# Quick Start Guide

This article summarizes key information to help you quickly discover and understand JWST data from MAST.

**On this page...**

## Discovering JWST Data

The most effective approach to discovering JWST science data in MAST depends upon your objective and your involvement in JWST observing programs. If you are new to MAST or to using the Portal, see MAST Primer for JWST.

### Program PI or Co-I

If you are a Principal Investigator (PI) or Co-Investigator (Co-I) on one or more active JWST observing programs (i.e., approved programs that expect to obtain data in the current cycle), or are an Archive Researcher awaiting data from certain programs to become available, do one or more of the following:

- Consult the Portal Guide chapter Program Subscriptions and Notifications. Notifications will include a link to the associated observations, which when clicked will show these observations in the Portal.
- Execute a Portal Advanced Search and tick the `JWST` box in the *Mission* filter, and enter the program number in the *Proposal ID* filter to search for data in your program.
- Review the Using MAST APIs chapter in this manual to learn about scripted searches.

### General User

If you have a scientific interest in JWST data but are not part of an investigator team, you might prefer these options:

- Execute a Portal *Advanced Search* and click the `JWST` box in the *Mission* filter, or follow the Using the MAST Portal tutorial in this Manual for JWST-specific searches.
- Execute a Portal basic search by target name or position to see if any JWST observations have been (or will be) obtained for sources of interest. The results will also include observations from all missions hosted at MAST.
- Review the Using MAST APIs chapter in this manual to learn about scripted searches.
- Consult the list of JWST Approved Programs to see which science programs will obtain data in the current Cycle.

> ⊘ Anonymous users will be able to search for all data, but will only be able to retrieve public data. See the next section.

## Available Science Data

### Exclusive Access Data

Most science data obtained from JWST will be released to the astronomical community following an ***exclusive access period*** (EAP), during which the Principal Investigating Team enjoys exclusive scientific use. The duration of the exclusive access period depends upon the type of program. Some programs, whether by policy or choice, have a zero-length EAP.

> ⊘ **Authorization for EAP Data**
>
> Principal Investigators are automatically given authorization to access data products within the EAP for their observing programs. PIs must authorize other members of their team if they need to access these data prior to the expiration of the EAP. See the article on MAST User Accounts to learn how to grant access.

### Public Data

A large quantity of JWST data will be available for public use as soon as the observations are obtained and processed. These include the following categories of observing programs:

- **Early Release Observations:** Data from the ERO program, which demonstrate the capabilities of the JWST instruments, will be public after a brief embargo period.
- **Early Release Science:** Data from all 13 Cy-1 ERS programs have a zero-length EAP.
- **Cy-1 Guest Observer:** Data from 33 of the GO programs have zero-length EAP.
- **Cy-1 Guaranteed Time Observer:** Data from 16 of the GTO programs have a component with zero-length EAP.
- **Calibration:** All data obtained from JWST calibration programs have zero-length EAP; many of these include observations of astrophysical targets.
- **Commissioning**: All data obtained from JWST commissioning programs. Note that some commissioning data may not be suitable for science.
- All data for which the EAP has expired.

## Data Notifications

Use the MAST Portal to register for notifications about data from specific observing programs. This is a particularly good way for general MAST users to learn when the EAP expires on data of interest. See the Portal Guide chapter Program Subscriptions and Notifications for details.

# Understanding JWST Data

The Field Guide to JWST Data chapter in this manual, along with certain other JWST reference materials, will help you understand enough about JWST data products to get started on data analysis. Here are some key elements:

### Data Processing Levels

The calibration pipeline for JWST processes data in stages from raw to the most refined, calibrated, and combined products; most products produced by intermediate pipeline stages are also archived. See the chapter on Science Data Products to learn about the categories of JWST products and how they are represented in MAST, and see the article on Processing Levels and Product Stages for details about each type of data file. Generally, the highest-levels of products are appropriate for science analysis.

### File Naming Scheme

The file name convention for JWST data products was designed to facilitate automated pipeline processing, and relates the files to details of the observing program that generated them. The names are not scientist-friendly. See the Field Guide chapter for a summary, or the File Naming Schemes reference document for details. The most important distinction is between products that relate to an *exposure* vs. those that relate to a *source* or *target*.

### Data Product Types

A data product type refers to the semantic content of the file. It is encoded in the product filename as a suffix, appearing just before the file extension (e.g., `*_cat.ecsv` indicates the file content is a source catalog). Which products you see for a given observation in MAST depends upon the instrument configuration (e.g., imaging, some form of spectroscopy, coronography), data taking mode (e.g., timeseries, dithers), and the level of processing. See the sortable table of MAST Data Product Types for a brief explanation of type extensions, and the calibration pipeline Data Product Types for details.

### FITS Keywords

Most (but not all) science data products are in FITS format. These files have primary and extension headers that contain valuable metadata. The keyword names and definitions may be found in the searchable JWST Keyword Dictionary for all instruments and configurations. See the article on Keyword Metadata for details.

### JWST Calibration Pipeline

The calibration pipeline that produces JWST data products will be re-executed (and data products regenerated) after initial ingestion in response to events such as pipeline software updates or updates to calibration reference files. There are other reasons for a user to re-run the pipeline on their own system, e.g. to modify choices for backgrounds or spectrum extraction parameters. See the JWST Science Calibration Pipeline overview, and the JWST Calibration Pipeline reference document for details.

## Selecting JWST Data Products

The full set of data products related to a single JWST observation may consist of hundreds of files. Standard MAST searches return **Observations**, which are collections of related files; this bundling de-clutters the interface and makes the selection of file types more manageable for users. See the chapter on Data Product Linkages to see how files are rolled up under an Observation. One can use filters in the Portal Download Basket to select the small number that are needed for actual science analysis. Using the "Minimum Recommended Products" filter is often helpful.

## Retrieving JWST Data

There are multiple options for retrieving data products from MAST. They include:

- Streaming data products from your Portal session

- Downloading a bash script to retrieve files asynchronously.
- Staging data at STScI for later retrieval
- Using third-party tools that support scripted data retrieval

See the Portal Guide chapter on Retrieving Data for details.

# For Further Reading...

- Field Guide to JWST Data
- Portal Guide
- JWST Acronyms

JWST Reference documents:

- JDox: JWST User Documentation
- JWST Data Products
- JWST Pipeline