

NIRISS AMI hands-on exercises



Example science program in JWST ETC

1. Log in to JWST ETC and Open program #23

Create New Workbook Sample Workbooks ▾ Example Science Program Workbooks ▾

User Access Permissions for #23: NIRISS AMI Observations of Extrasolar Planets Around a Host Star ?

User ▾

#22 NIRCam Deep Field Imaging with MIRI Imaging Parallels
#23: NIRISS AMI Observations of Extrasolar Planets Around a Host Star
#26: MIRI MRS and NIRSpec IFU Observations of Cassiopeia A
#28: MIRI MRS Spectroscopy of a Late M Star

Email Add User by Email Revoke

Create a scene with another target with spectral type F0V, vega $mag=6.5$, normalized in NIRISS F430M. Name the source ‘Target 2’ and name the scene ‘Target 2 Scene’

- i. Create a Target Acquisition calculation for this source
- ii. Create a new calculation to use this scene
- iii. Calculate NGROUPS for an observation with NRM + F430M
- iv. Compare the ‘Maximum number of Groups Before Saturation’ value with the central pixel value in Groups Before Saturation image
- v. Calculate NINT to get 10^9 total photons in the exposure.
 - Use photon collect time formula and Extracted Flux in the Reports panel
- vi. What contrast can you reach with 10^9 total photons?

AMI calculations in JWST ETC

2. What is the magnitude (Vegamag) of the brightest F0V star that you can observe with NGROUPS=7 in F480M, F380M?
3. Create calculations to calculate NGROUPS and NINT required to get 10^7 photons from HD37093. Use Vegamag = 5.47 normalized in F380M and vegamag=5.46 normalized in F430M and F480M
4. Calculate NGROUPS=1 and NGROUPS=2 bright limits (Vegamag) for a A0V star observed with F380M.



AMI calculations in JWST ETC

Answers to questions

1. Log in to JWST ETC and Open program #23

Select a Workbook ?

User ?

- #22 NIRCam Deep Field Imaging with MIRI Imaging Parallels
- #23: NIRISS AMI Observations of Extrasolar Planets Around a Host Star
- #26: MIRI MRS and NIRSpec IFU Observations of Cassiopeia A
- #28: MIRI MRS Spectroscopy of a Late M Star
- #31: NIRISS SOSS Time-Series Observations of HAT-P-1
- #33: NIRISS WFSS and NIRCam Imaging of Galaxies Within Lensing Clusters
- #34: NIRSpec IFU and Fixed Slit Observations of Near-Earth Asteroids

2. Create a scene with another target with spectral type F0V, vegamag=6.5, normalized in NIRISS F430M. Name the source ‘Target 2’ and name the scene ‘Target 2 Scene’

Select a Scene ?		Default Scene	
ID - Name -	Sources	# Calcs -	
★ 1 Target	1	3	
★ 2 PSF Reference Star	2	4	
☆ 3 Scene 3	0		

[New](#) [Add Source](#) [Remove Source](#) [Delete](#)

Select a Source ?				
ID	Plot	Name -	Scenes -	# Calcs -
1	<input type="checkbox"/>	HD 218396	1	3
2	<input checked="" type="checkbox"/>	HD 218172	2	4
3	<input type="checkbox"/>	Source 3	0	

[New](#) [Delete](#)

Source selected: 3

[Reset](#) [Save](#)

Scene Identity Information

Target 2 Scene

No comment

Source Identity Information

Target 2

Source selected: 3

[Reset](#) [Save](#)

Source Editor ?

ID Continuum Renorm Lines Shape Offset

Spectral Energy Distribution

Uploaded File

Select

No Continuum

Redshift

Extinction

Law

Ext. Magnitude

Ext. Bandpass

[Reset](#) [Save](#)



AMI calculations in JWST ETC

Answers to questions

2. Create a scene with another target with spectral type F0V, vegamag=6.5, normalized in NIRISS F430M. Name the source 'Target 2' and name the scene 'Target 2 Scene' continued...

Source Editor

ID Continuum Renorm Lines Shape Offset

Normalize Source Flux Density

Renormalization applied after redshift

Normalize at wavelength
0.001 mJy λ 2 μm

Normalize in bandpass
6.5 vega mag

JWST NIRISS/IMAGING F430M

HST WFC3/IR F098M

Source selected: 3

Reset Save

Calculations Scenes and Sources Upload Spectra Caveats and Limitations

Select a Scene ★ Default Scene

ID Name -	Sources	# Calcs -
★ 1 Target	1	3
★ 2 PSF Reference Star	2	4
★ 3 Target 2 Scene	3	0

Select a Source

ID - Plot Name -	Scenes -	# Calcs -
1 HD 218396	1	3
2 HD 218172	2	4
3 Target 2	3	0

New Add Source Remove Source Delete

Select new scene, new source and then add source

Source Editor

ID Continuum Renorm Lines Shape Offset

Position of Source in Scene

X offset 0 arcsec

Y offset 0 arcsec

Orientation 0 degrees

Source selected: 3

Reset Save

Source Editor

ID Continuum Renorm Lines Shape Offset

Shape of source: Point Extended

Source selected: 3

Reset Save



AMI calculations in JWST ETC

Answers to questions

- i. Create a Target Acquisition calculation for this source
- ii. Create a new calculation to use this scene
- iii. Calculate NGROUPS for an observation with NRM + F430M
- iv. Compare the 'Maximum number of Groups Before Saturation' value with the central pixel value in Groups Before Saturation image
- v. Calculate NINT to get 10^9 total photons in the exposure.
 - Use photon collect time formula and Extracted Flux in the Reports panel
- vi. What contrast can you reach with 10^9 total photons?

Left Panel: Calculations Tab

ID	Mode	Filter	Exposure Time (s)	Scn	SNR	Action
1	niriss ami	SOSS	0.85	1	1007.77	!
2	niriss ami	WFSS	0.85	2	717.74	✓
3	niriss ami	AMI	5039.82	1	7831.05	✓
4	niriss ami	Target Acquisition	4.81	2	8050.99	✓
5	niriss target_acq	4.81	1	0.22	104.87	✓
6	niriss target_acq	4.81	2	0.22	72.26	✓
7	niriss target_acq	4.81	2	0.32	117.41	✓

Middle Panel: Calculations Tab (Detailed View)

ID	Mode	Filter	Exposure Time (s)	Scn	SNR	Action
1	niriss ami	4.81	1	0.85	1007.77	!
2	niriss ami	4.81	2	0.62	507.22	✓
3	niriss ami	4.81	1	5039.82	7831.05	✓
4	niriss ami	4.81	2	8050.99	7836.49	✓
5	niriss target_acq	4.81	1	0.22	104.87	✓
6	niriss target_acq	4.81	2	0.22	72.26	✓
7	niriss target_acq	4.81	2	0.32	117.41	✓
8	niriss target_acq	4.81	1	0.22	0.00	!

Right Panel: Instrument Setup Tab

Scene: 3: Target 2 Scene

Instrument Setup: NIRISS/IMAGING, F430M

Detector Setup: Normalization applied after redshift

Strategy: Normalize at wavelength, 0.001, flam, 2 μm

Strategy: Normalize in bandpass, 6.5, vegamag

Strategy: JWST

Calculation selected: 8, Mode: niriss target_acq

Bottom Left Panel: Backgrounds Tab

Background configuration: Low

Background configuration: Date: Jul 1 2020

Bottom Middle Panel: NIRISS Target Aquisition Tab

Acq Mode: SOSS or AMI Bright

Filter: F480M

Bottom Right Panel: Strategy Tab

Subarray: SOSS or AMI TA

Readout pattern: NISRAPID

Groups: 13

Integrations: 1

Exposures: 1

Total exposure time: 00:00:01 (0.72 s)

Total Integrations: 1

Calculation selected: 8, Mode: niriss target_acq



AMI calculations in JWST ETC

Answers to questions

- i. Create a Target Acquisition calculation for this source
- ii. **Create a new calculation to use this scene**
- iii. Calculate NGROUPS for an observation with NRM + F430M
- iv. Compare the 'Maximum number of Groups Before Saturation' value with the central pixel value in Groups Before Saturation image
- v. Calculate NINT to get 10^9 total photons in the exposure.
 - Use photon collect time formula and Extracted Flux in the Reports panel
- vi. What contrast can you reach with 10^9 total photons?

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		Calculations		Scenes and Sources		Upload Spectra		Caveats and Lin	
MIRI	NIRCam	NIRISS	NIRSpec						
ID	Mode	Imaging		(s)	SNR -	▲			
1	<input type="checkbox"/> niriss amri	SOSS		0.85	1007.77	!			
2	<input type="checkbox"/> niriss amri	WFSS		0.62	507.22	✓			
3	<input type="checkbox"/> niriss amri	AMI		5039.82	7831.05	✓			
4	<input type="checkbox"/> niriss amri	Target Acquisition		4.81	2	8050.99	7836.49	✓	
5	<input type="checkbox"/> niriss target_acq	4.81	1	0.22	104.87	✓			
6	<input type="checkbox"/> niriss target_acq	4.81	2	0.22	72.26	✓			
7	<input type="checkbox"/> niriss target_acq	4.81	2	0.32	117.41	✓			
8	<input checked="" type="checkbox"/> niriss target_acq	4.81	3	0.72	157.37	✓			
-	-	---	-	-	-	-			

		Calculations		Scenes and Sources		Upload Spectra		Caveats and Limitations	
MIRI	NIRCam	NIRISS	NIRSpec						
ID	Mode	λ	Scn	(s)	SNR -	▲			
1	<input type="checkbox"/> niriss amri	4.81	1	0.85	1007.77	!			
2	<input type="checkbox"/> niriss amri	4.81	2	0.62	507.22	✓			
3	<input type="checkbox"/> niriss amri	4.81	1	5039.82	7831.05	✓			
4	<input type="checkbox"/> niriss amri	4.81	2	8050.99	7836.49	✓			
5	<input type="checkbox"/> niriss target_acq	4.81	1	0.22	104.87	✓			
6	<input type="checkbox"/> niriss target_acq	4.81	2	0.22	72.26	✓			
7	<input type="checkbox"/> niriss target_acq	4.81	2	0.32	117.41	✓			
8	<input type="checkbox"/> niriss target_acq	4.81	3	0.72	157.37	✓			
9	<input checked="" type="checkbox"/> niriss amri	4.28	3	0.85	520.97	✓			
-	-	---	-	-	-	---			

		Scene for Calculation		Backgrounds		Instrument Setup		Detector Setup		Strategy	
Scene	★	ID	Continuum	Renorm	Lines	Shape	Offset				
Scene for Calculation		Scene Identity Information									
3: Target 2 Scene		Target 2 Scene									
Sources in that Scene		No comment									
3: Target 2											
Source Identity Information		Target 2									
Calculation selected: 9, Mode: niriss amri											
Reset Calculate											

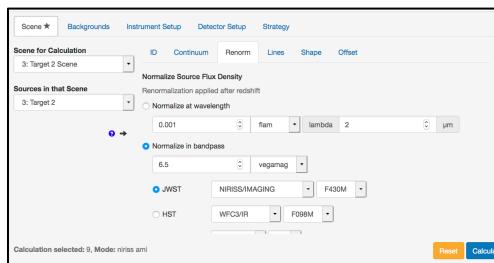
AMI calculations in JWST ETC

Answers to questions

- i. Create a Target Acquisition calculation for this source
- ii. Create a new calculation to use this scene
- iii. Calculate NGROUPS for an observation with NRM + F430M
- iv. Compare the 'Maximum number of Groups Before Saturation' value with the central pixel value in Groups Before Saturation image
- v. Calculate NINT to get 10^9 total photons in the exposure.
 - Use photon collect time formula and Extracted Flux in the Reports panel
- vi. What contrast can you reach with 10^9 total photons?

iii

Update Scene, background, Instrument Setup and Strategy and run the calculation with default Detector Setup



Scene ★ Backgrounds Instrument Setup Detector Setup Strategy

Scene for Calculation: 3: Target 2 Scene

Sources in that Scene: 3: Target 2

Normalize Source Flux Density: Renormalization applied after redshift

Normalize at wavelength: 0.001 flam lambda 2 μm

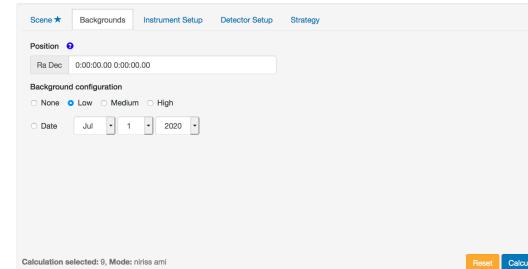
Normalize in bandpass: 6.5 vegamag

Instrument: JWST NIRISS/IMAGING Filter: F430M

HST WFC3/IR Filter: F098M

Calculation selected: 9, Mode: niriss ami

Reset Calculate



Scene ★ Backgrounds Instrument Setup Detector Setup Strategy

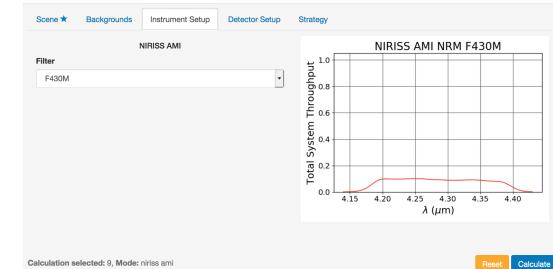
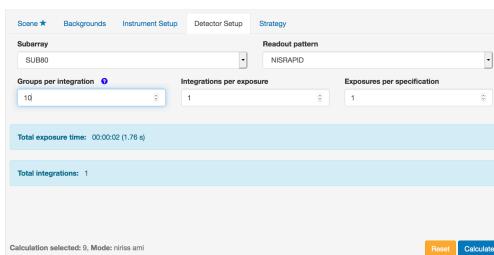
Position: Ra Dec: 0:00:00.00 0:00:00.00

Background configuration: Low

Date: Jul 1 2020

Calculation selected: 9, Mode: niriss ami

Reset Calculate

Scene ★ Backgrounds Instrument Setup Detector Setup Strategy

Subarray: SUB80 Readout pattern: NIRSPAD

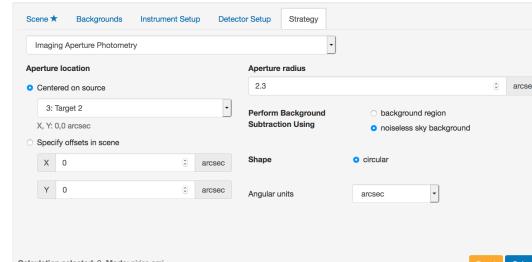
Groups per integration: 10 Integrations per exposure: 1 Exposures per specification: 1

Total exposure time: 00:00:02 (1.76 s)

Total integrations: 1

Calculation selected: 9, Mode: niriss ami

Reset Calculate



Scene ★ Backgrounds Instrument Setup Detector Setup Strategy

Imaging Aperture Photometry

Aperture location: Centered on source X, Y: 0.0 arcsec

Aperture radius: 2.3 arcsec

Perform Background Subtraction Using: noiseless sky background

Specify offsets in scene: X: 0 arcsec Y: 0 arcsec Shape: circular Angular units: arcsec

Calculation selected: 9, Mode: niriss ami

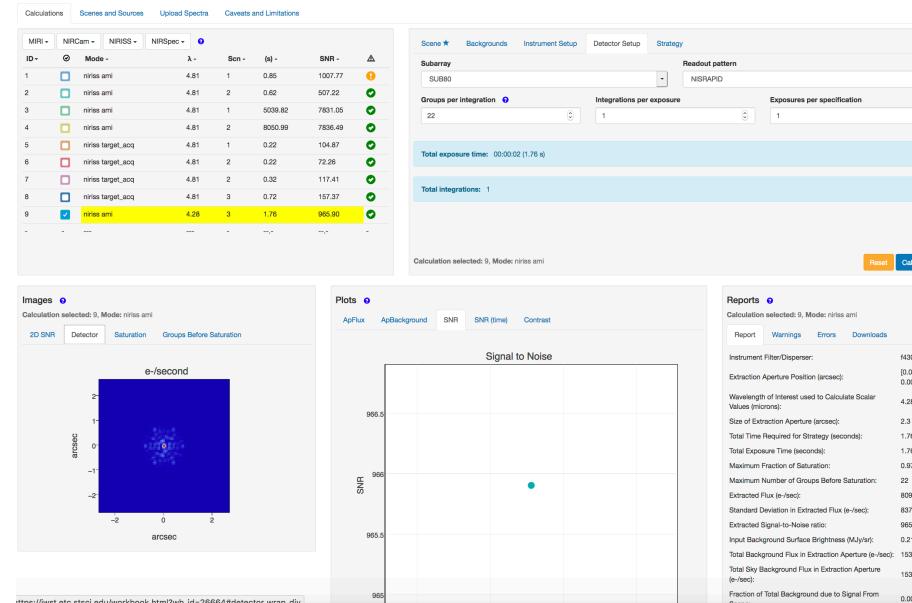
Reset Calculate

AMI calculations in JWST ETC

Answers to questions

- i. Create a Target Acquisition calculation for this source
- ii. Create a new calculation to use this scene
- iii. Calculate NGROUPS for an observation with NRM + F430M
- iv. Compare the 'Maximum number of Groups Before Saturation' value with the central pixel value in Groups Before Saturation image
- v. Calculate NINT to get 10^9 total photons in the exposure.
 - Use photon collect time formula and Extracted Flux in the Reports panel
- vi. What contrast can you reach with 10^9 total photons?

iii
continued



The screenshot shows the JWST ETC interface with three main panels:

- Calculation:** Shows a table of observations. The last row (ID 9) is highlighted in yellow and corresponds to the 'niris amr' target. The 'Groups Before Saturation' column shows values ranging from 1 to 22.
- Strategy:** Displays the readout pattern settings. It shows 'Subarray: SUB90' and 'Readout pattern: NIRSAPID'. The 'Groups per integration' is set to 22, 'Integrations per exposure' to 1, and 'Exposures per specification' to 1. The 'Total exposure time' is 00:00:02 (1.76 s) and 'Total integrations' is 1.
- Reports:** Provides detailed reporting for the selected calculation. Key parameters include:
 - Instrument Filter/Dispenser: F430M/nisl
 - Extraction Aperture Position (arcsec): (0.00, 0.00)
 - Wavelength of Interest used to Calculate Scalar Values (microns): 4.28
 - Size of Extraction Aperture (arcsec): 2.3
 - Total Time Required for Strategy (seconds): 1.76
 - Total Exposure Time (seconds): 1.76
 - Maximum Fraction of Saturation: 0.97
 - Maximum Number of Groups Before Saturation: 22
 - Extracted Flux (e-/sec): 809296.80
 - Standard Deviation in Extracted Flux (e-/sec): 837.87
 - Extracted Signal-to-Noise ratio: 965.90
 - Input Background Surface Brightness (MAU/sr): 0.21
 - Total Background Flux in Extraction Aperture (e-/sec): 153.77
 - Total Sky Background Flux in Extraction Aperture (e-/sec): 153.77
 - Fraction of Total Background due to Signal From Scene: 0.00

The URL at the bottom of the interface is https://jwst.etc.stsci.edu/workbook.html?wb_id=28664#detector_wrap_div.

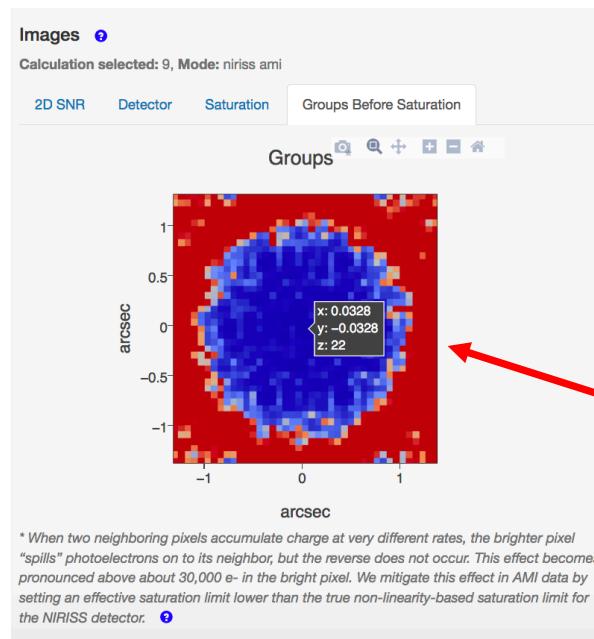
Maximum Number of Groups Before saturation value is 22 from the Reports panel. Therefore set Groups per integration to 22. (NGROUPS)

AMI calculations in JWST ETC

Answers to questions

- i. Create a Target Acquisition calculation for this source
- ii. Create a new calculation to use this scene
- iii. Calculate NGROUPS for an observation with NRM + F430M
- iv. Compare the 'Maximum number of Groups Before Saturation' value with the central pixel value in Groups Before Saturation image
- v. Calculate NINT to get 10^9 total photons in the exposure.
 - Use photon collect time formula and Extracted Flux in the Reports panel
- vi. What contrast can you reach with 10^9 total photons?

iv



Reports

Calculation selected: 9, Mode: niriss ami

Report	Warnings	Errors	Downloads
Instrument Filter/Disperser:	f430m/null		
Extraction Aperture Position (arcsec):	[0.00, 0.00]		
Wavelength of Interest used to Calculate Scalar Values (microns):	4.28		
Size of Extraction Aperture (arcsec):	2.3		
Total Time Required for Strategy (seconds):	1.76		
Total Exposure Time (seconds):	1.76		
Maximum Fraction of Saturation:	0.97		
Maximum Number of Groups Before Saturation:	22		
Extracted Flux (e-/sec):	809296.80		
Standard Deviation in Extracted Flux (e-/sec):	837.87		
Extracted Signal-to-Noise ratio:	965.90		
Input Background Surface Brightness (MJy/sr):	0.21		
Total Background Flux in Extraction Aperture (e-/sec):	153.77		
Total Sky Background Flux in Extraction Aperture (e-/sec):	153.77		
Fraction of Total Background due to Signal From Scene:	0.00		
Average Number of Cosmic Rays per Ramp:	1.3e-4		

Maximum number of Groups Before *saturation in the brightest pixel of AMI PSF.



AMI calculations in JWST ETC

Answers to questions



- i. Create a Target Acquisition calculation for this source
- ii. Create a new calculation to use this scene
- iii. Calculate NGROUPS for an observation with NRM + F430M
- iv. Compare the 'Maximum number of Groups Before Saturation' value with the central pixel value in Groups Before Saturation image
- v. Calculate NINT to get 10^9 total photons in the exposure.
 - Use photon collect time formula and Extracted Flux in the Reports panel
- vi. What contrast can you reach with 10^9 total photons?

V

Total Time Required for Strategy (seconds):	1.76
Total Exposure Time (seconds):	1.76
Maximum Fraction of Saturation:	0.97
Maximum Number of Groups Before Saturation:	22
Extracted Flux (e-/sec):	809296.80
Standard Deviation in Extracted Flux (e-/sec):	837.87
Extracted Signal-to-Noise ratio:	965.90
Input Background Surface Brightness (M Jy/arcsec ²):	0.21

Total photons = flux × NGROUPS × NINT × TFRAME

$$\text{NINT} = \text{Total photons} / (\text{flux} \times \text{NGROUPS} \times \text{TFRAME})$$

$$= 10^9 / (809296.80 \text{ e-/sec} \times 22 \times 0.07544 \text{ sec})$$

$$= 744.5 \rightarrow \text{Round up to } 745$$



AMI calculations in JWST ETC

Answers to questions



- i. Create a Target Acquisition calculation for this source
 - ii. Create a new calculation to use this scene
 - iii. Calculate NGROUPS for an observation with NRM + F430M
 - iv. Compare the 'Maximum number of Groups Before Saturation' value with the central pixel value in Groups Before Saturation image
 - v. Calculate NINT to get 10^9 total photons in the exposure.
 - Use photon collect time formula and Extracted Flux in the Reports panel
 - vi. What contrast can you reach with 10^9 total photons?
- vi
- $$\text{sqrt}(100/(10^{**9})) = 0.0003$$

AMI calculations in JWST ETC

Answers to questions

2. What is the vegamag magnitude of the brightest F0V star that you can observe with NGROUPS=7 in F480M, F380M?

- F480M

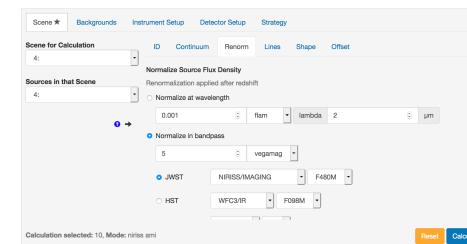
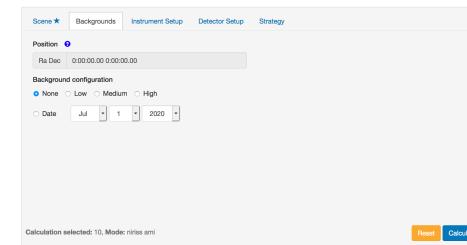
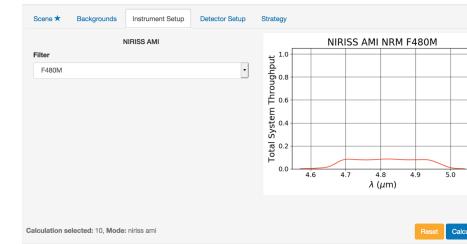
Vegamag =5 gives maximum number of Groups Before Saturation as 7.

Vegamag = 5.1 gives maximum number of Groups Before Saturation as 8.

Therefore vegamag=5 is the NGROUP=7 bright limit for F480M

- F380M

vegamag = 6
for NGROUPS=7

Reports	
Calculation selected: 10, Mode: niriss ami	
Report	Warnings
Instrument Filter/Disperser:	f480m/null
Extraction Aperture Position (arcsec):	[0.00, 0.00]
Wavelength of Interest used to Calculate Scalar Values (microns):	4.81
Size of Extraction Aperture (arcsec):	2.5
Total Time Required for Strategy (seconds):	0.62
Total Exposure Time (seconds):	0.62
Maximum Fraction of Saturation:	0.91
Maximum Number of Groups Before Saturation:	7
Extracted Flux (e-/sec):	2877649.50
Standard Deviation in Extracted Flux (e-/sec):	3275.57
Extracted Signal-to-Noise ratio:	878.52
Input Background Surface Brightness (MJy/sr):	0.00
Total Background Flux in Extraction Aperture (e-/sec):	0.00
Total Sky Background Flux in Extraction Aperture (e-/sec):	0.00
Fraction of Total Background due to Signal From Scene:	0.00



AMI calculations in JWST ETC

Answers to questions



3. Create calculations to calculate NGROUPS and NINT required to get 10^7 photons from HD37093. Use Vegamag = 5.47 normalized in F380M and vegamag=5.46 normalized in F430M and F480M

Answer:

This is similar to calculations 2, 3 and 4 in NIRISS AMI Examples sample workbook. The only difference is in the total number of photons which will change the number of integrations.

F480M NGROUPS=11, NINT = 7

F430M NGROUPS=8, NINT = 8

F380M NGROUPS=4, NINT = 11

AMI calculations in JWST ETC

Answers to questions

4. Calculate NGROUPS=1 and NGROUPS=2 bright limits (Vegamag) for A0V star observed with F380M.

This is similar to Example 3 in NIRISS AMI Examples. Only the filter is different.

**NGROUPS=2 bright limit
For F380M**

4.66

**Change the magnitude to
4.65 and look at the warning message**

Source Editor

- ID Continuum Renorm Lines Shape Offset

Normalize Source Flux Density

Renormalization applied after redshift

Normalize at wavelength
0.001 flam lambda 2 μm

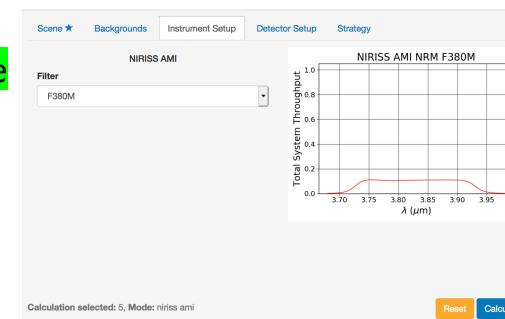
Normalize in bandpass
4.66 vegamag

JWST NIRISS/IMAGING F380M

HST WFC3/IR FO98M

Source selected: 4

Reset Save



Reports

Calculation selected: 5, Mode: niriss ami

Instrument Filter/Disperser:	f380/null
Extraction Aperture Position (arcsec):	[0.00, 0.00]
Wavelength of Interest used to Calculate Scalar Values (microns):	3.83
Size of Extraction Aperture (arcsec):	2
Total Time Required for Strategy (seconds):	0.25
Total Exposure Time (seconds):	0.25
Maximum Fraction of Saturation:	0.99
Maximum Number of Groups Before Saturation:	2
Extracted Flux (e-/sec):	6705701.97
Standard Deviation in Extracted Flux (e-/sec):	15015.28
Extracted Signal-to-Noise ratio:	446.59
Input Background Surface Brightness (MJy/sr):	0.00
Total Background Flux in Extraction Aperture (e-/sec):	0.00
Total Sky Background Flux in Extraction Aperture (e-/sec):	0.00
Fraction of Total Background due to	0.00



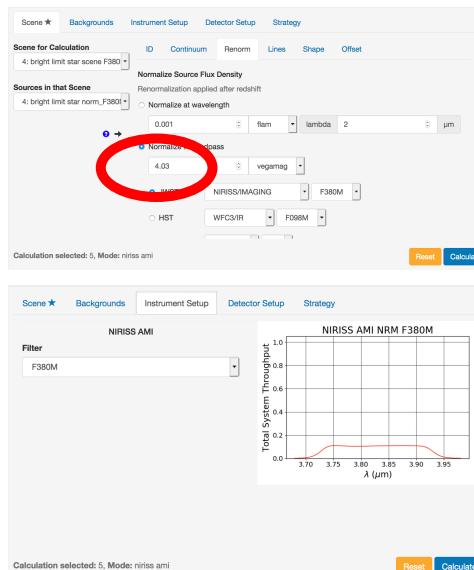
AMI calculations in JWST ETC

Answers to questions

4. Calculate **NGROUPS=1** and **NGROUPS=2** bright limits (Vegamag) for A0V star observed with F380M.

This is similar to Example 3 in NIRISS AMI Examples. Only the filter is different.

NGROUPS=1 bright limit for F380M is 4.03. Change the magnitude to 4.02 and look at the central pixel in Groups Before Saturation image.



Reports

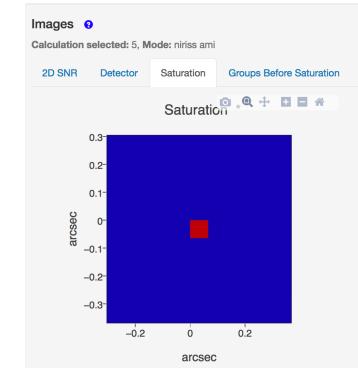
Calculation selected: 5, Mode: niriss ami

Report	Warnings	Errors	Downloads
Instrument Filter/Disperser:	f380m/null		
Extraction Aperture Position (arcsec):	[0.00, 0.00]		
Wavelength of Interest used to Calculate Scalar Values (microns):	3.83		
Size of Extraction Aperture (arcsec):	2		
Total Time Required for Strategy (seconds):	0.25		
Total Exposure Time (seconds):	0.25		
Maximum Fraction of Saturation:	1.77		
Maximum Number of Groups Before Saturation:	1		
Extracted Flux (e-/sec):	11979653.37		
Standard Deviation in Extracted Flux (e-/sec):	NaN		
Extracted Signal-to-Noise ratio:	0.00		
Input Background Surface Brightness (MJy/sr):	0.00		
Total Background Flux in Extraction Aperture (e-/sec):	0.00		
Total Sky Background Flux in Extraction Aperture (e-/sec):	0.00		
Fraction of Total Background due to	0.00		

Reports

Calculation selected: 5, Mode: niriss ami

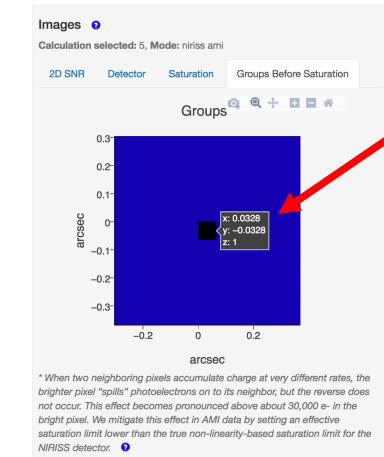
Report	Warnings	Errors	Downloads
• Full saturation: There are 1 pixels saturated* at the end of the first group. These pixels cannot be recovered. *(See footnote in the Saturation image tab.)			



* When two neighboring pixels accumulate charge at very different rates, the brighter pixel "spills" photoelectrons on to its neighbor, but the reverse does not occur. This effect becomes pronounced above about 30,000 e- in the bright pixel. We mitigate this effect in AMI data by setting an effective saturation limit lower than the true non-linearity-based saturation limit for the NIRISS detector.

Saturation image

Signal limit exceeded in group 2 but not in group 1

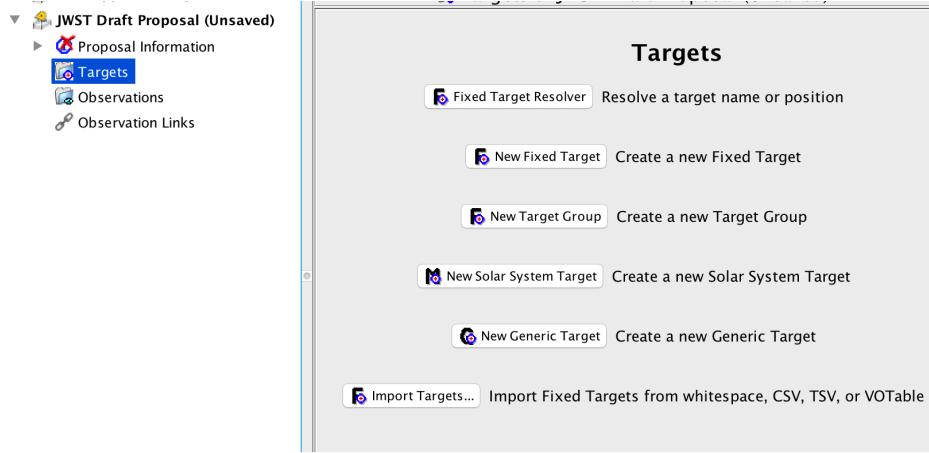


Groups Before Saturation image



Example science program in JWST APT

AMI Specific strategies



Get coordinates from GAIA DR2 archive, enter epoch as 2015.5

- Use Fixed Target Resolver to search for target and then manually update coordinates OR
- Select New Fixed target and update information.

The screenshot shows the 'JWST Approved Proposal 23 (Unsaved)' editor. The 'Targets' section is expanded, showing 'Fixed Targets' with entries for '1 HD-218396' and '2 HD-218172'. The main panel displays the details for '1 HD-218396'.

Number	1
Name in the Proposal	HD-218396
Name for the Archive	HD 218396
Category	Star
Description	+/- Exoplanet Systems: F stars
Choose 1 to 5 items after selecting a category.	
J2000 Coordinates (ICRS) RA: 23 07 28.8327 Dec: +21 08 2.53	
Uncertainty	RA: [] Arcsec [] Dec: [] Arcsec []
Proper Motion	RA: [108.30] mas/yr Dec: [-49.48] mas/yr
Epoch	[2015.5]
Annual Parallax (arcsec)	[]
Extended	[Unknown]

Recommended for spectroscopy (for advice to data reduction pipeline)



Example science program in JWST APT

Astronomer's Proposal Tools Version 27.3.1 JWST PRD: PRDOPSSOC-M-025 - JWST Approved Proposal 23 (Unsaved)

Direct Imaging Parameters
Direct Image True False

PSF Reference Observations

This is a PSF Reference Observation HD-218172 (Obs 2) (PSF Reference; Filters [F480M])

PSF Reference Observations

Additional justification: Additional justification of sole reference exposure will be provided in the science investigation.

Edit Exoplanets in HD 218396 with NIRISS AMI New Edit Visit 1:1

Astronomer's Proposal Tools Version 27.3.1 JWST PRD: PRDOPSSOC-M-025 - JWST Approved Proposal 23 (Unsaved)

Filters

Add Duplicate Insert Above Remove

Direct Imaging Parameters
Direct Image True False

PSF Reference Observations

This is a PSF Reference Observation (exclusive access period will be 0 months)

Edit Visit 1:1 New Edit Visit 2:1

Observation	Number	Status	Duplication	Label	Science	Total Char...	Data Volume	Parallel Slo...	Instrument	Ter

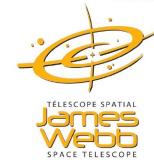
Show: Observation

2 errors & warnings (Click for Details)



Example science program in JWST APT

AMI Specific strategies



Adding Special Requirements

Screenshot of Astronomer's Proposal Tools Version 27.3.1 showing the "Group/Sequence Observations Link" dialog.

The dialog is titled "Group/Sequence Observations Link" and shows two observations selected in the "Observation list": HD-218396 (Obs 1) and HD-218172 (Obs 2).

Options in the dialog include:

- Time interval: [] Days
- Sequence:
- Non-interruptible:
- Exclusive Use Of Instrument:

At the bottom, there is an "OK" button and tabs for "NIRISS Aperture Masking Interferometry", "Special Requirements", and "Comments".

A callout box with the text "Click on Add" points to the "Special Requirements" tab.

A dropdown menu under "Special Requirements" shows the following options:

- Timing
- Position Angle
- Offset
- No Parallel
- On Hold
- Target Of Opportunity
- Maximum Visit Duration
- Background Noise
- After Date
- Before Date
- Between Dates
- Phase
- After Observation Link
- Group/Sequence Observations Link** (highlighted)

The status bar at the bottom right indicates "2 errors & warnings (Click for Details)".



Example science program in JWST APT

AMI Specific strategies

Create 'NIRISS AMI Observations of Extrasolar Planets around a Host Star' proposal and compare with the existing program.

- Select target HR8799(or HD218396) and calibrator (HD218172).
- Enter/update coordinates, proper motion using information from Gaia DR2 archive, use 2015.5 epoch.
- Create observations for each source using NIRISS AMI template.
- Update exposure parameters using calculations 5 and 7 for Target Acquisition and calculations 3 and 4 for science observations in JWST ETC example science program workbook #23: NIRISS AMI Observations of Extrasolar Planets Around a Host Star.
- Create Group non-interruptible Special Requirement for the target and the calibrator.
- Update PSF Reference Observations field for the target and the calibrator.
- Run visit planner
- Run Smart accounting
- Create the times report (via APT File – Export) to look at an ASCII listing of charged times
- Create Target Confirmation Charts and view the observations in Aladin.