

Imaging Options

JWST NIRC*am*, NIRISS, and MIRI imaging options are summarized here, including filter choice, subarray choice, and dither choice.

Introduction

Parent article: [JWST Imaging](#)

*Main articles: [NIRC*am* Imaging](#), [NIRISS Imaging](#), [MIRI Imaging](#)*

Several filter, subarray, and dither options are available in [NIRC*am*](#), [NIRISS](#), and [MIRI](#) imaging modes. These options are summarized below, with links to relevant instrument pages.

Imaging filters

*Main articles: [NIRC*am* Filters](#), [NIRISS Filters](#), [MIRI Filters and Dispersers](#)*

NIRC*am* offers 29 filters: 13 in the short wavelength (SW) channel and 16 in the long wavelength (LW) channel. This includes a total of 2 extra-wide filters ($R = \lambda/\Delta\lambda = 1-2$), 8 wide filters ($R = 4-5$), 12 medium filters ($R = 8-20$), and 7 narrow filters ($R = 78-92$). The filters on each of the two NIRC*am* modules have slightly different transmissions.

NIRISS offers 12 filters: 7 wide filters and 5 medium filters. With the exception of F158M, the NIRISS filter transmissions are very similar to the NIRC*am* filters.

MIRI offers 9 wide filters, plus one additional redundant filter (F2550WR). Note that not every filter is available for every time-series and high-contrast imaging mode—only certain filters can be paired with other optical elements (e.g., occulting masks).

Additional information about the imaging filters can be found at the articles listed below.

- [NIRC*am* Filters](#)
- [NIRISS Filters](#)
- [MIRI Filters](#)

Imaging subarrays

*Main articles: [NIRC*am* Detector Subarrays](#), [MIRI Detector Subarrays](#)*

For NIRC*am* and NIRISS, the full frame detector is read out through 4 parallel outputs in 10.7 s. MIRI's full frame detector is read out in 4 interleaved data outputs in 2.8 s.

For bright sources that saturate in these frame times, several imaging subarrays are available for MIRI and NIRCam; subarrays are *not* supported for NIRISS imaging. MIRI offers 4 imaging subarrays with frame times of 8.5–86.5 ms, plus 4 additional subarrays used with coronagraphy that have frame times of 24–32.4 ms. Each NIRCam channel (the SW channel and the LW channel) offers 3 point source subarrays and 3 extended source subarrays. The extended source subarrays fall in the center of the LW detector, thus the corresponding SW subarrays traverse the detector gaps. Consequently, dithers should be used to cover the SW gaps when using the extended source subarrays if full spatial coverage is required. The frametimes are 49–165 ms for the point source subarrays and 0.28–4.18 s for the extended source subarrays. More information can be found at the following articles:

- [NIRCam Subarrays](#)
- [MIRI Subarrays](#)

Imaging dither patterns

Main article: [JWST Dithering Overview](#)

Several dither patterns are available for imaging, including patterns designed for optimal PSF sampling and patterns designed to cover detector gaps (for NIRCam). NIRISS imaging can only be executed as a coordinated parallel with NIRCam or MIRI as prime instrument. As such, it will follow the dither pattern selected by the prime instrument's observing mode. Details can be found at the articles listed below:

- [NIRCam Dither Patterns](#)
- [MIRI Dither Patterns](#)
- [Dithers for Coordinated Parallel Observations](#)