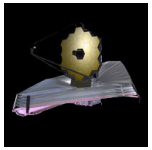

7802 - Dust in shocks: The missing link in AGN feedback

Cycle: 4, Proposal Category: GO

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OBSERVATIONS

Folder	***Observation***	***Label***	***Observing Template***	***Science Target***
ESO-428-14-BG				
	1		MIRI Medium Resolution Spectroscopy	(5) ESO-428-14-BG
ESO-428-14				
	2		MIRI Medium Resolution Spectroscopy	(1) ESO-428-14
NGC-5929-BG				
	3		MIRI Medium Resolution Spectroscopy	(6) NGC-5929-BG
NGC-5929				
	4		MIRI Medium Resolution Spectroscopy	(2) NGC-5929
Mrk-1066-BG				
	5		MIRI Medium Resolution Spectroscopy	(7) Mrk-1066-BG
Mrk-1066				
	6		MIRI Medium Resolution Spectroscopy	(3) Mrk-1066
Mrk-573-BG				
	7		MIRI Medium Resolution Spectroscopy	(8) Mrk-573-BG
Mrk-573				
	8		MIRI Medium Resolution Spectroscopy	(4) Mrk-573

ABSTRACT

Active Galactic Nuclei (AGN) reside at the centres of most massive galaxies and are thought to be responsible for regulating galaxy evolution through feedback processes. While highly luminous AGN can exhibit multiple feedback mechanisms, which are hard to de-couple, low-luminosity AGN (LLAGN) are simpler systems, with mechanically (not radiatively) dominated energy input into the interstellar medium (ISM). A number of LLAGN are found to host subrelativistic radio jets that are double sided and collimated with their extended narrow line region (NLR). In many of these systems, the interaction between the jet and the ISM can drive shocks, which can influence the physical conditions in the NLR and, in some cases, even destroy the dust. Intriguingly, several observations have detected dust within shocked regions. While various hypotheses have been proposed to explain how dust survives in shocks, constraining dust properties in these hostile environments remains the missing link for accurately modeling AGN feedback and defining its efficiency.

Mid-infrared (MIR) emission from dust grains serves as a powerful diagnostic tool to assess the extent of grain processing, revealing whether dust survives shocks, is partially destroyed, or undergoes significant alterations. Leveraging the unique spatial resolution and sensitivity of JWST's MIRI/MRS instrument, we propose to study a sample of nearby radio-selected LLAGN to capture dust survival (or not) in shocked regions and constrain the key properties governing grain processing. This will have important implications for AGN feedback and the dust lifecycle, both of which are crucial for understanding galaxy evolution.

OBSERVING DESCRIPTION

We request MIRI/MRS observations for a radio-selected sample of four low luminosity active galactic nuclei (LLAGN), over the full range (4.9–28.5 um) using all the four channels. All targets in our sample exhibit extended radio emission (~100-400 pc from the nucleus) that is fully covered by the smallest FOV (3.2"x3.8", Channel 1) with a single central pointing. Since the southern hot spot in Mrk 573, at ~400 pc, lies near the edge of the Channel 1 FOV, we request a 2-column, 1-row mosaic with 10% overlap to ensure complete coverage, specifically capturing [Fe II]5.34um—a key shock tracer. For science exposures, we request a 4-point dither for optimal PSF sampling, and a recommended 2-point dither for the background exposures. We also request simultaneous imaging (for all targets, except ESO 428-G14, for which imaging exists) with filters F560W, F1000W, and F1500W and imager subarray SUB256. To ensure sufficient visibility, we do not restrict the PA for background observations.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	ESO-428-14	RA: 07 16 31.2062 (109.1300258d) Dec: -29 19 28.88 (-29.32469d) Equinox: J2000	Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Galaxy* *Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]*				
(2)	NGC-5929	RA: 15 26 6.1564 (231.5256517d) Dec: +41 40 14.38 (41.67066d) Equinox: J2000	Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Galaxy* *Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]*				
(3)	Mrk-1066	RA: 02 59 58.5970 (44.9941542d) Dec: +36 49 13.81 (36.82050d) Equinox: J2000	Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Galaxy* *Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]*				
(4)	Mrk-573	RA: 01 43 57.7778 (25.9907408d) Dec: +02 20 59.53 (2.34987d) Equinox: J2000	Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Galaxy* *Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]*				
(5)	ESO-428-14-BG	RA: 07 16 26.3108 (109.1096283d) Dec: -29 17 55.85 (-29.29885d) Equinox: J2000	Epoch of Position: 2000	
Comments: *Category=Unidentified* *Description=[Blank field]*				
(6)	NGC-5929-BG	RA: 15 26 0.4034 (231.5016808d) Dec: +41 41 46.69 (41.69630d) Equinox: J2000	Epoch of Position: 2000	
Comments: *Category=Unidentified* *Description=[Blank field]*				
(7)	Mrk-1066-BG	RA: 02 59 53.3047 (44.9721029d) Dec: +36 50 47.29 (36.84647d) Equinox: J2000	Epoch of Position: 2000	
Comments: *Category=Unidentified* *Description=[Blank field]*				
(8)	Mrk-573-BG	RA: 01 43 53.5469 (25.9731121d) Dec: +02 22 32.91 (2.37581d) Equinox: J2000	Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *Category=Unidentified* *Description=[Blank field]*				

Observation

Proposal 7802, Observation 1 Sun Aug 24 00:00:21 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [Observation 2]

Comments: We request to observe the background prior to the science observations to avoid persistence issues.

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
(5)	ESO-428-14-BG	RA: 07 16 26.3108 (109.1096283d) Dec: -29 17 55.85 (-29.29885d) Equinox: J2000	Epoch of Position: 2000	

Comments:
Category=Unidentified
Description=[Blank field]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	NO	FULL	Allow Auto Reorder

Dithers

#	Dither Type	Optimized For	Direction
1	2-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	Optional ETC ID
1	SHORT(A)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
1	SHORT(A)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	
2	MEDIUM(B)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
2	MEDIUM(B)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	
3	LONG(C)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
3	LONG(C)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	

Special Requirements	Group Observations 1, 2, Non-interruptible

Observation

Proposal 7802, Observation 2 Sun Aug 24 00:00:21 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Observation 1]

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
(1)	ESO-428-14	RA: 07 16 31.2062 (109.1300258d) Dec: -29 19 28.88 (-29.32469d) Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Galaxy
Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	NO	FULL	Allow Auto Reorder

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	Optional ETC ID
1	SHORT(A)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
1	SHORT(A)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	
2	MEDIUM(B)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
2	MEDIUM(B)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	
3	LONG(C)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
3	LONG(C)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	

Special Requirements	Group Observations 1, 2, Non-interruptible

Observation

Proposal 7802, Observation 3 Sun Aug 24 00:00:21 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [Observation 4]

Comments: We request to observe the background prior to the science observations to avoid persistence issues.

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
(6)	NGC-5929-BG	RA: 15 26 0.4034 (231.5016808d) Dec: +41 41 46.69 (41.69630d) Equinox: J2000	Epoch of Position: 2000	

Comments:
Category=Unidentified
Description=[Blank field]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	SUB256	Allow Auto Reorder

Dithers

#	Dither Type	Optimized For	Direction
1	2-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	Optional ETC ID
1		IMAGER	F560W	FASTR1	5	120	1	Dither 1	2	240	430.71	
1	SHORT(A)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
1	SHORT(A)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	
2		IMAGER	F1000W	FASTR1	5	120	1	Dither 1	2	240	430.71	
2	MEDIUM(B)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
2	MEDIUM(B)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	
3		IMAGER	F1130W	FASTR1	5	120	1	Dither 1	2	240	430.71	
3	LONG(C)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
3	LONG(C)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	

Special Requirements	Group Observations 3, 4, Non-interruptible

Observation

Proposal 7802, Observation 4 Sun Aug 24 00:00:21 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Observation 3]

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
(2)	NGC-5929	RA: 15 26 6.1564 (231.5256517d) Dec: +41 40 14.38 (41.67066d) Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Galaxy
Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	SUB256	Allow Auto Reorder

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	Optional ETC ID
1		IMAGER	F560W	FASTR1	5	120	1	Dither 1	4	480	861.42	
1	SHORT(A)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
1	SHORT(A)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	
2		IMAGER	F1000W	FASTR1	5	120	1	Dither 1	4	480	861.42	
2	MEDIUM(B)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
2	MEDIUM(B)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	
3		IMAGER	F1130W	FASTR1	5	120	1	Dither 1	4	480	861.42	
3	LONG(C)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
3	LONG(C)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	

Special Requirements	Group Observations 3, 4, Non-interruptible

Observation

Proposal 7802, Observation 5 Sun Aug 24 00:00:21 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [Observation 6]

Comments: We request to observe the background prior to the science observations to avoid persistence issues.

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
(7)	Mrk-1066-BG	RA: 02 59 53.3047 (44.9721029d) Dec: +36 50 47.29 (36.84647d) Equinox: J2000	Epoch of Position: 2000	

Comments:
Category=Unidentified
Description=[Blank field]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	SUB256	Allow Auto Reorder

Dithers

#	Dither Type	Optimized For	Direction
1	2-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	Optional ETC ID
1		IMAGER	F1130W	FASTR1	5	120	1	Dither 1	2	240	430.71	
1	LONG(C)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
1	LONG(C)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	
2		IMAGER	F1000W	FASTR1	5	120	1	Dither 1	2	240	430.71	
2	MEDIUM(B)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
2	MEDIUM(B)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	
3		IMAGER	F560W	FASTR1	5	120	1	Dither 1	2	240	430.71	
3	SHORT(A)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
3	SHORT(A)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	

Special Requirements	Group Observations 5, 6, Non-interruptible

Observation

Proposal 7802, Observation 6 Sun Aug 24 00:00:21 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Observation 5]

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
(3)	Mrk-1066	RA: 02 59 58.5970 (44.9941542d) Dec: +36 49 13.81 (36.82050d) Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Galaxy
Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	SUB256	Allow Auto Reorder

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	Optional ETC ID
1		IMAGER	F1130W	FASTR1	5	120	1	Dither 1	4	480	861.42	
1	LONG(C)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
1	LONG(C)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	
2		IMAGER	F1000W	FASTR1	5	120	1	Dither 1	4	480	861.42	
2	MEDIUM(B)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
2	MEDIUM(B)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	
3		IMAGER	F560W	FASTR1	5	120	1	Dither 1	4	480	861.42	
3	SHORT(A)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
3	SHORT(A)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	

Special Requirements	Group Observations 5, 6, Non-interruptible

Observation

Proposal 7802, Observation 7 Sun Aug 24 00:00:21 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observation For: [Observation 8]

Comments: We request to observe the background prior to the science observations to avoid persistence issues.

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
(8)	Mrk-573-BG	RA: 01 43 53.5469 (25.9731121d) Dec: +02 22 32.91 (2.37581d) Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Unidentified
Description=[Blank field]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	SUB256	Allow Auto Reorder

Dithers

#	Dither Type	Optimized For	Direction
1	2-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	Optional ETC ID
1		IMAGER	F560W	FASTR1	5	50	1	Dither 1	2	100	179.113	
1	SHORT(A)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
1	SHORT(A)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	
2		IMAGER	F1000W	FASTR1	5	50	1	Dither 1	2	100	179.113	
2	MEDIUM(B)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
2	MEDIUM(B)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	
3		IMAGER	F1130W	FASTR1	5	50	1	Dither 1	2	100	179.113	
3	LONG(C)	MRSLONG		FASTR1	80	1	1	Dither 1	2	2	444.006	
3	LONG(C)	MRSSHORT		FASTR1	80	1	1	Dither 1	2	2	444.006	

Special Requirements	Group Observations 7, 8, Non-interruptible

Observation

Proposal 7802, Observation 8 Sun Aug 24 00:00:21 GMT 2025

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Background Observations:[Observation 7]

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
(4)	Mrk-573	RA: 01 43 57.7778 (25.9907408d) Dec: +02 20 59.53 (2.34987d) Equinox: J2000	Epoch of Position: 2000	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Galaxy
Description=[Active galactic nuclei, Active galaxies, Seyfert galaxies]

Acquisition

#	Target
1	NONE

Template

AcqFilter	Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
	All MRS	YES	SUB256	Allow Auto Reorder

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
1	2	10.0	10.0	0.0	0.0	DEFAULT

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	Optional ETC ID
1		IMAGER	F560W	FASTR1	5	50	1	Dither 1	4	200	358.226	
1	SHORT(A)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
1	SHORT(A)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	
2		IMAGER	F1000W	FASTR1	5	50	1	Dither 1	4	200	358.226	
2	MEDIUM(B)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
2	MEDIUM(B)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	
3		IMAGER	F1130W	FASTR1	5	50	1	Dither 1	4	200	358.226	
3	LONG(C)	MRSLONG		FASTR1	80	1	1	Dither 1	4	4	888.013	
3	LONG(C)	MRSSHORT		FASTR1	80	1	1	Dither 1	4	4	888.013	

Special Requirements	Group Observations 7, 8, Non-interruptible