

NIRSpec Operations

The operational aspects of JWST's NIRSpec instrument define how instrument-level capabilities can be applied for science. These features include target acquisition methods, dither/nods for each observing mode, and special considerations for science observations.

Introduction

The JWST Near Infrared Spectrograph (NIRSpec) enables 0.6–5.3 μm spectroscopy at resolving powers of ~ 100 , $\sim 1,000$, and $\sim 2,700$ in [multi-object spectroscopy \(MOS\)](#), [integral field unit \(IFU\) spectroscopy](#), [fixed slits \(FSs\) spectroscopy](#), and [bright object time-series \(BOTS\) spectroscopy](#) modes.

These NIRSpec science modes include the following operational capabilities:

- [NIRSpec dithering strategies](#)
Dithering of spectroscopic observations is necessary to improve coverage of the sky, cover gaps between detectors, correct for detector defects and pixel-to-pixel response fluctuations, and to improve the sampling of the point- and line-spread functions of the instrument. MOS, IFU, and FS modes have [dithering strategies](#) to accomplish these goals in the articles listed below:
 - [NIRSpec MOS Dither and Nod Patterns](#)
 - [NIRSpec IFU Dither and Nod Patterns](#)
 - [NIRSpec FS Dither and Nod Patterns](#)
- [NIRSpec target acquisition](#)
- [NIRSpec MOS operations](#)
 - [NIRSpec MOS Operations - Observing Process](#)
 - [NIRSpec MOS Operations - Catalogs and Images](#)
 - [NIRSpec MOS Operations - Pre-Imaging using NIRCcam](#)
 - [NIRSpec MOS Operations - Confirmation Images](#)
 - [NIRSpec MOS Operations - Slit Losses](#)
- [NIRSpec IFU operations](#)
- [NIRSpec FS operations](#)
- [NIRSpec BOTS operations](#)
- [NIRSpec auto-cals \(auto-calibrations\)](#)

Auto-cals

NIRSpec auto-cals (auto-calibrations) are internal calibration exposures that can be acquired with lamps within the NIRSpec calibration assembly (CAA). These auto-cals can be acquired for flat fields, wavelength reference exposures, and broad line peaks measured for dispersion verification.

✔ It is not recommended for users to acquire NIRSpec auto-cals with their science for two reasons:

- Acquiring auto-cals can cause moderate overheads, ~5 minutes or more per exposure.
- Acquiring auto-cals with lamp illumination may cause low levels [persistence](#) in subsequent science that could effect very deep sky exposures on faint objects.

✔ NIRSpec auto-cals have been added to the science templates for FS, IFU, and MOS observing modes to make it possible to acquire lamp exposures at the same time as on-sky external exposures. It is expected this capability will primarily be used for instrument commissioning and observatory calibration observations.