

Summary of how to use MIRI DHAS miri_ql tool to display and analyze MIRI jwst_pipeline products.

Limitations: The focus of this tool is to analyze the input and output products of the caldetector 1 pipeline. This tool only displays and analyzes uncalibrated images, rate images and intermediate ramp images with various steps applied. Viewing and analyzing calibrated products (output of calimage2 and calspec2 pipelines) will be in a future delivery, but limited to output products of the same size as the input science image, in other words, no analyzing resampled images or extracted images will be available.

DHAS 9.6.5 and higher can be used access the JWST_MIRI_QL package. This IDL software tool exists in MIRI DHAS package: DHAS/MPipeline/Pro/JWST_MIRI_QL. Like the other DHAS tools it contains some basic defaults found in preferences file tied to the version number: DHAS/Preferences/JWST_MIRI_QL_v9.6.0.preferences.

General summary and guide to how to use the tool:

1. The data is assumed to be in DMS format (if not run create_data script in the jwst_pipeline to convert it to DMS format).
2. Run the calwebb_detector1 pipeline on the data. For each caldetector1 step with the 'save_results = True' set the intermediate ramps are written out and can be displayed by this tool. The user needs to remember that this intermediate product also contains the corrections to the pixel ramps from steps that occurred in the pipeline previous to this step. For example, the linearity step occurs before the dark subtraction, the intermediate dark subtracted data also contain the linearity step modifications to the pixel ramp.
3. A set of test data and output products is provided at the MIRI test team website: [sftp teammir@poppy.as.arizona.edu](mailto:teammir@poppy.as.arizona.edu) (if you don't know the password ask Jane Morrison: morrison@as.arizona.edu) cd into DHAS/MIRI_QL_EXAMPLE
 - a. The cfg files for the steps have the option 'save_results = True' added.
 - b. Running calwebb_detector1 on an uncalibration file in that directory will result in the rate images and the intermediate step products for linearity, rscd, dark current and reference pixels.
4. To run the 'miri_ql' tool follow these steps: (it is assumed you already have the DHAS set up on your computer with the correct PATHS and environmental variables set. If not see the instructions on poppy.as.arizona.edu/dhas/)
 - a. Invoke IDL
 - b. Type 'miri_ql'. A control window VERY SIMILAR to the DHAS QL tool will pop up
 - c. **Display Data -> Display Science Frames and Rates** (select uncalibrated file). View and analyze uncalibrated images, rate files, query pixel ramps with corrections from the steps applied, basic statistics on images, compare different frame image to one another.

- d. **Display Data -> Display Rate and Rates int Images** (select rate.fits file). View and analyze rate images, rate files, query pixel rates, basic statistics on images, compare different integration rate images to one another integration. Note by default the **Final Averaged Rate** image is shown, to view the Integration Rate select **Int Rate** from **Final Rate** drop down options.
- e. **Compare Data -> Compare Two Science Images or Two Rate images:** compare two frame/group images or compare rates images from two different files or rate integrations from the same or two different files.