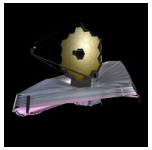

# 1995 - Answering the Most Important Problem in Cosmology Today: Is the Tension in the Hubble Constant Real?

Cycle: 1, Proposal Category: GO

**INVESTIGATORS**

| *Name* | *Institution* |
|---|---|
| **Prof. Wendy L. Freedman (PI)** | **University of Chicago** |
| Dr. Barry F. Madore (CoI) (CoPI) | Carnegie Institution of Washington |
| Dr. In Sung Jang (CoI) | University of Chicago |
| Ms. Abigail Lee (CoI) | University of Chicago |
| Ms. Kayla A. Owens (CoI) | University of Chicago |
| Dr. Taylor J Hoyt (CoI) | Lawrence Berkeley National Laboratory |

**OBSERVATIONS**

| *Folder* | *Observation* | *Label* | *Observing Template* | *Science Target* |
|---|---|---|---|---|
| Observation Folder | | | | |
| | 1 | | NIRCam Imaging | (1) MESSIER-101 |
| | 3 | | NIRCam Imaging | (3) NGC4258-HALO |
| | 4 | | NIRCam Imaging | (4) NGC4258-OUTER-DISK |
| | 5 | | NIRCam Imaging | (5) NGC4258-INNER-DISK |
| | 55 | | NIRCam Imaging | (55) NGC4258-INNER-DISK-FIX |
| | 6 | | NIRCam Imaging | (6) NGC1365 |
| | 12 | | NIRCam Imaging | (12) NGC4424 |
| | 14 | | NIRCam Imaging | (14) NGC7250 |
| | 16 | | NIRCam Imaging | (16) NGC2442 |
| | 17 | | NIRCam Imaging | (17) NGC3972 |
| | 19 | | NIRCam Imaging | (19) NGC4038 |

| *Folder* | *Observation* | *Label* | *Observing Template* | *Science Target* |
|---|---|---|---|---|
| | 21 | | NIRCam Imaging | (20) NGC4536 |
| | 22 | | NIRCam Imaging | (21) NGC4639 |
| | 23 | | NIRCam Imaging | (22) NGC5643 |

**ABSTRACT**

Measurements of the Hubble constant are on the cusp of heralding in a fundamental discovery in cosmology that goes beyond the standard Lambda CDM model. Yet published differences in the local distance scale may be indicating that systematic errors, which have long been the bane of the extragalactic distance scale, are larger than currently estimated. The importance of this possibility cannot be overstated. Independent paths for measuring Ho are vital to provide necessary cross checks against unrecognized systematic uncertainties. In this first year of JWST, we propose to measure the distances to half of the current sample of SHoES galaxies that calibrate the Type Ia supernova distance scale using three independent methods in the same galaxies: this will be the first time such a test has been carried out. Each of these methods (Cepheids, the TRGB and carbon stars) are individually of high precision. With its unequalled light-gathering power in space, its infrared sensitivity and high angular resolution, JWST is uniquely poised to provide the most accurate local measurement of the Hubble constant yet to date; and most importantly, it will provide a robust estimate of its systematic uncertainties (currently reddening, metallicity and crowding/blending). As part of its legacy, HST resolved the factor-of-two debate in the Hubble constant, but even with two additional decades of progress, outstanding uncertainties still remain. A legacy of JWST will be the resolution of the current tension, and a robust answer to this question: "Is there new physics required beyond the standard model?"

**OBSERVING DESCRIPTION**

Each of the 10 galaxies in this program will be observed using NIRCam as the primary instrument and NIRISS in parallel. The same filters will be used for each galaxy: F115W (J band) for the short-wavelength channel on NIRCam and F444W for the long-wavelength channel. NIRISS will be observing (in parallel) only in F115W so as to go as deep as possible for the detection and measurement of TRGB stars in the halo. The exposure times have been adjusted so as to give approximately the same signal-to-noise ratios for each of the Cepheid sample reardless of host galaxy distance. Rotations of the primary field were chosen to optimally situate NIRISS in the halo along the minor axis while NIRCam is integrating on the disk.

**Fixed Targets**

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | MESSIER-101 | RA: 14 03 30.3516 (210.8764650d)<br>Dec: +54 21 39.34 (54.36093d)<br>Equinox: J2000 | | |
| *Comments: This object was generated by the targetselector and retrieved from the NED database.*<br>*Category=Galaxy*<br>*Description=[Field galaxies, Galaxy disks, Galaxy halos]* | | | | |
| (3) | NGC4258-HALO | RA: 12 18 26.9494 (184.6122892d)<br>Dec: +47 12 32.20 (47.20894d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |
| *Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*<br>*Category=Galaxy*<br>*Description=[Field galaxies, Galaxy disks, Galaxy halos]* | | | | |
| (4) | NGC4258-OUTER-DISK | RA: 12 19 23.2291 (184.8467879d)<br>Dec: +47 11 3.65 (47.18435d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |
| *Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*<br>*Category=Galaxy*<br>*Description=[Field galaxies, Galaxy disks, Galaxy halos]*<br>*Extended=YES* | | | | |
| (5) | NGC4258-INNER-DISK | RA: 12 18 52.1485 (184.7172854d)<br>Dec: +47 22 1.98 (47.36722d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |
| *Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*<br>*Category=Galaxy*<br>*Description=[Field galaxies, Galaxy disks, Galaxy halos]* | | | | |
| (6) | NGC1365 | RA: 03 33 45.8000 (53.4408333d)<br>Dec: -36 09 21.00 (-36.15583d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |
| *Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*<br>*Category=Galaxy*<br>*Description=[Field galaxies, Galaxy disks, Galaxy halos]* | | | | |
| (12) | NGC4424 | RA: 12 27 11.6000 (186.7983333d)<br>Dec: +09 25 13.90 (9.42053d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |
| *Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*<br>*Category=Galaxy*<br>*Description=[Field galaxies, Galaxy disks, Galaxy halos]* | | | | |
| (14) | NGC7250 | RA: 22 18 17.8000 (334.5741667d)<br>Dec: +40 33 44.60 (40.56239d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |
| *Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*<br>*Category=Galaxy*<br>*Description=[Field galaxies, Galaxy disks, Galaxy halos]* | | | | |
| (16) | NGC2442 | RA: 07 36 17.9000 (114.0745833d)<br>Dec: -69 33 20.20 (-69.55561d)<br>Equinox: J2000 | | |
| *Comments: This object was generated by the targetselector and retrieved from the NED database.*<br>*Category=Galaxy*<br>*Description=[Galaxy disks, Galaxy halos]* | | | | |

| | | | | |
|---|---|---|---|---|
| (17) | NGC3972 | RA: 11 55 45.0888 (178.9378700d)<br>Dec: +55 19 14.66 (55.32074d)<br>Equinox: J2000 | | |
| *Comments: This object was generated by the targetselector and retrieved from the NED database.*<br>*Category=Galaxy*<br>*Description=[Galaxy disks, Galaxy halos]* | | | | |
| (19) | NGC4038 | RA: 12 01 52.4000 (180.4683333d)<br>Dec: -18 52 26.10 (-18.87392d)<br>Equinox: J2000 | | |
| *Comments: This object was generated by the targetselector and retrieved from the NED database.*<br>*Category=Galaxy*<br>*Description=[Galaxy disks, Galaxy halos]* | | | | |
| (20) | NGC4536 | RA: 12 34 19.9000 (188.5829167d)<br>Dec: +02 12 20.90 (2.20581d)<br>Equinox: J2000 | | |
| *Comments: This object was generated by the targetselector and retrieved from the NED database.*<br>*Category=Galaxy*<br>*Description=[Galaxy disks, Galaxy halos]* | | | | |
| (21) | NGC4639 | RA: 12 42 52.3781 (190.7182421d)<br>Dec: +13 15 26.71 (13.25742d)<br>Equinox: J2000 | | |
| *Comments: This object was generated by the targetselector and retrieved from the NED database.*<br>*Category=Galaxy*<br>*Description=[Galaxy disks, Galaxy halos]* | | | | |
| (22) | NGC5643 | RA: 14 32 40.8000 (218.1700000d)<br>Dec: -44 10 28.60 (-44.17461d)<br>Equinox: J2000 | | |
| *Comments: This object was generated by the targetselector and retrieved from the NED database.*<br>*Category=Galaxy*<br>*Description=[Galaxy disks, Galaxy halos]* | | | | |
| (55) | NGC4258-INNER-DISK-FIX | RA: 12 18 51.3874 (184.7141142d)<br>Dec: +47 20 57.39 (47.34928d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |
| *Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*<br>*Category=Galaxy*<br>*Description=[Field galaxies, Galaxy disks, Galaxy halos]* | | | | |

## Observation

**Proposal 1995, Observation 1** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 1:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 1:3) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | MESSIER-101 | RA: 14 03 30.3516 (210.8764650d)<br>Dec: +54 21 39.34 (54.36093d)<br>Equinox: J2000 | | |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=Galaxy*
*Description=[Field galaxies, Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | FULL | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F444W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | |
|---|---|
| | Group Visits within 53.0 Days<br>Aperture PA Range 120 to 150 Degrees (V3 120.0713531 to 150.0713531)<br>Visits Same PA<br>No Parallel Attachments |

## Observation

**Proposal 1995, Observation 3**

Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (3) | NGC4258-HALO | RA: 12 18 26.9494 (184.6122892d)<br>Dec: +47 12 32.20 (47.20894d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Galaxy*
*Description=[Field galaxies, Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F444W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | |
|---|---|
| | Aperture PA Range 65 to 85 Degrees (V3 65.0713531 to 85.0713531)<br>Aperture PA Range 250 to 270 Degrees (V3 250.0713531 to 270.0713531)<br>No Parallel Attachments |

## Observation

**Proposal 1995, Observation 4** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 4:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (4) | NGC4258-OUTER-DISK | RA: 12 19 23.2291 (184.8467879d)<br>Dec: +47 11 3.65 (47.18435d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Galaxy*
*Description=[Field galaxies, Galaxy disks, Galaxy halos]*
*Extended=YES*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F356W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | Aperture PA Range 110 to 140 Degrees (V3 110.0713531 to 140.0713531)<br>Offset 90.0 arcsec, -15.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 5** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (5) | NGC4258-INNER-DISK | RA: 12 18 52.1485 (184.7172854d)<br>Dec: +47 22 1.98 (47.36722d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Galaxy*
*Description=[Field galaxies, Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULE | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F444W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | Aperture PA Range 260 to 265 Degrees (V3 260.0713531 to 265.0713531)<br>Offset -90.0 arcsec, -30.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 55** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 55:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 55:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (55) | NGC4258-INNER-DISK-FIX | RA: 12 18 51.3874 (184.7141142d)<br>Dec: +47 20 57.39 (47.34928d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Galaxy*
*Description=[Field galaxies, Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULE | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F444W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | Aperture PA Range 282 to 292 Degrees (V3 282.0713531 to 292.0713531)<br>Offset 50.0 arcsec, 30.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 6** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

(Visit 6:1) Informational (Form): Visit schedulable, but most scheduling windows are when JWST is pointed in direction of greatest micrometeoroid impact risk. This is likely due to scheduling special requirements.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (6) | NGC1365 | RA: 03 33 45.8000 (53.4408333d)<br>Dec: -36 09 21.00 (-36.15583d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Galaxy*
*Description=[Field galaxies, Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 4-POINT-LARGE-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F356W | SHALLOW4 | 6 | 1 | 12 | 12 | 3736.396 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 12 | 12 | 3736.396 | |

| Special Requirements | Aperture PA Range 270 to 303 Degrees (V3 270.0713531 to 303.0713531)<br>Offset 88.0 arcsec, 0.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 12** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 12:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (12) | NGC4424 | RA: 12 27 11.6000 (186.7983333d)<br>Dec: +09 25 13.90 (9.42053d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Galaxy*
*Description=[Field galaxies, Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F356W | SHALLOW4 | 8 | 1 | 9 | 9 | 3768.606 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 9 | 1 | 9 | 9 | 3575.344 | |

| Special Requirements | Aperture PA Range 120 to 150 Degrees (V3 120.0713531 to 150.0713531)<br>Offset -120.0 arcsec, -30.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 14** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 14:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (14) | NGC7250 | RA: 22 18 17.8000 (334.5741667d)<br>Dec: +40 33 44.60 (40.56239d)<br>Equinox: J2000 | Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Galaxy*
*Description=[Field galaxies, Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F444W | SHALLOW4 | 8 | 1 | 9 | 9 | 3768.606 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 9 | 1 | 9 | 9 | 3575.344 | |

| Special Requirements | Aperture PA Range 15 to 90 Degrees (V3 15.0713531 to 90.0713531)<br>Offset 57.0 arcsec, -30.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 16** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 16:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (16) | NGC2442 | RA: 07 36 17.9000 (114.0745833d)<br>Dec: -69 33 20.20 (-69.55561d)<br>Equinox: J2000 | | |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=Galaxy*
*Description=[Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F356W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | Aperture PA Range 210 to 250 Degrees (V3 210.0713531 to 250.0713531)<br>Offset 90.0 arcsec, 0.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 17**

Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 17:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (17) | NGC3972 | RA: 11 55 45.0888 (178.9378700d)<br>Dec: +55 19 14.66 (55.32074d)<br>Equinox: J2000 | | |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=Galaxy*
*Description=[Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F356W | SHALLOW4 | 8 | 1 | 9 | 9 | 3768.606 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 8 | 1 | 9 | 9 | 3188.821 | |

| Special Requirements | |
|---|---|
| | Aperture PA Range 156 to 170 Degrees (V3 156.0713531 to 170.0713531)<br>Aperture PA Range 336 to 350 Degrees (V3 336.0713531 to 350.0713531)<br>Offset 87.0 arcsec, 0.0 arcsec<br>No Parallel Attachments |

## Observation

**Proposal 1995, Observation 19** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 19:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (19) | NGC4038 | RA: 12 01 52.4000 (180.4683333d)<br>Dec: -18 52 26.10 (-18.87392d)<br>Equinox: J2000 | | |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=Galaxy*
*Description=[Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F356W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | Aperture PA Range 320 to 100 Degrees (V3 320.0713531 to 100.0713531)<br>Offset 85.0 arcsec, 0.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 21** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 21:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (20) | NGC4536 | RA: 12 34 19.9000 (188.5829167d)<br>Dec: +02 12 20.90 (2.20581d)<br>Equinox: J2000 | | |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=Galaxy*
*Description=[Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F444W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | |
|---|---|
| | Aperture PA Range 160 to 182 Degrees (V3 160.0713531 to 182.0713531)<br>Aperture PA Range 245 to 285 Degrees (V3 245.0713531 to 285.0713531)<br>Offset -85.0 arcsec, 0.0 arcsec<br>No Parallel Attachments |

## Observation

**Proposal 1995, Observation 22** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 22:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (21) | NGC4639 | RA: 12 42 52.3781 (190.7182421d)<br>Dec: +13 15 26.71 (13.25742d)<br>Equinox: J2000 | | |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=Galaxy*
*Description=[Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F356W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | Aperture PA Range 38 to 130 Degrees (V3 38.0713531 to 130.0713531)<br>Aperture PA Range 218 to 238 Degrees (V3 218.0713531 to 238.0713531)<br>Offset 85.0 arcsec, 0.0 arcsec<br>No Parallel Attachments |
|---|---|

## Observation

**Proposal 1995, Observation 23** Tue May 30 16:03:08 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRCam Imaging

Coordinated Parallel Template(s): NIRISS Imaging

## Diagnostics

(Visit 23:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (22) | NGC5643 | RA: 14 32 40.8000 (218.1700000d)<br>Dec: -44 10 28.60 (-44.17461d)<br>Equinox: J2000 | | |

*Comments: This object was generated by the targetselector and retrieved from the NED database.*
*Category=Galaxy*
*Description=[Galaxy disks, Galaxy halos]*

## Template

| NIRCam Imaging | NIRISS Imaging |
|---|---|
| Module: ALL | |
| Subarray: FULL | |
| Target Placement: Module Gap | |

## Dithers

| # | Primary Dither Type | Primary Dithers | Dither Size | Subpixel Positions | Coordinated Parallel Subpixel Selector | Dither Direct Images Primes |
|---|---|---|---|---|---|---|
| 1 | INTRAMODULEBOX | 3 | | 1 | 3-POINT-SMALL-WITH-NIRISS | NO_DITHERING |

## Spectral Elements

| NIRCam Imaging | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | F356W | SHALLOW4 | 6 | 1 | 9 | 9 | 2802.297 | |

## Spectral Elements

| NIRISS Imaging | Filter | Grism | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F115W | | NIS | 7 | 1 | 9 | 9 | 2802.297 | |

| Special Requirements | |
|---|---|
| | Aperture PA Range 155 to 270 Degrees (V3 155.0713531 to 270.0713531)<br>Aperture PA Range 330 to 90 Degrees (V3 330.0713531 to 90.0713531)<br>Offset 60.0 arcsec, 0.0 arcsec<br>No Parallel Attachments |