



2177 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Cycle: 1, Proposal Category: GO

INVESTIGATORS

| <i>Name</i> | <i>Institution</i> | <i>E-Mail</i> |
|-------------------------------------------------|-----------------------------------------------------|--------------------------------------|
| Dr. Vincenzo Mainieri (PI) (ESA Member) | European Southern Observatory - Germany | vmainier@eso.org |
| Marina Bianchin (CoI) | Universidade Federal de Santa Maria | marinabianchin17@gmail.com |
| Dr. Gabriela Calistro Rivera (CoI) (ESA Member) | European Southern Observatory - Germany | gcalistr@eso.org |
| Dr. Stefano Carniani (CoI) (ESA Member) | Scuola Normale Superiore, Pisa | stefano.carniani@sns.it |
| Claudia Cicone (CoI) (ESA Member) | University of Oslo | claudia.cicone@astro.uio.no |
| Dr. Chiara Circosta (CoI) (ESA Member) | University College London | c.circosta@ucl.ac.uk |
| Dr. Alessandra Contursi (CoI) (ESA Member) | Institut de Radioastronomie Millimetrique, Grenoble | contursi@iram.fr |
| Dr. Tiago Costa (CoI) (ESA Member) | Max Planck Institute for Astrophysics | tcosta@mpa-garching.mpg.de |
| Christopher Mark Harrison (CoI) (ESA Member) | Newcastle University | christopher.harrison@newcastle.ac.uk |
| Darshan Kakkad (CoI) (US Admin CoI) | Space Telescope Science Institute | dkakkad@stsci.edu |
| Isabella Lamperti (CoI) (ESA Member) | University College London (UCL) | isabellalamperti@gmail.com |
| Dr. Michele Perna (CoI) (ESA Member) | Centro de Astrobiología (CAB) | michele.perna@cab.inta-csic.es |
| Dr. Rogemar Andre Riffel (CoI) | Universidade Federal de Santa Maria | rogemar@ufsm.br |
| Mr. Jan Scholtz (CoI) (ESA Member) | Chalmers University of Technology/Onsala Space Obs | honzascholtz@gmail.com |
| Dr. John David Silverman (CoI) | University of Tokyo | silverman@ipmu.jp |
| Dr. Giustina Vietri (CoI) (ESA Member) | INAF - IASF Milano | giustina.vietri@gmail.com |
| Mr. Samuel Ruthven Ward (CoI) (ESA Member) | European Southern Observatory - Germany | sward@eso.org |

OBSERVATIONS

| <i>Folder</i> | <i>Observation</i> | <i>Label</i> | <i>Observing Template</i> | <i>Science Target</i> |
|--------------------|--------------------|-----------------------|-------------------------------------|---------------------------|
| Observation Folder | | | | |
| | 1 | CID346_H2 | MIRI Medium Resolution Spectroscopy | (1) CID346 |
| | 2 | XID36_H2 | MIRI Medium Resolution Spectroscopy | (2) XID36 |
| | 5 | XID36_BACKGROUN D | MIRI Medium Resolution Spectroscopy | (5) XID36-BACKGROUND |
| | 3 | J1333_H2 | MIRI Medium Resolution Spectroscopy | (3) J1333+1649 |
| | 6 | J1333_background | MIRI Medium Resolution Spectroscopy | (6) J1333+1649-BACKGROUND |
| | 4 | CID346_BACKGROU ND | MIRI Medium Resolution Spectroscopy | (4) CID346-BACKGROUND |

ABSTRACT

An efficient coupling between the energy released by Active Galactic Nuclei (AGN) and the interstellar medium (ISM) of their host galaxy can generate kpc scales outflows which may regulate the rate at which stars can form and ultimately influence the growth of the galaxy. These AGN-driven outflows include gas in various phases (ionized, atomic, molecular) but at $z > 1$, due to the limitations of current instrumentation, we are forced to adopt a single-phase (ionized) view of the outflow phenomenon which may lead to wrong estimates of their extent, mass and energetics, therefore ultimately misinterpreting their relevance for galaxy evolution.

The aim of the proposed JWST/MIRI observations is to overcome this limit, and to map the mid-infrared ro-vibrational H₂ lines to complete the multi-phase characterization of already well-studied AGN at cosmic noon. The three selected AGN have the best available characterization of the ionized component of the outflow at these redshifts, from sub-pc to kpc scales. With the MIRI observations we will be able to map the warm component of the ISM down to ~ 2 kpc. We will be able to test model predictions on the enhancement of H₂ emission in the presence of cooling of gas shocked by AGN-driven outflow. Ultimately, we will derive the total (ionized+molecular) mass outflow rate and kinetic energy for these outflows which will provide a key constrain on the current models of AGN feedback.

OBSERVING DESCRIPTION

The targets of these observations are three AGN at $z \sim 2$ with well established ionized outflows from sub-pc to kpc scales.

We will use MIRI MRS to sample the warm molecular phase of the outflow via H₂ transitions with the Long configuration in CH-1

We will also cover the PAH3.3 micron feature in the Long configuration in CH-2

We will not perform Targer Acquisition, since the absolute JWST pointing accuracy of 0.1 arcsec is more than sufficient given the size of our targets

JWST Proposal 2177 (Created: Tuesday, August 23, 2022 at 11:01:05 AM Eastern Standard Time) - Overview

(~1 arcsec diameter) and the fov of CH-1.

CID436 ($z=2.219$)

No target acquisition procedure needed

4-point dither pattern

330 groups and 3 exposures per dither position

Readout mode: FAST

Total exposure time on source: 3.05 hours

XID36 ($z=2.259$)

No target acquisition procedure needed

4-point dither pattern

330 groups and 3 exposures per dither position

Readout mode: FAST

Total exposure time on source: 3.05 hours

J1333+1649 ($z=2.089$)

No target acquisition procedure needed

4-point dither pattern

330 groups and 3 exposures per dither position

Readout mode: FAST

Total exposure time on source: 3.05 hours

Proposal 2177 - Targets - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------|
| Fixed Targets | (1) | CID346 | RA: 09 59 43.4100 (149.9308750d) Dec: +02 07 7.44 (2.11873d) Equinox: J2000 | Epoch of Position: 2000 |
| | | <i>Comments: Type-1 AGN, z=2.219</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | |
| | (2) | XID36 | RA: 03 31 50.7700 (52.9615417d) Dec: -27 47 3.41 (-27.78428d) Equinox: J2000 | Epoch of Position: 2000 |
| | | <i>Comments: Type-2 AGN, z=2.259</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | |
| | (3) | J1333+1649 | RA: 13 33 35.7900 (203.3991250d) Dec: +16 49 3.96 (16.81777d) Equinox: J2000 | Epoch of Position: 2000 |
| | | <i>Comments: Type-1 AGN, z=2.089</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | |
| (4) | CID346-BACKGROUND | RA: 09 59 41.8228 (149.9242617d) Dec: +02 07 7.35 (2.11871d) Equinox: J2000 | Epoch of Position: 2000 | |
| | <i>Comments: Background observation for a Type-1 AGN, z=2.219</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei]</i> <i>Extended=YES</i> | | | |
| (5) | XID36-BACKGROUND | RA: 03 31 51.6257 (52.9651071d) Dec: -27 47 24.38 (-27.79011d) Equinox: J2000 | Epoch of Position: 2000 | |
| | <i>Comments: Background observations of a Type-2 AGN, z=2.259</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | | |
| (6) | J1333+1649-BACKGROUND | RA: 13 33 35.7900 (203.3991250d) Dec: +16 49 23.96 (16.82332d) Equinox: J2000 | Epoch of Position: 2000 | |
| | <i>Comments: BACKGROUND OBSERVATIONS FOR A Type-1 AGN, z=2.089</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | | |

Proposal 2177 - Observation 1 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Tue Aug 23 16:01:05 GMT 2022

| | | | | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------|---------------|------------------------|-----------------------------|---------------------------------|------------------------|------------------------|----------------------|---------------------------|----------------------------|-------------------------|
| Observation | Proposal 2177, Observation 1: CID346_H2 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observations:[CID346_BACKGROUND (Obs 4)] | | | | | | | | | | | | |
| | (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) | CID346 | RA: 09 59 43.4100 (149.9308750d) Dec: +02 07 7.44 (2.11873d) Equinox: J2000 | | | | Epoch of Position: 2000 | | | | | | |
| <i>Comments: Type-1 AGN, z=2.219</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | | | | | | | | | | | | |
| Acquisition | # | Target | | | | | | | | | | | |
| | 1 | NONE | | | | | | | | | | | |
| Template | AcqFilter | Primary Channel | | | | Simultaneous Imaging | | | Imager Subarray | | | | |
| | | ALL | | | | NO | | | FULL | | | | |
| Dithers | # | Dither Type | | | | Optimized For | | | Direction | | | | |
| | 1 | 4-Point | | | | EXTENDED SOURCE | | | NEGATIVE | | | | |
| Spectral Elements | # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/E xp | Exposures/Dit h | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | LONG(C) | MRSLONG | | SLOWR1 | 38 | 3 | 1 | Dither 1 | 4 | 12 | 11084.923 | |
| | 1 | LONG(C) | MRSSHORT | | SLOWR1 | 38 | 3 | 1 | Dither 1 | 4 | 12 | 11084.923 | |

Proposal 2177 - Observation 1 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Special Requirements

Sequence Observations 1, 4, Non-interruptible

Proposal 2177 - Observation 2 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Tue Aug 23 16:01:05 GMT 2022

| | | | | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------|--------|-----------------|----------------------|--------------------------|----------------|-----------------|---------------|--------------------|---------------------|------------------|
| Observation | Proposal 2177, Observation 2: XID36_H2 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observations:[XID36_BACKGROUND (Obs 5)] | | | | | | | | | | | | |
| | (Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. | | | | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | | | | Targ. Coord. Corrections | | | Miscellaneous | | | |
| | (2) | XID36 | RA: 03 31 50.7700 (52.9615417d) Dec: -27 47 3.41 (-27.78428d) Equinox: J2000 | | | | Epoch of Position: 2000 | | | | | | |
| <i>Comments: Type-2 AGN, z=2.259</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | | | | | | | | | | | | |
| Acquisition | # | Target | | | | | | | | | | | |
| | 1 | NONE | | | | | | | | | | | |
| Template | AcqFilter | Primary Channel | | | | Simultaneous Imaging | | | Imager Subarray | | | | |
| | | ALL | | | | NO | | | FULL | | | | |
| Dithers | # | Dither Type | | | | Optimized For | | | Direction | | | | |
| | 1 | 4-Point | | | | EXTENDED 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 | LONG(C) | MRSLONG | | SLOWR1 | 38 | 3 | 1 | Dither 1 | 4 | 12 | 11084.923 | |
| | 1 | LONG(C) | MRSSHORT | | SLOWR1 | 38 | 3 | 1 | Dither 1 | 4 | 12 | 11084.923 | |

Proposal 2177 - Observation 2 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Special Requirements

Sequence Observations 2, 5, Non-interruptible

Proposal 2177 - Observation 5 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Tue Aug 23 16:01:05 GMT 2022

| | | | | | | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------|--------|-----------------|----------------------|--------------------------|----------------|-----------------|---------------|--------------------|---------------------|------------------|
| Observation | Proposal 2177, Observation 5: XID36_BACKGROUND Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [XID36_H2 (Obs 2)] | | | | | | | | | | | | |
| | (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) | XID36-BACKGROUND | RA: 03 31 51.6257 (52.9651071d) Dec: -27 47 24.38 (-27.79011d) Equinox: J2000 | | | | Epoch of Position: 2000 | | | | | | |
| <i>Comments: Background observations of a Type-2 AGN, z=2.259</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | | | | | | | | | | | | |
| Acquisition | # | Target | | | | | | | | | | | |
| | 1 | NONE | | | | | | | | | | | |
| Template | AcqFilter | Primary Channel | | | | Simultaneous Imaging | | | Imager Subarray | | | | |
| | | ALL | | | | NO | | | FULL | | | | |
| Dithers | # | Dither Type | | | | Optimized For | | | Direction | | | | |
| | 1 | 4-Point | | | | EXTENDED 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 | LONG(C) | MRSLONG | | SLOWR1 | 38 | 1 | 1 | None | 1 | 1 | 907.817 | |
| | 1 | LONG(C) | MRSSHORT | | SLOWR1 | 38 | 1 | 1 | None | 1 | 1 | 907.817 | |

Proposal 2177 - Observation 5 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Special Requirements

Sequence Observations 2, 5, Non-interruptible

Proposal 2177 - Observation 3 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Tue Aug 23 16:01:05 GMT 2022

| | | | | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------|---------------|------------------------|-----------------------------|---------------------------------|------------------------|------------------------|----------------------|---------------------------|----------------------------|-------------------------|
| Observation | Proposal 2177, Observation 3: J1333_H2 Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observations:[J1333_background (Obs 6)] | | | | | | | | | | | | |
| | (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) | J1333+1649 | RA: 13 33 35.7900 (203.3991250d) Dec: +16 49 3.96 (16.81777d) Equinox: J2000 | | | | Epoch of Position: 2000 | | | | | | |
| <i>Comments: Type-1 AGN, z=2.089</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | | | | | | | | | | | | |
| Acquisition | # | Target | | | | | | | | | | | |
| | 1 | NONE | | | | | | | | | | | |
| Template | AcqFilter | Primary Channel | | | | Simultaneous Imaging | | | Imager Subarray | | | | |
| | | ALL | | | | NO | | | FULL | | | | |
| Dithers | # | Dither Type | | | | Optimized For | | | Direction | | | | |
| | 1 | 4-Point | | | | EXTENDED SOURCE | | | NEGATIVE | | | | |
| Spectral Elements | # | Wavelength Range | Detector | Filter | Readout Pattern | Groups/Int | Integrations/E xp | Exposures/Dit h | Dither | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | LONG(C) | MRSLONG | | SLOWR1 | 38 | 3 | 1 | Dither 1 | 4 | 12 | 11084.923 | |
| | 1 | LONG(C) | MRSSHORT | | SLOWR1 | 38 | 3 | 1 | Dither 1 | 4 | 12 | 11084.923 | |

Proposal 2177 - Observation 3 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Special Requirements

Sequence Observations 3, 6, Non-interruptible

Proposal 2177 - Observation 6 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Tue Aug 23 16:01:05 GMT 2022

| | | | | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------|--------|-----------------|----------------------|--------------------------|----------------|-----------------|---------------|--------------------|---------------------|------------------|
| Observation | Proposal 2177, Observation 6: J1333_background Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [J1333_H2 (Obs 3)] | | | | | | | | | | | | |
| | (Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. | | | | | | | | | | | | |
| Diagnosics | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | | | | Targ. Coord. Corrections | | | Miscellaneous | | | |
| | (6) | J1333+1649-BACKGROUND | RA: 13 33 35.7900 (203.3991250d) Dec: +16 49 23.96 (16.82332d) Equinox: J2000 | | | | Epoch of Position: 2000 | | | | | | |
| <i>Comments: BACKGROUND OBSERVATIONS FOR A Type-1 AGN, z=2.089</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei, Active galaxies, Quasars]</i> <i>Extended=YES</i> | | | | | | | | | | | | | |
| Acquisition | # | Target | | | | | | | | | | | |
| | 1 | NONE | | | | | | | | | | | |
| Template | AcqFilter | Primary Channel | | | | Simultaneous Imaging | | | Imager Subarray | | | | |
| | | ALL | | | | NO | | | FULL | | | | |
| Dithers | # | Dither Type | | | | Optimized For | | | Direction | | | | |
| | 1 | 4-Point | | | | EXTENDED 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 | LONG(C) | MRSLONG | | SLOWR1 | 38 | 1 | 1 | None | 1 | 1 | 907.817 | |
| | 1 | LONG(C) | MRSSHORT | | SLOWR1 | 38 | 1 | 1 | None | 1 | 1 | 907.817 | |

Proposal 2177 - Observation 6 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Special Requirements

Sequence Observations 3, 6, Non-interruptible

Proposal 2177 - Observation 4 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Tue Aug 23 16:01:05 GMT 2022

| | | | | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------|--------|----------------------|--------------------------|------------------|-----------------|---------------|---------------|--------------------|---------------------|------------------|
| Observation | Proposal 2177, Observation 4: CID346_BACKGROUND Diagnostic Status: Warning Observing Template: MIRI Medium Resolution Spectroscopy Background Observation For: [CID346_H2 (Obs 1)] | | | | | | | | | | | | |
| | (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) | CID346-BACKGROUND | RA: 09 59 41.8228 (149.9242617d) Dec: +02 07 7.35 (2.11871d) Equinox: J2000 | | | Epoch of Position: 2000 | | | | | | | |
| <i>Comments: Background observation for a Type-1 AGN, z=2.219</i> <i>Category=Galaxy</i> <i>Description=[Active galactic nuclei]</i> <i>Extended=YES</i> | | | | | | | | | | | | | |
| Acquisition | # | Target | | | | | | | | | | | |
| | 1 | NONE | | | | | | | | | | | |
| Template | AcqFilter | Primary Channel | | | Simultaneous Imaging | | | Imager Subarray | | | | | |
| | | ALL | | | NO | | | FULL | | | | | |
| Dithers | # | Dither Type | | | Optimized For | | | Direction | | | | | |
| | 1 | 4-Point | | | EXTENDED 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 | LONG(C) | MRSLONG | | SLOWR1 | 38 | 1 | 1 | None | 1 | 1 | 907.817 | |
| | 1 | LONG(C) | MRSSHORT | | SLOWR1 | 38 | 1 | 1 | None | 1 | 1 | 907.817 | |

Proposal 2177 - Observation 4 - A missing piece of the puzzle: the warm molecular phase of AGN-driven outflows at cosmic noon

Special Requirements

Sequence Observations 1, 4, Non-interruptible