



# 8290 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Cycle: 4, Proposal Category: GO

## INVESTIGATORS

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Prof. Daniel Schaerer (CoI) (ESA Member)	University of Geneva, Department of Astronomy
Prof. Sally Oey (CoI) (US Admin CoI)	University of Michigan

## OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				
	1	MRS-knot-B	MIRI Medium Resolution Spectroscopy	(4) ESO-350-IG-038-B-MIRI
	3	MRS-knot-C	MIRI Medium Resolution Spectroscopy	(5) ESO-350-IG-038-C-MIRI
	4	MRS-sky	MIRI Medium Resolution Spectroscopy	(2) ESO-350-IG-038-sky
	2	NIRSPEC-A	NIRSpec IFU Spectroscopy	(3) ESO-350-IG-038-A

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
	5	NIRSPEC-B	NIRSpec IFU Spectroscopy	(8) ESO-350-IG-038-B-NIRSPEC
	6	NIRSPEC-C	NIRSpec IFU Spectroscopy	(9) ESO-350-IG-038-C-NIRSPEC
	7	NIRCAM	NIRCam Imaging	(1) ESO-350-IG-038

## ABSTRACT

Escaping Lyman continuum radiation from low mass star forming galaxies likely were the agents of cosmic reionization at a redshift  $z > 6$ . At the redshifts in question, the sightlines are completely opaque to Lyman continuum (LyC), making direct measurements of the LyC escape fractions impossible to measure directly. Therefore attention has been drawn to local universe analogs, where the escape fraction can be measured directly, and physical conditions studied in a detail not possible at high redshifts. Haro11 is the nearest known Lyman continuum emitting galaxy and thereby offers unique opportunities to explore the physical conditions that allows LyC to escape into intergalactic space. It is a dwarf galaxy merger, and present 3 starburst knots (A, B, and C), each of which have been studied extensively, and it contains an unusually rich population of young massive star clusters. Recent COS spectroscopy shows LyC to be emitted from knots B and C. Curiously, both these knots contain a luminous compact X-ray source, while knot A does not. This raises questions as to whether the LyC escape is connected to accreting black holes. With the proposed observations we will search for the sites of X-ray emission and determine if they are low mass AGN by revealing themselves through hot dust and [NeV], [NeVI] emission. We will in parallel probe young obscured star clusters, for a full census of the ionizing photon production contributed by massive stars, and map the dust geometry. Hence we will be able to gauge the relative contributions from stars and X-ray sources to the ionization budget of Haro11 - the nearest Lyman continuum leaker.

## OBSERVING DESCRIPTION

We will observe Haro11 with JWST, using the following modes:

NIRCam imaging, NIRSPEC/IFU spectroscopy, MIRI MRS spectroscopy (with simultaneous imaging).

With NIRCam we will use SW filters F090W, F150W, F210M; and LW filters F250M, F335M and F360M using SHALLOW4 readout with 8 groups per integration, 1 integration per position, and 8 dither positions. The images would be used to search for embedded star clusters and determine their age and ionizing photon output. The F335M images will be used to map the PAH feature at 3.3 micron.

With NIRSPEC/IFU we will use the G140H/F100LP and G235H/F170LP settings and obtain one observation for each of the three star forming knots (A, B and C).

We will use NRSIRS2 readout, with 12/10 groups per integration, and employ the 4-POINT dithering pattern for a total exposure of 3560/2599s (in

G235H and G140H, respectively) per target. No separate sky observations are needed for these observations. The data will be used to map emission lines, primarily the ones from ionized hydrogen, to model the nebular spectrum and the reddening geometrical distribution.

With MIRI/MRS we will use two pointings to observe knot B and C, known to contain compact X-ray sources, for the full wavelength setting using FASTR1 readout, 100 groups per integration, 2 integrations per position and 4 positions (4-POINT dither pattern) for an exposure time of 2231s per setting and target. We add simultaneous imaging with F770W as recommended for accurate astrometry. The observations of B and C are grouped together with a sky observation with the same exposure parameters, but half the exposure time. We will position the sky exposures such that Haro11 is included in the imager and observe in F560W, F770W and F2100W.

Proposal 8290 - Targets - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	ESO-350-IG-038	RA: 00 36 52.5000 (9.2187500d) Dec: -33 33 18.00 (-33.55500d) Equinox: J2000		
<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>  <i>Category=Galaxy</i>  <i>Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies]</i>  <i>Extended=YES</i></p>				
(2)	ESO-350-IG-038-sky	RA: 00 36 52.5000 (9.2187500d) Dec: -33 33 16.99 (-33.55472d) Equinox: J2000		
<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>  <i>Category=Unidentified</i>  <i>Description=[Blank field]</i>  <i>Extended=YES</i></p>				
(3)	ESO-350-IG-038-A	RA: 00 36 52.3841 (9.2182671d) Dec: -33 33 19.95 (-33.55554d) Equinox: J2000		
<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>  <i>Category=Galaxy</i>  <i>Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies]</i>  <i>Extended=YES</i></p>				
(4)	ESO-350-IG-038-B-MIRI	RA: 00 36 52.4093 (9.2183721d) Dec: -33 33 17.00 (-33.55472d) Equinox: J2000		
<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>  <i>Category=Galaxy</i>  <i>Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies]</i>  <i>Extended=YES</i></p>				
(5)	ESO-350-IG-038-C-MIRI	RA: 00 36 52.6692 (9.2194550d) Dec: -33 33 16.87 (-33.55469d) Equinox: J2000		
<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>  <i>Category=Galaxy</i>  <i>Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies]</i>  <i>Extended=YES</i></p>				
(8)	ESO-350-IG-038-B-NIRSPEC	RA: 00 36 52.4093 (9.2183721d) Dec: -33 33 17.00 (-33.55472d) Equinox: J2000		
<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>  <i>Category=Galaxy</i>  <i>Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies]</i>  <i>Extended=YES</i></p>				
(9)	ESO-350-IG-038-C-NIRSPEC	RA: 00 36 52.6692 (9.2194550d) Dec: -33 33 16.87 (-33.55469d) Equinox: J2000		
<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i>  <i>Category=Galaxy</i>  <i>Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies]</i>  <i>Extended=YES</i></p>				

Fixed Targets

Proposal 8290 - Observation 1 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Tue Sep 30 13:00:10 GMT 2025

<b>Observation</b>	<b>Proposal 8290, Observation 1: MRS-knot-B</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Medium Resolution Spectroscopy Background Observations:[MRS-sky (Obs 4)]												
	(MRS-knot-B (Obs 1)) Warning (Form): Filter mismatch between science and background observations may result in incorrect background subtraction. (Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	#	Name	Target Coordinates		Targ. Coord. Corrections				Miscellaneous				
	(4)	ESO-350-IG-038-B-MIRI	RA: 00 36 52.4093 (9.2183721d) Dec: -33 33 17.00 (-33.55472d) Equinox: J2000										
Comments: This object was generated by the targetselector and retrieved from the NED database. Category=Galaxy Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies] Extended=YES													
<b>Acquisition</b>	#	Target											
	1	NONE											
<b>Template</b>	AcqFilter	Primary Channel		Simultaneous Imaging		Imager Subarray		Grating Wheel Direction					
		All MRS		YES		FULL		Allow Auto Reorder					
<b>Dithers</b>	#	Dither Type			Optimized For				Direction				
	1	4-Point			EXTENDED SOURCE				NEGATIVE				
<b>Spectral Elements</b>	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1		IMAGER	F770W	SLOWR1	10	1	1	Dither 1	4	4	955.597	
	1	SHORT(A)	MRSLONG		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	1	SHORT(A)	MRSSHORT		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	2		IMAGER	F770W	SLOWR1	10	1	1	Dither 1	4	4	955.597	
	2	MEDIUM(B)	MRSLONG		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	2	MEDIUM(B)	MRSSHORT		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	3		IMAGER	F770W	SLOWR1	10	1	1	Dither 1	4	4	955.597	
	3	LONG(C)	MRSLONG		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	3	LONG(C)	MRSSHORT		FASTR1	94	2	1	Dither 1	4	8	2097.93	

Proposal 8290 - Observation 1 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Special Requirements

Aperture PA Range 20.0 to 60.0 Degrees (V3 20.0 to 60.0)

Group Observations 1, 3, 4, Non-interruptible

Proposal 8290 - Observation 3 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Tue Sep 30 13:00:10 GMT 2025

<b>Observation</b>	<b>Proposal 8290, Observation 3: MRS-knot-C</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Medium Resolution Spectroscopy Background Observations:[MRS-sky (Obs 4)]												
	(MRS-knot-C (Obs 3)) Warning (Form): Filter mismatch between science and background observations may result in incorrect background subtraction. (Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous				
	(5)	ESO-350-IG-038-C-MIRI	RA: 00 36 52.6692 (9.2194550d) Dec: -33 33 16.87 (-33.55469d) Equinox: J2000										
Comments: This object was generated by the targetselector and retrieved from the NED database. Category=Galaxy Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies] Extended=YES													
<b>Acquisition</b>	#	Target											
	1	NONE											
<b>Template</b>	AcqFilter	Primary Channel			Simultaneous Imaging			Imager Subarray		Grating Wheel Direction			
		All MRS			YES			FULL		Allow Auto Reorder			
<b>Dithers</b>	#	Dither Type			Optimized For			Direction					
	1	4-Point			EXTENDED SOURCE			NEGATIVE					
<b>Spectral Elements</b>	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/E xp	Exposures/Dit h	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1		IMAGER	F770W	SLOWR1	10	1	1	Dither 1	4	4	955.597	
	1	SHORT(A)	MRSLONG		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	1	SHORT(A)	MRSSHORT		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	2		IMAGER	F770W	SLOWR1	10	1	1	Dither 1	4	4	955.597	
	2	MEDIUM(B)	MRSLONG		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	2	MEDIUM(B)	MRSSHORT		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	3		IMAGER	F770W	SLOWR1	10	1	1	Dither 1	4	4	955.597	
	3	LONG(C)	MRSLONG		FASTR1	94	2	1	Dither 1	4	8	2097.93	
	3	LONG(C)	MRSSHORT		FASTR1	94	2	1	Dither 1	4	8	2097.93	

Proposal 8290 - Observation 3 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Special Requirements

Aperture PA Range 20.0 to 60.0 Degrees (V3 20.0 to 60.0)

Group Observations 1, 3, 4, Non-interruptible

Proposal 8290 - Observation 4 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Tue Sep 30 13:00:10 GMT 2025

<b>Observation</b>	<b>Proposal 8290, Observation 4: MRS-sky</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [MRS-knot-B (Obs 1), MRS-knot-C (Obs 3)]												
	(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.												
<b>Fixed Targets</b>	#	Name	Target Coordinates			Targ. Coord. Corrections			Miscellaneous				
	(2)	ESO-350-IG-038-sky	RA: 00 36 52.5000 (9.2187500d) Dec: -33 33 16.99 (-33.55472d) Equinox: J2000										
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=Unidentified Description=[Blank field] Extended=YES													
<b>Acquisition</b>	#	Target											
	1	NONE											
<b>Template</b>	AcqFilter	Primary Channel			Simultaneous Imaging			Imager Subarray		Grating Wheel Direction			
		Imager			YES			FULL		Allow Auto Reorder			
<b>Dithers</b>	#	Dither Type			Optimized For			Direction					
	1	4-Point			BACKGROUND			NEGATIVE					
<b>Spectral Elements</b>	#	Wavelength Range	Detector	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
	1		IMAGER	F770W	FASTR1	94	1	1	Dither 1	4	4	1043.415	
	1	SHORT(A)	MRSLONG		FASTR1	94	1	1	Dither 1	4	4	1043.415	
	1	SHORT(A)	MRSSHORT		FASTR1	94	1	1	Dither 1	4	4	1043.415	
	2		IMAGER	F560W	FASTR1	94	1	1	Dither 1	4	4	1043.415	
	2	MEDIUM(B)	MRSLONG		FASTR1	94	1	1	Dither 1	4	4	1043.415	
	2	MEDIUM(B)	MRSSHORT		FASTR1	94	1	1	Dither 1	4	4	1043.415	
	3		IMAGER	F2100W	FASTR1	94	1	1	Dither 1	4	4	1043.415	
	3	LONG(C)	MRSLONG		FASTR1	94	1	1	Dither 1	4	4	1043.415	
	3	LONG(C)	MRSSHORT		FASTR1	94	1	1	Dither 1	4	4	1043.415	

Proposal 8290 - Observation 4 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Special Requirements

Aperture PA Range 24.83544897 to 64.83544897 Degrees (V3 20.0 to 60.0)

Group Observations 1, 3, 4, Non-interruptible

Proposal 8290 - Observation 2 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Tue Sep 30 13:00:10 GMT 2025

<b>Observation</b>	<p><b>Proposal 8290, Observation 2: NIRSPEC-A</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRSPEC IFU Spectroscopy</p>											
<b>Diagnostics</b>	(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(3)	ESO-350-IG-038-A	RA: 00 36 52.3841 (9.2182671d) Dec: -33 33 19.95 (-33.55554d) Equinox: J2000									
	<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i></p> <p><i>Category=Galaxy</i></p> <p><i>Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies]</i></p> <p><i>Extended=YES</i></p>											
<b>Template</b>	<b>TA Method</b>						<b>HFF Readout Mode</b>					
	NONE						false					
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>		<b>Size</b>	<b>Starting Point</b>			<b>Number of Points</b>	<b>Points</b>			
	1	4-POINT-DITHER										
<b>Spectral Elements</b>	<b>#</b>	<b>Grating/Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Leakcal</b>	<b>Dither</b>	<b>Autocal</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>Optional ETC ID</b>
	1	G235H/F170LP	NRSIRS2	12	1	false	true	NONE	4	4	3559.689	
	2	G140H/F100LP	NRSIRS2	10	1	false	true	NONE	4	4	2976.134	

Proposal 8290 - Observation 5 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Tue Sep 30 13:00:10 GMT 2025

<b>Observation</b>	<p><b>Proposal 8290, Observation 5: NIRSPEC-B</b></p> <p><b>Diagnostic Status: Warning</b></p> <p>Observing Template: NIRSPEC IFU Spectroscopy</p>											
<b>Diagnostics</b>	(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(8)	ESO-350-IG-038-B-NIRSPEC	RA: 00 36 52.4093 (9.2183721d) Dec: -33 33 17.00 (-33.55472d) Equinox: J2000									
	<p><i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i></p> <p><i>Category=Galaxy</i></p> <p><i>Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies]</i></p> <p><i>Extended=YES</i></p>											
<b>Template</b>	<b>TA Method</b>						<b>HFF Readout Mode</b>					
	NONE						false					
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>		<b>Size</b>	<b>Starting Point</b>		<b>Number of Points</b>		<b>Points</b>			
	1	4-POINT-DITHER										
<b>Spectral Elements</b>	<b>#</b>	<b>Grating/Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Leakcal</b>	<b>Dither</b>	<b>Autocal</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>Optional ETC ID</b>
	1	G235H/F170LP	NRSIRS2	12	1	false	true	NONE	4	4	3559.689	
	2	G140H/F100LP	NRSIRS2	10	1	false	true	NONE	4	4	2976.134	

Proposal 8290 - Observation 6 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Tue Sep 30 13:00:10 GMT 2025

<b>Observation</b>	<b>Proposal 8290, Observation 6: NIRSPEC-C</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRSPEC IFU Spectroscopy											
	(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.											
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>			<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>			
	(9)	ESO-350-IG-038-C-NIRSPEC	RA: 00 36 52.6692 (9.2194550d)	Dec: -33 33 16.87 (-33.55469d)	Equinox: J2000							
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=Galaxy Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies] Extended=YES												
<b>Template</b>	<b>TA Method</b>						<b>HFF Readout Mode</b>					
	NONE						false					
<b>Dithers</b>	<b>#</b>	<b>Dither Type</b>		<b>Size</b>	<b>Starting Point</b>		<b>Number of Points</b>		<b>Points</b>			
	1	4-POINT-DITHER										
<b>Spectral Elements</b>	<b>#</b>	<b>Grating/Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Leakcal</b>	<b>Dither</b>	<b>Autocal</b>	<b>Total Dithers</b>	<b>Total Integrations</b>	<b>Total Exposure Time</b>	<b>Optional ETC ID</b>
	1	G235H/F170LP	NRSIRS2	12	1	false	true	NONE	4	4	3559.689	
	2	G140H/F100LP	NRSIRS2	10	1	false	true	NONE	4	4	2976.134	

Proposal 8290 - Observation 7 - The obscured regions of the nearest Lyman continuum leaker: massive stars or accreting black holes?

Tue Sep 30 13:00:10 GMT 2025

<b>Observation</b>	<b>Proposal 8290, Observation 7: NIRCAM</b> <b>Diagnostic Status: Warning</b> Observing Template: NIRCAM Imaging <i>Comments: PA ranges added following advice from NIRCAM reviewer</i>									
	(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
<b>Fixed Targets</b>	<b>#</b>	<b>Name</b>	<b>Target Coordinates</b>		<b>Targ. Coord. Corrections</b>			<b>Miscellaneous</b>		
	(1)	ESO-350-IG-038	RA: 00 36 52.5000 (9.2187500d) Dec: -33 33 18.00 (-33.55500d) Equinox: J2000							
<i>Comments: This object was generated by the targetselector and retrieved from the NED database.</i> Category=Galaxy Description=[Emission line galaxies, Lyman-alpha galaxies, Starburst galaxies] Extended=YES										
<b>Template</b>	<b>Module</b>					<b>Subarray</b>				
	B					FULL				
<b>Dithers</b>	<b>#</b>	<b>Primary Dither Type</b>		<b>Primary Dithers</b>	<b>Subpixel Dither Type</b>		<b>Dither Size</b>	<b>Subpixel Positions</b>		
	1	INTRAMODULEX		4	SMALL-GRID-DITHER			2		
<b>Spectral Elements</b>	<b>#</b>	<b>Short Filter</b>	<b>Long Filter</b>	<b>Readout Pattern</b>	<b>Groups/Int</b>	<b>Integrations/Exp</b>	<b>Total Integrations</b>	<b>Total Dithers</b>	<b>Total Exposure Time</b>	<b>Optional ETC ID</b>
	1	F090W	F300M	SHALLOW4	10	1	8	8	4208.814	
	2	F150W	F335M	SHALLOW4	8	1	8	8	3349.872	
	3	F210M	F250M	SHALLOW4	9	1	8	8	3779.343	
<b>Special Requirements</b>	Aperture PA Range 0 to 7 Degrees (V3 359.94737309 to 6.94737309) Aperture PA Range 19 to 64 Degrees (V3 18.94737309 to 63.94737309) Aperture PA Range 91 to 104 Degrees (V3 90.94737309 to 103.94737309) Aperture PA Range 112 to 188 Degrees (V3 111.94737309 to 187.94737309) Aperture PA Range 193 to 217 Degrees (V3 192.94737309 to 216.94737309) Aperture PA Range 233 to 282 Degrees (V3 232.94737309 to 281.94737309) Aperture PA Range 285 to 307 Degrees (V3 284.94737309 to 306.94737309) Aperture PA Range 323 to 359 Degrees (V3 322.94737309 to 358.94737309) Offset 30.0 arcsec, 30.0 arcsec									