			
Diagnostics	(Visit 39:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.																																			
Fixed Targets	<table border="1"> <thead> <tr> <th>#</th><th>Name</th><th>Target Coordinates</th><th>Targ. Coord. Corrections</th><th>Miscellaneous</th></tr> </thead> <tbody> <tr> <td>(38)</td><td>M49-SKYBACKGROUND</td><td>RA: 12 29 4.2400 (187.2676667d) Dec: +08 06 24.40 (8.10678d) Equinox: J2000</td><td></td><td></td></tr> </tbody> </table>												#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(38)	M49-SKYBACKGROUND	RA: 12 29 4.2400 (187.2676667d) Dec: +08 06 24.40 (8.10678d) Equinox: J2000																
	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous																															
(38)	M49-SKYBACKGROUND	RA: 12 29 4.2400 (187.2676667d) Dec: +08 06 24.40 (8.10678d) Equinox: J2000																																		
Comments: Category=Calibration Description=[Telescope/sky background] Extended=NO																																				
Template	TA Method																																			
	NONE																																			
Dithers	<table border="1"> <thead> <tr> <th>#</th><th>Dither Type</th><th>Size</th><th>Starting Point</th><th>Number of Points</th><th>Points</th></tr> </thead> <tbody> <tr> <td>1</td><td>4-POINT-DITHER</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>												#	Dither Type	Size	Starting Point	Number of Points	Points	1	4-POINT-DITHER																
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	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID																								
1	G235H/F170LP	NRSIRS2RAPID	10	1	false	true	NONE	4	4	641.911																										
Special Requirements	Sequence Observations 20, 21, 39, Non-interruptible																																			

Proposal 2567 - Observation 41 - Do Massive Black Holes Come in Small Packages? A census of black holes in compact stellar syste...

Observation	Proposal 2567, Observation 41: M87 Sky Background Sun Nov 20 17:03:09 GMT 2022																																			
	Diagnostic Status: Warning Observing Template: NIRSpec IFU Spectroscopy Background Observation For: [cE-VCC1297 (Obs 22), cE-VCC1627 (Obs 23)]																																			
Diagnostics	(Visit 41:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.																																			
Fixed Targets	<table border="1"> <thead> <tr> <th>#</th><th>Name</th><th>Target Coordinates</th><th>Targ. Coord. Corrections</th><th>Miscellaneous</th></tr> </thead> <tbody> <tr> <td>(40)</td><td>M87-SKYBACKGROUND</td><td>RA: 12 35 1.0000 (188.7541667d) Dec: +12 22 48.70 (12.38019d) Equinox: J2000</td><td></td><td></td></tr> </tbody> </table>												#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous	(40)	M87-SKYBACKGROUND	RA: 12 35 1.0000 (188.7541667d) Dec: +12 22 48.70 (12.38019d) Equinox: J2000																
	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous																															
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Comments: Category=Calibration Description=[Telescope/sky background] Extended=NO																																				
Template	TA Method																																			
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	#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Leakcal	Dither	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID																								
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Special Requirements	Sequence Observations 22, 23, 41, Non-interruptible																																			