



ESAC 2017 JWST Workshop



MIRI LRS slit observations of SMMJ123616.15+621513.7: measuring dust properties at high-z Macarena Garcia Marin, Pamela Klaassen, Stacey Bright, Sarah Kendrew

Stience Case 1.1





Goal: This program aims at obtaining MIRI LRS spectra of SMMJ123616.15+621513.7, an Ultra Luminous Infrared Galaxy at redshift 2.578. The resulting spectra (5-12 microns) will measure the hot dust through PAH features such as those at 1026 Chary & Elbaz Dale & Helou 6.2, 7.7 and 8.6, and 11.3 μm 1025 Methodology: Spectral extraction of 1024 MIR spectra, lines fitting and spectral 10²³ [W/Hz]1026 templates fitting. Lagache Franceschini



Observations: MIRI LRS Source type: Faint distant galaxy Analysis technique: Spectral extraction







Use ESA Sky to find the source of interest, and display the JWST instruments footprint on it.

Hint: Use the source name GOODS J123616.12+621514.0 Identify the science aperture MIRI LRS.

Are there other bright sources around? Any source that can fall into in the slit and contaminate the results?

ESA Sky can be also used to download already reduced files of the target from all ESA missions.

Run the Target visibility tool to check the observability windows.







MIRI: FULL array, filter wheel in double prism position (P750L).

Detector readout pattern of choice should be decided when running the ETC. Find readout patterns in JDox.





Exposure Time Calculator



Sources and Scenes

Source 1: Set up an extended source with a 2D Gaussian shape using the ULIRGs template available in the ETC. Assign the semi-minor and major axis using the information in the figure and target redshift.

Normalize in bandpass to 20.86 K-band.

Set up a scene with the source in the center.

Calculation:

Use low background, LRS prism, FAST readout mode. Use aperture radius of 0.3 and background subtraction

using a background region.



Aim for SNR of about 10 or more at 10 microns. Consider alternative background strategies.



-2-1012arcsecRujopakarn et al. 2010. The whitebar represents 5 kpcThe yellow circle does notrepresent the MIRI LRS aperturebut the beam of other instrument.



Exposure Time Calculator



TA estimation

Repeat the calculation using the ETC TA menu. Pick a suitable TA filter and low background.







Target's visibility: Run the target visibility tool to find out when this target is visible and which orients will be available.

Use that information to check in ESA sky, or in Aladdin/APT, whether some orients are more favorable than others.







Targets:

- Use the APT "New fixed target" tab to load the coordinates: SMMJ123616.15+621513.7 RA: 12 36 16.1500 DEC: +62 15 13.70 Choose an extended source.
- Use ESASky or Aladdin in APT to select a suitable region of the sky as background
- Define a background target; the background should be an empty/clear region of the sky. Remember to assign the background target to the science one.

Template:

- MIRI Low Resolution Spectroscopy.
- Define TA following your ETC estimations. Use the source itself (it has a bright central nucleus) or try to select another point source near the galaxy.



- Define dither patterns using mapping, and a number of dither points that is consistent with your ETC estimations. We use mapping because the source has a certain extended structure to it.
- Use Aladdin to visualize the MIRI LRS footprint.





The Background observation folder can be created by duplicating the science observation folder, and changing the target.

- Consider whether it is necessary to replicate all dither strategy.
- Go to the Special Requirements tab and add a Time Constrain Explicit Requirement. Link the science and background observations to be executed in a non- interruptible sequence. This is to ensure data are taking in the exact same conditions.







Highlight the Observation folders and run the Visit Planner. Verify the schedulability of the program. Go to the visit planner menu and run smart accounting to remove potential unnecessary overheads.

Review the program.

Do you have errors or warnings? If yes, are they expected? Can you "fix" any? Is the TA strategy of choice satisfactory?

