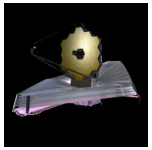

# 1647 - Caught in the act: a debris disc in outburst

Cycle: 1, Proposal Category: GO

**INVESTIGATORS**



| *Name* | *Institution* | *E-Mail* |
|---|---|---|
| **Andrew Swan (PI) (ESA Member)** | **The University of Warwick** | **andrew.swan@warwick.ac.uk** |
| Prof. Jay Farihi (CoI) (ESA Member) | University College London | j.farihi@ucl.ac.uk |
| Dr. Kate Y.L Su (CoI) (US Admin CoI) | University of Arizona | ksu@as.arizona.edu |



**OBSERVATIONS**

| *Folder* | *Observation* | *Label* | *Observing Template* | *Science Target* |
|---|---|---|---|---|
| Epoch 1 | | | | |
| | 1 | NIRSPEC BOTS prism | NIRSpec Bright Object Time Series | (1) WD0145+234 |
| | 3 | MIRI MRS | MIRI Medium Resolution Spectroscopy | (1) WD0145+234 |
| Epoch 2 | | | | |
| | 4 | NIRSPEC BOTS prism | NIRSpec Bright Object Time Series | (1) WD0145+234 |
| Epoch 3 | | | | |
| | 5 | NIRSPEC BOTS prism | NIRSpec Bright Object Time Series | (1) WD0145+234 |
| Epoch 4 | | | | |
| | 6 | NIRSPEC BOTS prism | NIRSpec Bright Object Time Series | (1) WD0145+234 |
| Epoch 5 | | | | |
| | 7 | NIRSPEC BOTS prism | NIRSpec Bright Object Time Series | (1) WD0145+234 |
| Epoch 6 | | | | |
| | 8 | NIRSPEC BOTS prism | NIRSpec Bright Object Time Series | (1) WD0145+234 |
| | 18 | NIRSPEC BOTS prism | NIRSpec Bright Object Time Series | (1) WD0145+234 |
| | 9 | MIRI MRS | MIRI Medium Resolution Spectroscopy | (1) WD0145+234 |
| | 19 | MIRI MRS | MIRI Medium Resolution Spectroscopy | (1) WD0145+234 |

**ABSTRACT**

A polluted white dwarf hosting a planetary debris disc is experiencing an infrared outburst on a scale unprecedented in decades of observations. Recent follow-up photometry confirms the system remains highly active, and we propose multi-wavelength monitoring across a range of timescales to follow this event as it unfolds.

There is compelling evidence that planetary systems survive through stellar evolution and emerge dynamically active around white dwarfs. WD0145+234 is a rare example where emission from circumstellar gas and dust accompanies the photospheric metals. It recently brightened by over one magnitude in the infrared, likely due to emission from dust liberated in planetesimal collisions. Catching it in such an active state gives us a ringside view of white dwarf debris disc evolution in real time.

As one of the brightest representatives of its class, the system is ripe for mineralogical characterisation, and the collisional activity makes a strong case for a search for variation. If optical studies show changes in the photospheric metals, they would be the first of their kind, so taking infrared spectra in parallel is the best way to maximise the science return.

Timely infrared observations are critical to understanding the nature of this spectacular event. Our program will investigate the composition, dynamics, and evolution of this evolved planetary system, and the insights gained will be applicable across the population.

**OBSERVING DESCRIPTION**

(1) Photometric monitoring, using NIRSpec in BOTS mode with the prism to obtain hour-long light curves, which themselves will be used to build up a long-term light curve.

(2) MIRI MRS spectroscopy to characterise the system. Wavelengths up to 13 microns are targeted at S/N > 20, based on a conservative estimate of the dust brightness. Longer wavelength data will be binned in the spectral direction to measure the continuum and any broad features.

Six epochs of photometry are required, the first and last of which will also take MIRI spectra. Observation groups are set up so that visits occur on an approximately logarithmically-spaced cadence, and so that MIRI spectra are taken as close as possible to the photometry.

# Proposal 1647 - Targets - Caught in the act: a debris disc in outburst

**Fixed Targets**

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Observation

**Proposal 1647, Observation 1: NIRSPEC BOTS prism**

Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRSpec Bright Object Time Series

## Diagnostics

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

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | TA Method | Subarray | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SAME | WATA | SUB32 | F140X | NRSRAPID | 3 | 1 | 1 | 0.08 | 58193.29 |

## Template

| Subarray |
|---|
| SUB512 |

## Spectral Elements

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | PRISM/CLEAR | NRSRAPID | 33 | 467 | 1 | 1 | 467 | 3600.533 | 58193.45 |

## Special Requirements

Time Series Observation
No Parallel Attachments

Group Observations 1, 3, Non-interruptible

## Observation

**Proposal 1647, Observation 3: MIRI MRS**

Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: MIRI Medium Resolution Spectroscopy

## 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) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|
| 1 | SAME | F560W | FAST | 6 | 1 | 1 | 16.65 | 64853.13 |

## Template

| Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|
| ALL | YES | FULL |

## Dithers

| # | Dither Type | Optimized For | Direction |
|---|---|---|---|
| 1 | 4-Point | POINT SOURCE | NEGATIVE |

## Spectral Elements

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 1 | SHORT(A) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.4 |
| 1 | SHORT(A) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.12 |
| 2 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 2 | MEDIUM(B) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.2 |
| 2 | MEDIUM(B) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.10 |
| 3 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 3 | LONG(C) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.1 |
| 3 | LONG(C) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.8 |

| | |
|---|---|
| **Special Requirements** | Group Observations 1, 3, Non-interruptible |

## Observation

**Proposal 1647, Observation 4: NIRSPEC BOTS prism** Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRSpec Bright Object Time Series

## 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 |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | TA Method | Subarray | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SAME | WATA | SUB32 | F140X | NRSRAPID | 3 | 1 | 1 | 0.08 | 58193.29 |

## Template

| Subarray |
|---|
| SUB512 |

## Spectral Elements

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | PRISM/CLEAR | NRSRAPID | 33 | 467 | 1 | 1 | 467 | 3600.533 | 58193.45 |

## Special Requirements

Time Series Observation
No Parallel Attachments

## Observation

**Proposal 1647, Observation 5: NIRSPEC BOTS prism**

Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRSpec Bright Object Time Series

## 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 |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | TA Method | Subarray | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SAME | WATA | SUB32 | F140X | NRSRAPID | 3 | 1 | 1 | 0.08 | 58193.29 |

## Template

| Subarray |
|---|
| SUB512 |

## Spectral Elements

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | PRISM/CLEAR | NRSRAPID | 33 | 467 | 1 | 1 | 467 | 3600.533 | 58193.45 |

## Special Requirements

Between Dates 03-AUG-2022:12:00:00 and 04-AUG-2022:14
Time Series Observation
No Parallel Attachments

6 After 5 by 256 Hours to 320 Hours

## Observation

**Proposal 1647, Observation 6: NIRSPEC BOTS prism**

Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRSpec Bright Object Time Series

## Diagnostics

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

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | TA Method | Subarray | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SAME | WATA | SUB32 | F140X | NRSRAPID | 3 | 1 | 1 | 0.08 | 58193.29 |

## Template

| Subarray |
|---|
| SUB512 |

## Spectral Elements

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | PRISM/CLEAR | NRSRAPID | 33 | 467 | 1 | 1 | 467 | 3600.533 | 58193.45 |

## Special Requirements

Time Series Observation
No Parallel Attachments

6 After 5 by 256 Hours to 320 Hours
7 After 6 by 512 Hours to 640 Hours

## Observation

**Proposal 1647, Observation 7: NIRSPEC BOTS prism**

Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRSpec Bright Object Time Series

## Diagnostics

(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | TA Method | Subarray | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SAME | WATA | SUB32 | F140X | NRSRAPID | 3 | 1 | 1 | 0.08 | 58193.29 |

## Template

| Subarray |
|---|
| SUB512 |

## Spectral Elements

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | PRISM/CLEAR | NRSRAPID | 33 | 467 | 1 | 1 | 467 | 3600.533 | 58193.45 |

## Special Requirements

Time Series Observation
No Parallel Attachments

7 After 6 by 512 Hours to 640 Hours
8 After 7 by 1024 Hours to <None specified>

## Observation

**Proposal 1647, Observation 8: NIRSPEC BOTS prism**

Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRSpec Bright Object Time Series

## Diagnostics

(Visit 8:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | TA Method | Subarray | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SAME | WATA | SUB32 | F140X | NRSRAPID | 3 | 1 | 1 | 0.08 | 58193.29 |

## Template

| Subarray |
|---|
| SUB512 |

## Spectral Elements

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | PRISM/CLEAR | NRSRAPID | 33 | 467 | 1 | 1 | 467 | 3600.533 | 58193.45 |

## Special Requirements

Time Series Observation
No Parallel Attachments

8 After 7 by 1024 Hours to <None specified>
Group Observations 8, 9, Non-interruptible

## Observation

**Proposal 1647, Observation 18: NIRSPEC BOTS prism**

Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: NIRSpec Bright Object Time Series

## Diagnostics

(Visit 18:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | TA Method | Subarray | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SAME | WATA | SUB32 | F140X | NRSRAPID | 3 | 1 | 1 | 0.08 | 58193.29 |

## Template

| Subarray |
|---|
| SUB512 |

## Spectral Elements

| # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | PRISM/CLEAR | NRSRAPID | 33 | 467 | 1 | 1 | 467 | 3600.533 | 58193.45 |

## Special Requirements

Time Series Observation
No Parallel Attachments

Group Observations 18, 19, Non-interruptible

## Observation

**Proposal 1647, Observation 9: MIRI MRS** Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: MIRI Medium Resolution Spectroscopy

## Diagnostics

(Visit 9:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|
| 1 | SAME | F560W | FAST | 6 | 1 | 1 | 16.65 | 64853.13 |

## Template

| Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|
| ALL | YES | FULL |

## Dithers

| # | Dither Type | Optimized For | Direction |
|---|---|---|---|
| 1 | 4-Point | POINT SOURCE | NEGATIVE |

## Spectral Elements

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 1 | SHORT(A) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.1 |
| 1 | SHORT(A) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.8 |
| 2 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 2 | MEDIUM(B) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.2 |
| 2 | MEDIUM(B) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.10 |
| 3 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 3 | LONG(C) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.4 |
| 3 | LONG(C) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.12 |

| | |
|---|---|
| **Special Requirements** | Group Observations 8, 9, Non-interruptible |

## Observation

**Proposal 1647, Observation 19: MIRI MRS** Wed Jan 18 23:00:57 GMT 2023

**Diagnostic Status: Warning**

Observing Template: MIRI Medium Resolution Spectroscopy

## 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 |
|---|---|---|---|---|
| (1) | WD0145+234 | RA: 01 47 54.8118 (26.9783825d)<br>Dec: +23 39 42.09 (23.66169d)<br>Equinox: J2000 | Proper Motion RA: -3.791405848904527E-4 sec of time/yr<br>Proper Motion Dec: -0.0975890000745494 arcsec/yr<br>Epoch of Position: 2015.5 | |

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.*
*Category=Star*
*Description=[Circumstellar dust, Circumstellar gas, White dwarfs]*
*Extended=NO*

## Acquisition

| # | Target | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|
| 1 | SAME | F560W | FAST | 6 | 1 | 1 | 16.65 | 64853.13 |

## Template

| Primary Channel | Simultaneous Imaging | Imager Subarray |
|---|---|---|
| ALL | YES | FULL |

## Dithers

| # | Dither Type | Optimized For | Direction |
|---|---|---|---|
| 1 | 4-Point | POINT SOURCE | NEGATIVE |

## Spectral Elements

| # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/Exp | Exposures/Dith | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 1 | SHORT(A) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.1 |
| 1 | SHORT(A) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.8 |
| 2 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 2 | MEDIUM(B) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.2 |
| 2 | MEDIUM(B) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.10 |
| 3 | | IMAGER | F1000W | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 58193.6 |
| 3 | LONG(C) | MRSLONG | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.4 |
| 3 | LONG(C) | MRSSHORT | | FASTR1 | 100 | 1 | 1 | Dither 1 | 4 | 4 | 1110.016 | 64853.12 |

| | |
|---|---|
| **Special Requirements** | Group Observations 18, 19, Non-interruptible |