



1260 - NGC 1068 As Proving Ground for NIRISS AMI

Cycle: 1, Proposal Category: GTO

INVESTIGATORS

| <i>Name</i> | <i>Institution</i> |
|---|---|
| Prof. K. E. Saavik Ford (PI) | City University of New York Borough of Manhattan Comm Coll |
| Prof. Barry Mckernan (CoI) | City University of New York Borough of Manhattan Comm Coll |
| Dr. Anand Sivaramakrishnan (CoI) | Space Telescope Science Institute |
| Dr. Andre Martel (CoI) | Space Telescope Science Institute |
| Dr. John Hutchings (CoI) (CSA Member) | Dominion Astrophysical Observatory |
| Deepashri Thatte (CoI) | Space Telescope Science Institute |
| Kathryn St.Laurent (CoI) | Space Telescope Science Institute |
| Dr. Laurent Marc MUGNIER (CoI) (ESA Member) | Office National d'Études et de Recherches Aérospatiales |

OBSERVATIONS

| <i>Folder</i> | <i>Observation</i> | <i>Label</i> | <i>Observing Template</i> | <i>Science Target</i> |
|--------------------|--------------------|--------------|--|-----------------------|
| Observation Folder | | | | |
| | 1 | | NIRISS Aperture Masking Interferometry | (1) NGC1068 |
| | 2 | | NIRISS Aperture Masking Interferometry | (4) HD17130 |
| | 3 | | NIRISS Aperture Masking Interferometry | (1) NGC1068 |
| | 4 | | NIRISS Aperture Masking Interferometry | (3) HD15633 |
| | 103 | | NIRISS Aperture Masking Interferometry | (1) NGC1068 |
| | 104 | | NIRISS Aperture Masking Interferometry | (4) HD17130 |

ABSTRACT

Ground-based imaging of the Narrow Line Region (NLR) of nearby Seyfert 2 Active Galactic Nucleus (AGN), NGC 1068, reveals substantial near-IR emission aligned along the axis of a biconical outflow. Clear evidence of dust emission at temperatures $\sim 700\text{K}$ imply a heating mechanism acting

JWST Proposal 1260 (Created: Monday, July 21, 2025, 4:00:10PM Eastern Standard Time) - Overview

locally, at distances of ~few 10s pc away from the AGN central engine. At larger distances, the near-IR emission is roughly coincident with [OIII] emission observed from HST, and radio emission possibly due to a jet. Thus it has been suggested that a sheath of interacting material around the jet may be providing heating via photoionization. The highest angular resolution near-IR images, however, show a possible arc of emission, probably in the plane orthogonal to the jet, extremely close to the central point source (~130mas). If real, the arc must be produced by mechanisms operating at the poorly-understood interface between the inflowing reservoir of material supplying the torus and central engine. Only NIRISS AMI observations can unambiguously detect or rule out the presence of the arc structure; we propose observations in F380M, F430M and F480M filters, yielding 65-70mas resolution across a sub-arcsecond field of view. We expect to measure the temperatures of a variety of clouds in the field, including the arc, with some objects as bright as $L=7.7$. The processes governing this region are critically responsible for the balance between inflowing material from the galaxy, outflowing material due to AGN feedback, and accretion onto the black hole itself. [abridged]

Observation IDs: DOYON_80[00-11]

Partially Seq non-int with Program ID: 1200 (PI: Rameau) Observation IDs: DOYON_400[0-5]

OBSERVING DESCRIPTION

We will observe NGC 1068, an $L'=7.7$ source at two orientations using NIRISS AMI. The observations must be separated by at least 15 degrees in position angle to provide adequate (u,v) plane coverage. Due to features in the (u,v) plane, actual permitted PA offsets cannot be fully specified in the explicit requirements, see comments for full permissions. Thus observations must be separated by ~weeks. For each observation we will also observe HD15633 as a PSF calibrator. We need 3 filters to measure the temperatures of observed dust features in NGC 1068, with $1e8$ photons in each filter. Gratadour et al. 2006 find the nuclear source is $M'=6.6$, which is nearly equivalent to F480M; $L'=7.7$, approximately equivalent to F380M and we interpolate to find F430M should be 7.2mag. Due to the brightness of the source, we use the 80x80 sub-array. Based on current chip performance and bad pixel placement, we do not require dithers.

In addition, we are coordinating with GTO ID: 1200, PI: Rameau on calibrator observations; our observation 4 (the longer calibrator observation) must be observed in a non-int seq with Rameau's program. This is not fully represented by this APT file, nor by the APT submitted under ID: 1200. The order of observations does not matter--our observations 3&4 can happen before our observations 1&2; in addition, Program 1200 can go before Program 1260 or vice versa. The brightness of our calibrator, HD15633 is estimated from WISE $W1=5.56$ and $W2=5.43$; program 1260 requires $1e8$ photons for each filter at each visit for target and calibrator; program 1200 requires $2.5e9$ photons in F480M in the non-int seq observation.

Total request is 4.4hr.

Proposal 1260 - Targets - NGC 1068 As Proving Ground for NIRISS AMI

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---------|---|--|---------------|
| (1) | NGC1068 | RA: 02 42 40.7710 (40.6698792d) Dec: -00 00 47.84 (-.01329d) Equinox: J2000 | | |
| <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]</i></p> | | | | |
| (3) | HD15633 | RA: 02 30 45.2032 (37.6883467d) Dec: +00 15 20.71 (.25575d) Equinox: J2000 | Proper Motion RA: -51.227 mas/yr Proper Motion Dec: -51.617000031001226 mas/yr Epoch of Position: 2000 | |
| <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Category=Calibration</i> <i>Description=[A stars, Point spread function]</i></p> | | | | |
| (4) | HD17130 | RA: 02 44 56.4577 (41.2352404d) Dec: -00 00 13.16 (-.00366d) Equinox: J2000 | Proper Motion RA: 6.049 mas/yr Proper Motion Dec: -12.075 mas/yr Epoch of Position: 2000 | |
| <p><i>Comments: K=6.357, [W2]=6.304 +/- 0.025, and spectral type K0III</i> <i>Category=Calibration</i> <i>Description=[Point spread function]</i> <i>Extended=NO</i></p> | | | | |

Fixed Targets

Proposal 1260 - Observation 1 - NGC 1068 As Proving Ground for NIRISS AMI

Mon Jul 21 21:00:10 GMT 2025

| | | | | | | | | | | |
|---|--|------------------------|---|-------------------|---------------------------------|---------------------------|---------------------------|----------------------------|----------------------------|-------------------------|
| Observation | <p>Proposal 1260, Observation 1</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRISS Aperture Masking Interferometry</p> <p><i>Comments: Permissible PA offsets between Observation 1 and Observation 3 are:</i></p> <p>15-105 degrees 150-165 degrees 195-285 degrees 330-345 degrees</p> <p><i>due to (u,v) plane coverage.</i></p> | | | | | | | | | |
| | <p>(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 1:1) Warning (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.</p> <p>(Observation 1) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p> | | | | | | | | | |
| Diagnosics | | | | | | | | | | |
| | | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | | Targ. Coord. Corrections | | | Miscellaneous | | |
| | (1) | NGC1068 | RA: 02 42 40.7710 (40.6698792d) Dec: -00 00 47.84 (-.01329d) Equinox: J2000 | | | | | | | |
| <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Category=Galaxy</i></p> <p><i>Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]</i></p> | | | | | | | | | | |
| Acquisition | # | Target | Acquisition Mode | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | 1 NGC1068 | AMIBRIGHT | F480M | NISRAPID | 19 | 1 | 1 | 0.93 | 148223.7 |
| Template | Subarray | | | | | | | | | |
| | SUB80 | | | | | | | | | |
| Dithers | # | Primary Dithers | | | | Subpixel Positions | | | | |
| | 1 | NONE | | | | 5 | | | | |
| Spectral Elements | # | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID | Direct Image |
| | 1 | F480M | NISRAPID | 7 | 100 | 5 | 500 | 312.0 | 148223.1 | false |
| | 2 | F430M | NISRAPID | 7 | 139 | 5 | 695 | 433.68 | 148223.3 | false |
| | 3 | F380M | NISRAPID | 7 | 134 | 5 | 670 | 418.08 | 148223.5 | false |

Proposal 1260 - Observation 1 - NGC 1068 As Proving Ground for NIRISS AMI

| | |
|-----------------------------|---|
| PSF References | Observation 2 (PSF Reference; Filters [F380M, F430M, F480M]) Additional Justification: false |
| Special Requirements | No Parallel Attachments Sequence Observations 1, 2, Non-interruptible V3 PA Offset 103 from 1 by 15 to 105 Degrees (Same offsets in Aperture) |

Proposal 1260 - Observation 2 - NGC 1068 As Proving Ground for NIRISS AMI

Mon Jul 21 21:00:10 GMT 2025

| | | | | | | | | | | | |
|--------------------------|---|------------------------|---|-------------------|--|----------------------|---------------------------|----------------------------|----------------------------|-------------------------|--|
| Observation | <p>Proposal 1260, Observation 2 Diagnostic Status: Warning Observing Template: NIRISS Aperture Masking Interferometry</p> | | | | | | | | | | |
| Diagnostics | (Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. | | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | | Targ. Coord. Corrections | | | Miscellaneous | | | |
| | (4) | HD17130 | RA: 02 44 56.4577 (41.2352404d) Dec: -00 00 13.16 (-.00366d) Equinox: J2000 | | Proper Motion RA: 6.049 mas/yr Proper Motion Dec: -12.075 mas/yr Epoch of Position: 2000 | | | | | | |
| | <p><i>Comments: K=6.357, [W2]=6.304 +/- 0.025, and spectral type K0III</i> <i>Category=Calibration</i> <i>Description=[Point spread function]</i> <i>Extended=NO</i></p> | | | | | | | | | | |
| Acquisition | # | Target | Acquisition Mode | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID | |
| | 1 | SAME | AMIBRIGHT | F480M | NISRAPID | 9 | 1 | 1 | 0.475 | 148223.8 | |
| Template | <p>Subarray SUB80</p> | | | | | | | | | | |
| Dithers | # | Primary Dithers | | | | | Subpixel Positions | | | | |
| | 1 | NONE | | | | | 5 | | | | |
| Spectral Elements | # | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID | Direct Image | |
| | 1 | F480M | NISRAPID | 10 | 27 | 5 | 135 | 114.793 | 148223.2 | false | |
| | 2 | F430M | NISRAPID | 7 | 30 | 5 | 150 | 93.6 | 148223.4 | false | |
| | 3 | F380M | NISRAPID | 4 | 35 | 5 | 175 | 69.594 | 148223.6 | false | |
| PSF References | PSF Reference: true | | | | | | | | | | |

Proposal 1260 - Observation 2 - NGC 1068 As Proving Ground for NIRISS AMI

Special Requirements

No Parallel Attachments

Sequence Observations 1, 2, Non-interruptible

Proposal 1260 - Observation 3 - NGC 1068 As Proving Ground for NIRISS AMI

Mon Jul 21 21:00:10 GMT 2025

| | | | | | | | | | | |
|--------------------------|---|------------------------|---|-------------------|---------------------------------|---------------------------|---------------------------|----------------------------|----------------------------|-------------------------|
| Observation | <p>Proposal 1260, Observation 3 Diagnostic Status: Warning Observing Template: NIRISS Aperture Masking Interferometry</p> | | | | | | | | | |
| 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 | | |
| | (1) | NGC1068 | RA: 02 42 40.7710 (40.6698792d) Dec: -00 00 47.84 (-.01329d) Equinox: J2000 | | | | | | | |
| | <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=Galaxy Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]</p> | | | | | | | | | |
| Acquisition | # | Target | Acquisition Mode | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | SAME | AMIBRIGHT | F480M | NISRAPID | 19 | 1 | 1 | 0.93 | 148223.7 |
| Template | <p>Subarray SUB80</p> | | | | | | | | | |
| Dithers | # | Primary Dithers | | | | Subpixel Positions | | | | |
| | 1 | NONE | | | | NONE | | | | |
| Spectral Elements | # | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID | Direct Image |
| | 1 | F480M | NISRAPID | 29 | 133 | 1 | 133 | 303.729 | 148223.1 | false |
| | 2 | F430M | NISRAPID | 37 | 146 | 1 | 146 | 421.531 | 148223.3 | false |
| | 3 | F380M | NISRAPID | 32 | 163 | 1 | 163 | 409.13 | 148223.5 | false |
| PSF References | <p>Observation 4 (PSF Reference; Filters [F380M, F430M, F480M]) Additional Justification: false</p> | | | | | | | | | |

Proposal 1260 - Observation 3 - NGC 1068 As Proving Ground for NIRISS AMI

Special Requirements

Offset -0.00459 arcsec, 0.01412 arcsec
No Parallel Attachments

Sequence Observations 3, 4, Non-interruptible

Proposal 1260 - Observation 4 - NGC 1068 As Proving Ground for NIRISS AMI

Mon Jul 21 21:00:10 GMT 2025

| | | | | | | | | | | |
|--------------------------|---|-----------------|--|------------|------------------|--|--------------------|---------------------|---------------------|------------------|
| Observation | <p>Proposal 1260, Observation 4</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRISS Aperture Masking Interferometry</p> | | | | | | | | | |
| 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 | |
| | (3) | HD15633 | RA: 02 30 45.2032 (37.6883467d) Dec: +00 15 20.71 (.25575d) Equinox: J2000 | | | Proper Motion RA: -51.227 mas/yr Proper Motion Dec: -51.617000031001226 mas/yr Epoch of Position: 2000 | | | | |
| | <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Category=Calibration</i></p> <p><i>Description=[A stars, Point spread function]</i></p> | | | | | | | | | |
| Acquisition | # | Target | Acquisition Mode | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | SAME | AMIBRIGHT | F480M | NISRAPID | 9 | 1 | 1 | 0.475 | 148223.8 |
| Template | <p>Subarray</p> <p>SUB80</p> | | | | | | | | | |
| Dithers | # | Primary Dithers | | | | Subpixel Positions | | | | |
| | 1 | NONE | | | | NONE | | | | |
| Spectral Elements | # | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID | Direct Image |
| | 1 | F480M | NISRAPID | 10 | 1642 | 1 | 1642 | 1396.225 | 148223.11 | false |
| | 2 | F430M | NISRAPID | 7 | 148 | 1 | 148 | 92.352 | 148223.4 | false |
| | 3 | F380M | NISRAPID | 4 | 174 | 1 | 174 | 69.196 | 148223.6 | false |
| PSF References | PSF Reference: true | | | | | | | | | |

Proposal 1260 - Observation 4 - NGC 1068 As Proving Ground for NIRISS AMI

Special Requirements

Offset -0.00459 arcsec, 0.01412 arcsec
No Parallel Attachments

Sequence Observations 3, 4, Non-interruptible

Proposal 1260 - Observation 103 - NGC 1068 As Proving Ground for NIRISS AMI

Mon Jul 21 21:00:10 GMT 2025

| | | | | | | | | | | |
|--------------------------|---|------------------------|---|---------------------------------|-------------------------|---------------------------|---------------------------|----------------------------|----------------------------|-------------------------|
| Observation | <p>Proposal 1260, Observation 103</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRISS Aperture Masking Interferometry</p> | | | | | | | | | |
| Diagnostics | <p>(Visit 103:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Observation 103) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p> | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | | | Miscellaneous | | | |
| | (1) | NGC1068 | RA: 02 42 40.7710 (40.6698792d) Dec: -00 00 47.84 (-.01329d) Equinox: J2000 | | | | | | | |
| | <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Category=Galaxy</i></p> <p><i>Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]</i></p> | | | | | | | | | |
| Acquisition | # | Target | Acquisition Mode | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | SAME | AMIBRIGHT | F480M | NISRAPID | 19 | 1 | 1 | 0.93 | 148223.7 |
| Template | <p>Subarray</p> <p>SUB80</p> | | | | | | | | | |
| Dithers | # | Primary Dithers | | | | Subpixel Positions | | | | |
| | 1 | NONE | | | | 5 | | | | |
| Spectral Elements | # | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID | Direct Image |
| | 1 | F480M | NISRAPID | 20 | 91 | 5 | 455 | 730.148 | 148223.1 | false |
| | 2 | F430M | NISRAPID | 25 | 112 | 5 | 560 | 1109.875 | 148223.3 | false |
| | 3 | F380M | NISRAPID | 21 | 141 | 5 | 705 | 1184.513 | 148223.5 | false |
| PSF References | <p>Observation 104 (PSF Reference; Filters [F380M, F430M, F480M])</p> <p>Additional Justification: false</p> | | | | | | | | | |

Proposal 1260 - Observation 103 - NGC 1068 As Proving Ground for NIRISS AMI

Special Requirements

No Parallel Attachments

Sequence Observations 103, 104, Non-interruptible

V3 PA Offset 103 from 1 by 15 to 105 Degrees (Same offsets in Aperture)

Proposal 1260 - Observation 104 - NGC 1068 As Proving Ground for NIRISS AMI

Mon Jul 21 21:00:10 GMT 2025

| | | | | | | | | | | | |
|--------------------------|---|------------------------|---|-------------------|-------------------------|--|---------------------------|----------------------------|----------------------------|-------------------------|--|
| Observation | <p>Proposal 1260, Observation 104 Diagnostic Status: Warning Observing Template: NIRISS Aperture Masking Interferometry</p> | | | | | | | | | | |
| Diagnostics | (Visit 104:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. | | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | | | Targ. Coord. Corrections | | | Miscellaneous | | |
| | (4) | HD17130 | RA: 02 44 56.4577 (41.2352404d) Dec: -00 00 13.16 (-.00366d) Equinox: J2000 | | | Proper Motion RA: 6.049 mas/yr Proper Motion Dec: -12.075 mas/yr Epoch of Position: 2000 | | | | | |
| | <p><i>Comments: K=6.357, [W2]=6.304 +/- 0.025, and spectral type K0III</i> <i>Category=Calibration</i> <i>Description=[Point spread function]</i> <i>Extended=NO</i></p> | | | | | | | | | | |
| Acquisition | # | Target | Acquisition Mode | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID | |
| | 1 | SAME | AMIBRIGHT | F480M | NISRAPID | 7 | 1 | 1 | 0.384 | 148223.8 | |
| Template | <p>Subarray SUB80</p> | | | | | | | | | | |
| Dithers | # | Primary Dithers | | | | | Subpixel Positions | | | | |
| | 1 | NONE | | | | | 5 | | | | |
| Spectral Elements | # | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID | Direct Image | |
| | 1 | F480M | NISRAPID | 6 | 103 | 5 | 515 | 282.508 | 148223.11 | false | |
| | 2 | F430M | NISRAPID | 4 | 137 | 5 | 685 | 272.411 | 148223.4 | false | |
| | 3 | F380M | NISRAPID | 3 | 138 | 5 | 690 | 222.346 | 148223.6 | false | |
| PSF References | PSF Reference: true | | | | | | | | | | |

Proposal 1260 - Observation 104 - NGC 1068 As Proving Ground for NIRISS AMI

Special Requirements

No Parallel Attachments

Sequence Observations 103, 104, Non-interruptible