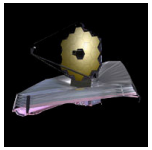

3788 - Alpha Elements and the Baryon Cycle in Isolated Dwarf Galaxies

Cycle: 2, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	5	LeoA_p_t_5	NIRSpec MultiObject Spectroscopy	(14) LeoA_MSA-Catalog
	7	ic1613_3nod_ps_t	NIRSpec MultiObject Spectroscopy	(11) IC1613-MSA-Catalog
	9	ic1613_3nod_ps_t	NIRSpec MultiObject Spectroscopy	(11) IC1613-MSA-Catalog
	8	tucana_p_t_right_addl_test_height_c2	NIRSpec MultiObject Spectroscopy	(15) tucana_MSA-Catalog

ABSTRACT

We propose to use NIRSpec multi-object spectroscopy to measure [alpha/Fe] for 150-200 red giant stars to a precision of 0.1-0.3 dex in 3 isolated dwarf galaxies with diverse star formation histories (SFHs; ancient, constant, young) as measured by HST. Target stars have ages spanning ~1-13 Gyr, enabling the construction of the first well-constrained [alpha/Fe] vs. [Fe/H] diagrams for low-mass galaxies that have not been significantly

influenced by a massive host. Such diagrams have provided deep knowledge of the formation of the Milky Way and its satellites (e.g., star formation efficiencies, Type II and Type Ia supernova contributions, bursty star formation), but are challenging to construct using the faint stars of distant (1 Mpc) isolated galaxies. We will (1) empirically characterize the [alpha/Fe] vs. [Fe/H] trends in each galaxy (i.e., plateau, knee, shin); (2) use semi-analytic chemical evolution models and state-of-the-art cosmological simulations to constrain and infer the baryonic processes that shaped each galaxy's evolution; (3) integrate our measurements into SFH fitting codes to achieve sub-Gyr age resolution at the oldest epochs; (4) measure velocity dispersions to a precision of 5 km/s for ~100 stars in the crowded inner regions of each galaxy.

This program will provide unique insights into the evolution of low-mass galaxies in absence of environmental influence. Such systems are key tests of the physics of galaxy evolution. Measuring [alpha/Fe] for large numbers of stars in distant systems is only possible due to the excellent sensitivity and angular resolution of JWST -- no other facility can make these measurements for faint, crowded stars.

OBSERVING DESCRIPTION

In this program, we will obtain NIRSpec MOS of 150-200 red giant branch (RGB) stars in 3 diverse isolated dwarf galaxies: Tucana, Leo A, and IC 1613. We use existing deep HST/ACS data for targeting. Each galaxy has many stars suitable for MSATA without violating crowding constraints.

We fill our masks preferentially with stars on the upper RGB (19.5 < F814W < 23) for which [alpha/Fe] and [Fe/H] can be measured to 0.1-0.3 dex precision (~40-80 primary stars per galaxy; 150-200 in total). Available slits are then assigned to fainter RGB stars (23 < F814W < 24) for which radial velocity measurements are still possible (~100 ancillary stars in total). We adopt the midpoint slit centering constraint when assigning stars to slits. The remainder of the mask is filled with ~30-60 ``blank sky'' shutters where we know no stars with F814W < 24 exist in order to sample the background. We only need a single slit configuration per galaxy to get a sufficiently large samples.

NIRSpec observations will be taken with the G140H/F100LP disperser-filter pair, providing 0.97-1.82 micron spectral coverage at R ~ 2700. At this modest resolution, measuring [alpha/Fe] and [Fe/H] to 0.1-0.3 dex precision can be achieved with spectra of S/N > 30 per pixel at 1.4 micron. This requires ~5.5 hours of integration per galaxy for our faintest primary stars (F814W = 23). The median S/N of our primary sample will be ~42 per pixel at 1.4 micron, while the median S/N of our ancillary targets will be ~8 per pixel at 1.4 micron. For both MSA configurations, we will take 4 exposures split across a 3-shutter cross-dispersion dither. Each NIRSpec exposures will employ the NRSIRS2RAPID readout pattern with 3 integration of 112 groups for a total of 19608s total integration per galaxy.

We do not request any specific orientation or observing constraints. As a result, the proposed observations are broadly schedulable for several dozen

day outside of the meteor avoidance zone during the Cycle 2 window.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(3)	TUCANA.V2_old	RA: 22 41 50.6852 (340.4611883d) Dec: -64 25 11.17 (-64.41977d) Equinox: J2000		
Comments: *Description=[]*				
(7)	IC1613.V2_old	RA: 01 04 29.7833 (16.1240971d) Dec: +02 09 22.23 (2.15617d) Equinox: J2000		
Comments: *Description=[]*				
(8)	TUCANA.V3	RA: 22 41 50.6852 (340.4611883d) Dec: -64 25 11.17 (-64.41977d) Equinox: J2000		
Comments: *Description=[]*				
(9)	LEOA.V3	RA: 09 59 24.2395 (149.8509979d) Dec: +30 44 54.11 (30.74836d) Equinox: J2000		
Comments: *Description=[]*				
(10)	IC1613.V3	RA: 01 04 29.7833 (16.1240971d) Dec: +02 09 22.23 (2.15617d) Equinox: J2000		
Comments: *Description=[]*				
(11)	IC1613-MSA-Catalog	RA: 01 04 27.5959 (16.1149829d) Dec: +02 09 14.48 (2.15402d) Equinox: J2000		
Comments: *Description=[]*				
(14)	LeoA_MSA-Catalog	RA: 09 59 24.4067 (149.8516946d) Dec: +30 44 57.27 (30.74924d) Equinox: J2000		
Comments: *Description=[]*				
(15)	tucana_MSA-Catalog	RA: 22 41 50.5405 (340.4605854d) Dec: -64 25 14.05 (-64.42057d) Equinox: J2000		
Comments: *Description=[]*				

Observation

Proposal 3788, Observation 5: LeoA_p_t_5 Wed Jun 12 18:01:34 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Diagnostics

(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c1 (#1) has 1 filler slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c1 (#1) has 1 primary slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c1 (#2) has 1 filler slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c1 (#2) has 1 primary slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c2 (#3) has 1 filler slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c2 (#3) has 1 master background shutters affected by failed open or closed shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c2 (#4) has 1 filler slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c2 (#4) has 1 master background shutters affected by failed open or closed shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c3 (#5) has 1 filler slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c3 (#5) has 1 primary slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c3 (#6) has 1 filler slit traces affected by failed open shutters.
(LeoA_p_t_5 (Obs 5)) Warning (Form): Config c3 (#6) has 1 primary slit traces affected by failed open shutters.
(Visit 5:1) Warning (Form): Data Excess over lower threshold
(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(14)	LeoA_MSA-Catalog	RA: 09 59 24.4067 (149.8516946d) Dec: +30 44 57.27 (30.74924d) Equinox: J2000		

Comments:
Description=[]

Acquisition

#	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F110W; Readout: NRSRAPID; 8 sources in 3 quads; [Optimal TA Accuracy]	SAME	F110W	ALLOPEN	NRSRAPID	3	1	4	171.788	

Template

TA Method	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold
MSATA	After Target ACQ and New MSA Config	MSA Center	LeoA-Primary (953 sources)	LeoA-Filler (1359 sources)	jwst-nirspec-g140h	1.5

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	6	149.868393	30.742310	19.914798793775287	1	98	149.834820	30.756399	20.095155830103973
1	28	149.865562	30.755652	20.344916112247994	1	130	149.866123	30.736122	20.294377246216147
1	66	149.826486	30.760866	19.782164376817427	1	138	149.815409	30.743584	20.288271664149136
1	92	149.828267	30.755154	20.072164376817426	1	156	149.869474	30.755248	20.384442794280766

Confirmation

#	Confirmation Type	Conf. Readout Pattern	Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time
1	c1	NRSIRS2RAPID	2	1	1	43.767
2	c2	NRSIRS2RAPID	2	1	1	43.767
3	c3	NRSIRS2RAPID	2	1	1	43.767

Spectral Elements

#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G140H/F100LP)	c1		149.84709520833334 Degrees 30.74214361111111 Degrees	257.6298667279719	0.12		1	3	3282.5
2	1 (G140H/F100LP)	c1		149.84709520833334 Degrees 30.74214361111111 Degrees	257.6298644334534	-0.12		1	3	3282.5
3	1 (G140H/F100LP)	c2		149.84694670833332 Degrees 30.74203944444444 Degrees	257.6297911277012	0.12		1	3	3282.5
4	1 (G140H/F100LP)	c2		149.84694670833332 Degrees 30.74203944444444 Degrees	257.6297888331783 4	-0.12		1	3	3282.5
5	1 (G140H/F100LP)	c3		149.84679816666664 Degrees 30.74193555555557 Degrees	257.6297155057079 6	0.12		1	3	3282.5
6	1 (G140H/F100LP)	c3		149.84679816666664 Degrees 30.74193555555557 Degrees	257.6297132111807 3	-0.12		1	3	3282.5

Special Requirements

MSA Scheduled Aperture PA 257.6322 to 257.6322 Degrees (V3 119.05761 to 119.05761)

Observation

Proposal 3788, Observation 7: ic1613_3nod_ps_t Wed Jun 12 18:01:34 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Diagnostics

(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c1 (#1) has 1 filler slits affected by failed closed shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c1 (#1) has 1 primary slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c1 (#1) has 1 primary slits affected by failed closed shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c1 (#2) has 1 filler slits affected by failed closed shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c1 (#2) has 1 primary slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c1 (#2) has 1 primary slits affected by failed closed shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c2 (#3) has 1 primary slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c2 (#3) has 1 primary slits affected by failed closed shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c2 (#4) has 1 primary slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c2 (#4) has 1 primary slits affected by failed closed shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c3 (#5) has 1 filler slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c3 (#5) has 1 master background shutters affected by failed open or closed shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c3 (#5) has 1 primary slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c3 (#6) has 1 filler slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c3 (#6) has 1 master background shutters affected by failed open or closed shutters.
(ic1613_3nod_ps_t (Obs 7)) Warning (Form): Config c3 (#6) has 1 primary slit traces affected by failed open shutters.
(Visit 7:1) Warning (Form): Data Excess over lower threshold
(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(11)	IC1613-MSA-Catalog	RA: 01 04 27.5959 (16.1149829d) Dec: +02 09 14.48 (2.15402d) Equinox: J2000		

Comments:
Description=[]

Acquisition

#	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F110W; Readout: NRSRAPID; 8 sources in 3 quads; [Optimal TA Accuracy]	SAME	F110W	ALLOPEN	NRSRAPID	3	1	4	171.788	

Template

TA Method	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold
MSATA	After Target ACQ and New MSA Config	MSA Center	IC1613-Primary (850 sources)	IC1613-Secondary (1728 sources)	jwst-nirspec-g140h	1.5

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	73	16.098994	2.148447	19.782146	1	116	16.097213	2.134728	19.86229
1	75	16.111363	2.127808	19.761858	1	121	16.113150	2.136729	19.757128
1	95	16.099938	2.178718	19.771702	1	130	16.116828	2.139122	19.887629
1	110	16.089451	2.157506	19.908222	1	167	16.118275	2.136160	19.931887

Confirmation

#	Confirmation Type	Conf. Readout Pattern	Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time
1	c1	NRSIRS2RAPID	2	1	1	43.767
2	c2	NRSIRS2RAPID	2	1	1	43.767
3	c3	NRSIRS2RAPID	2	1	1	43.767

Spectral Elements

#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G140H/F100LP)	c1		16.100709625 Degrees 2.16106138888888 888 Degrees	206.57933878559163	-0.12		1	3	3282.5
2	1 (G140H/F100LP)	c1		16.100709625 Degrees 2.16106138888888 888 Degrees	206.57933941499564	0.12		1	3	3282.5
3	1 (G140H/F100LP)	c2		16.100710291666665 Degrees 2.16089666666666 665 Degrees	206.57933914106 05	-0.12		1	3	3282.5
4	1 (G140H/F100LP)	c2		16.100710291666665 Degrees 2.16089666666666 665 Degrees	206.57933977041864	0.12		1	3	3282.5
5	1 (G140H/F100LP)	c3		16.100711 Degrees 2.16073194444444 44 Degrees	206.57933949795998	-0.12		1	3	3282.5
6	1 (G140H/F100LP)	c3		16.100711 Degrees 2.16073194444444 44 Degrees	206.57934012727222	0.12		1	3	3282.5

Special Requirements

MSA Scheduled Aperture PA 206.5799 to 206.5799 Degrees (V3 68.00532 to 68.00532)

Observation

Proposal 3788, Observation 9: ic1613_3nod_ps_t Wed Jun 12 18:01:34 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Diagnostics

(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c2 (#1) has 1 primary slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c2 (#1) has 1 primary slits affected by failed closed shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c2 (#2) has 1 primary slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c2 (#2) has 1 primary slits affected by failed closed shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c3 (#3) has 1 filler slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c3 (#3) has 1 master background shutters affected by failed open or closed shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c3 (#3) has 1 primary slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c3 (#4) has 1 filler slit traces affected by failed open shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c3 (#4) has 1 master background shutters affected by failed open or closed shutters.
(ic1613_3nod_ps_t (Obs 9)) Warning (Form): Config c3 (#4) has 1 primary slit traces affected by failed open shutters.
(Visit 9:1) Warning (Form): Data Excess over lower threshold
(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(11)	IC1613-MSA-Catalog	RA: 01 04 27.5959 (16.1149829d) Dec: +02 09 14.48 (2.15402d) Equinox: J2000		

Comments:
Description=[]

Acquisition

#	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F110W; Readout: NRSRAPID; 8 sources in 3 quads; [Optimal TA Accuracy]	SAME	F110W	ALLOPEN	NRSRAPID	3	1	4	171.788	

Template

TA Method	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold
MSATA	After Target ACQ and New MSA Config	MSA Center	IC1613-Primary (850 sources)	IC1613-Secondary (1728 sources)	jwst-nirspec-g140h	1.5

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	73	16.098994	2.148447	19.782146	1	116	16.097213	2.134728	19.86229
1	75	16.111363	2.127808	19.761858	1	121	16.113150	2.136729	19.757128
1	95	16.099938	2.178718	19.771702	1	130	16.116828	2.139122	19.887629
1	110	16.089451	2.157506	19.908222	1	167	16.118275	2.136160	19.931887

Confirmation

#	Confirmation Type	Conf. Readout Pattern	Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time
1	c2	NRSIRS2RAPID	2	1	1	43.767
2	c3	NRSIRS2RAPID	2	1	1	43.767

Spectral Elements

#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G140H/F100LP)	c2		16.100710291666665 Degrees 2.1608966666666665 Degrees	206.5793391410605	-0.12		1	3	3282.5
2	1 (G140H/F100LP)	c2		16.100710291666665 Degrees 2.1608966666666665 Degrees	206.57933977041864	0.12		1	3	3282.5
3	1 (G140H/F100LP)	c3		16.100711 Degrees 2.160731944444444 Degrees	206.57933949795998	-0.12		1	3	3282.5
4	1 (G140H/F100LP)	c3		16.100711 Degrees 2.160731944444444 Degrees	206.57934012727222	0.12		1	3	3282.5

Special Requirements

MSA Scheduled Aperture PA 206.5799 to 206.5799 Degrees (V3 68.00533 to 68.00533)

Observation

Proposal 3788, Observation 8: tucana_p_t_right_addl_test_height_c2 Wed Jun 12 18:01:34 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Diagnostics

(Visit 8:1) Warning (Form): Data Excess over lower threshold

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

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(15)	tucana_MSA-Catalog	RA: 22 41 50.5405 (340.4605854d) Dec: -64 25 14.05 (-64.42057d) Equinox: J2000		

Comments:
Description=[]

Acquisition

#	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F110W; Readout: NRSRAPID; 8 sources in 2 quads; [Optimal TA Accuracy]	SAME	F110W	ALLOPEN	NRSRAPID	3	1	4	171.788	

Template

TA Method	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold
MSATA	After Target ACQ and New MSA Config	MSA Center	Primary (459 sources)	Filler (690 sources)	jwst-nirspec-g140h	1.5

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	16	340.474168	-64.414836	20.674047994613066	1	60	340.491319	-64.419217	21.008628289484058
1	42	340.419923	-64.423013	20.812352168902706	1	70	340.483452	-64.418344	21.084063240549103
1	51	340.402530	-64.407186	20.90597549307588	1	72	340.499981	-64.412678	21.130204157188803
1	56	340.492212	-64.423667	20.95319987423541	1	5614	340.402728	-64.415284	19.907672947838666

Confirmation

#	Confirmation Type	Conf. Readout Pattern	Conf. Groups/Int	Conf. Integrations/Exp	Conf. Total Integrations	Conf. Total Exposure Time
1	c1	NRSIRS2RAPID	2	1	1	43.767
2	c2	NRSIRS2RAPID	2	1	1	43.767
3	c3	NRSIRS2RAPID	2	1	1	43.767

Spectral Elements

#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G140H/F100LP)	c1		340.462286625 Degrees -64.431770555555 54 Degrees	80.55846853379494	-0.125	0.05	1	3	3282.5
2	1 (G140H/F100LP)	c1		340.462286625 Degrees -64.431770555555 54 Degrees	80.55847465693896	0.115	0.05	1	3	3282.5
3	1 (G140H/F100LP)	c2		340.462594375 Degrees -64.431673333333 32 Degrees	80.55819124829236	-0.125	0.05	1	3	3282.5
4	1 (G140H/F100LP)	c2		340.462594375 Degrees -64.431673333333 32 Degrees	80.55819737158784	0.115	0.05	1	3	3282.5
5	1 (G140H/F100LP)	c3		340.462902041666 667 Degrees -64.431575833333 34 Degrees	80.55791403844745	-0.125	0.05	1	3	3282.5
6	1 (G140H/F100LP)	c3		340.462902041666 667 Degrees -64.431575833333 34 Degrees	80.55792016189407	0.115	0.05	1	3	3282.5

Special Requirements

MSA Scheduled Aperture PA 80.5600 to 80.5600 Degrees (V3 301.98547 to 301.98547)