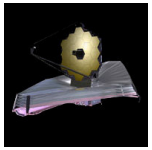

3991 - Small Cold Classical TNOs as Witnesses of Outer Nebular Chemistry

Cycle: 2, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1		NIRSpec IFU Spectroscopy	(1) 1992QB1
	2		NIRSpec IFU Spectroscopy	(2) 2015VE169
	3		NIRSpec IFU Spectroscopy	(3) 2013GD138
	4		NIRSpec IFU Spectroscopy	(4) 2011JY31
	5		NIRSpec IFU Spectroscopy	(5) 2006QE181
	6		NIRSpec IFU Spectroscopy	(6) 2002WL21
	7		NIRSpec IFU Spectroscopy	(7) 2015GM58
	8		NIRSpec IFU Spectroscopy	(8) 2013UB18
	9		NIRSpec IFU Spectroscopy	(9) 2011UG412

ABSTRACT

We propose to observe a sample of nine Cold Classical TNOs that are intermediate in size between the very small object Arrokoth explored by NASA's New Horizons mission and much larger objects observed by JWST during Cycle 1. Our purpose is to test whether Arrokoth's anomalously high abundance of methanol ice relative to water ice is typical of small Cold Classical TNOs, pointing to formation in a region of distinctly different nebular chemistry beyond the CO snow line. To learn more about this region of the nebula as well as potential size-dependent processes affecting objects that formed there, we divide our sample between two slices. The 1st slice matches Arrokoth's heliocentric distance, while varying the objects' sizes. The 2nd slice consists of objects at varying heliocentric distance but all of the same size. These two slices will enable us to determine whether or not there are systematic trends with size or with heliocentric distance, thereby shedding light on the processes responsible.

OBSERVING DESCRIPTION

NIRSpec IFU prism observations of small Cold Classical TNOs to test whether or not the anomalously methanol-rich composition of Arrokoth is shared by other objects in that dynamical region, and to investigate potential compositional dependences on size and heliocentric distance.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(1)	1992QB1	TYPE=ASTEROID,A=44.172221866523,E=0.073390 58260445568,I=2.186402706500573 ,O=359.4285368278592,W=5.634491467132836,M=2 0.14458990227914,EQUINOX=J2000,EPOCH=20- OCT-2012:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(2)	2015VE169	TYPE=ASTEROID,A=44.18015197653381,E=0.0299 4398733562404,I=2.526246151412768 ,O=120.1763846151305,W=239.7852837010981,M=4 6.08238592544748,EQUINOX=J2000,EPOCH=30- MAY-2016:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(3)	2013GD138	TYPE=ASTEROID,A=43.95519897008755,E=0.1145 233650001738,I=5.423369870192682 ,O=56.99881935703595,W=145.566957726735,M=12. 6592520989887,EQUINOX=J2000,EPOCH=15-FEB- 2014:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(4)	2011JY31	TYPE=ASTEROID,A=43.940016729415,E=0.058861 202121,I=2.607787645985,O=231.597828871697,W= 111.972727080901,M=315.319879909900,EQUINOX =J2000,EPOCH=15-JUL- 2024:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(5)	2006QE181	TYPE=ASTEROID,A=42.44011363833584,E=0.0237 6932110354685,I=2.114798352343149 ,O=103.7821684145028,W=250.6556065226163,M=1 8.17782258419355,EQUINOX=J2000,EPOCH=16- DEC-2014:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(6)	2002WL21	TYPE=ASTEROID,A=43.34736327963788,E=0.0459 5841237919221,I=2.546591612502639 ,O=67.77477690374296,W=337.4709983264189,M=3 9.39086676438113,EQUINOX=J2000,EPOCH=05- JUN-2012:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(7)	2015GM58	TYPE=ASTEROID,A=44.03901130645187,E=0.0543 9605250678921,I=2.829994031482419 ,O=92.40375874785167,W=189.4736228375117,M=2 88.1212577339317,EQUINOX=J2000,EPOCH=05- JAN-2016:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(8)	2013UB18	TYPE=ASTEROID,A=45.11657220232931,E=0.0338 1163320772763,I=3.561217919200097 ,O=134.9082860475859,W=282.4546171379045,M=3 23.0660348415789,EQUINOX=J2000,EPOCH=27- AUG-2014:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				
(9)	2011UG412	TYPE=ASTEROID,A=46.75940361285048,E=0.1586 723587131321,I=2.495697299656934 ,O=304.0541155251523,W=26.49550178631494,M=4 8.09724949972933,EQUINOX=J2000,EPOCH=22- AUG-2012:00:00:00,EpochTimeScale=TDB		
Comments: Extended=NO				

Observation

Proposal 3991, Observation 1

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 1) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(1)	1992QB1	TYPE=ASTEROID,A=44.172221866523,E=0.07339058260445568,I=2.186402706500573,O=359.4285368278592,W=5.634491467132836,M=20.14458990227914,EQUINOX=J2000,EPOCH=20-OCT-2012:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	20	3	false	true	NONE	4	12	3676.4	

Special Requirements

DEFAULT WINDOW: ANGULAR RATE 1992QB1 FROM JWST LESS THAN 0.075

Observation

Proposal 3991, Observation 2

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 2) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(2)	2015VE169	TYPE=ASTEROID,A=44.18015197653381,E=0.0299439873356240 4,I=2.526246151412768,O=120.1763846151305,W=239.7852837010981,M=46.08238592544748,EQUINOX=J2000,EPOCH=30-MAY-2016:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	24	3	false	true	NONE	4	12	4376.667	

Special Requirements

On Hold pending improved ephemeris.

DEFAULT WINDOW: ANGULAR RATE 2015VE169 FROM JWST LESS THAN 0.075

Observation

Proposal 3991, Observation 3

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 3) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(3)	2013GD138	TYPE=ASTEROID,A=43.95519897008755,E=0.1145233650001738,I=5.423369870192682,O=56.99881935703595,W=145.566957726735,M=12.6592520989887,EQUINOX=J2000,EPOCH=15-FEB-2014:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	26	3	false	true	NONE	4	12	4726.8	

Special Requirements

DEFAULT WINDOW: ANGULAR RATE 2013GD138 FROM JWST LESS THAN 0.075

Observation

Proposal 3991, Observation 4

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 4:1) Warning (Form): Data Excess over lower threshold

(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 4) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(4)	2011JY31	TYPE=ASTEROID,A=43.940016729415,E=0.058861 202121,I=2.607787645985,O=231.597828871697,W= 111.972727080901,M=315.319879909900,EQUINOX =J2000,EPOCH=15-JUL- 2024:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	34	8	false	true	NONE	4	32	16339.557	

Special Requirements

DEFAULT WINDOW: ANGULAR RATE 2011JY31 FROM JWST LESS THAN 0.075

Observation

Proposal 3991, Observation 5

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 5) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(5)	2006QE181	TYPE=ASTEROID,A=42.44011363833584,E=0.0237693211035468 5,I=2.114798352343149,O=103.7821684145028,W=250.6556065226163,M=18.17782258419355,EQUINOX=J2000,EPOCH=16-DEC-2014:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	24	3	false	true	NONE	4	12	4376.667	

Special Requirements

DEFAULT WINDOW: ANGULAR RATE 2006QE181 FROM JWST LESS THAN 0.075

Observation

Proposal 3991, Observation 6

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 6) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(6)	2002WL21	TYPE=ASTEROID,A=43.34736327963788,E=0.0459 5841237919221,I=2.546591612502639 ,O=67.77477690374296,W=337.4709983264189,M=3 9.39086676438113,EQUINOX=J2000,EPOCH=05- JUN-2012:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	24	3	false	true	NONE	4	12	4376.667	

Special Requirements

DEFAULT WINDOW: ANGULAR RATE 2002WL21 FROM JWST LESS THAN 0.075

Observation

Proposal 3991, Observation 7

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 7) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(7)	2015GM58	TYPE=ASTEROID,A=44.03901130645187,E=0.0543 9605250678921,I=2.829994031482419 ,O=92.40375874785167,W=189.4736228375117,M=2 88.1212577339317,EQUINOX=J2000,EPOCH=05- JAN-2016:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	24	3	false	true	NONE	4	12	4376.667	

Special Requirements

DEFAULT WINDOW: ANGULAR RATE 2015GM58 FROM JWST LESS THAN 0.075

Observation

Proposal 3991, Observation 8

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 8) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(8)	2013UB18	TYPE=ASTEROID,A=45.11657220232931,E=0.0338 1163320772763,I=3.561217919200097 ,O=134.9082860475859,W=282.4546171379045,M=3 23.0660348415789,EQUINOX=J2000,EPOCH=27- AUG-2014:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	26	3	false	true	NONE	4	12	4726.8	

Special Requirements

DEFAULT WINDOW: ANGULAR RATE 2013UB18 FROM JWST LESS THAN 0.075

Observation

Proposal 3991, Observation 9

Wed Jan 15 18:00:11 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec IFU Spectroscopy

Diagnostics

(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Observation 9) Informational (Form): The Visit Planner and Spike may produce different schedulability results.

Solar System Targets

#	Name	Level 1	Level 2	Level 3
(9)	2011UG412	TYPE=ASTEROID,A=46.75940361285048,E=0.1586723587131321,I=2.495697299656934,O=304.0541155251523,W=26.49550178631494,M=48.09724949972933,EQUINOX=J2000,EPOCH=22-AUG-2012:00:00:00,EpochTimeScale=TDB		

Comments: Extended=NO

Template

TA Method	HFF Readout Mode
NONE	false

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	PRISM/CLEAR	NRSIRS2RAPID	28	3	false	true	NONE	4	12	5076.934	

Special Requirements

DEFAULT WINDOW: ANGULAR RATE 2011UG412 FROM JWST LESS THAN 0.075