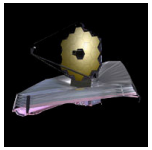

2050 - Mid-infrared molecular absorption in the atmospheres of K giants

Cycle: 1, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	HR 6348	MIRI Medium Resolution Spectroscopy	(1) HR6348
	2	HR 7341	MIRI Medium Resolution Spectroscopy	(2) HR7341
	3	HD 166780	MIRI Medium Resolution Spectroscopy	(3) HD166780
	4	HD 173511	MIRI Medium Resolution Spectroscopy	(4) HD173511

ABSTRACT

We will observe four K giants with the Medium-Resolution Spectrometer (MRS) on JWST in order to solve an enduring problem in stellar astrophysics. Stellar models consistently underpredict the strength of molecular absorption bands observed in the mid-infrared, including the CO fundamental at 5 um, the SiO fundamental at 8 um, and the OH bands from 14 to 18 um. This discrepancy impacts infrared photometric calibration and astrophysical fields well beyond stellar atmospheres, from stellar population models in galaxies to the cosmic distance ladder. Our MRS observations will resolve the line structure in the mid-infrared absorption bands with better spectral resolution and sensitivity than ever before possible. The resulting spectra will reveal the temperature and other physical properties of the absorbing molecular layer as a function of

wavelength. With these measurements, we can build a better generation of more accurate models of late-type stellar atmospheres.

OBSERVING DESCRIPTION

The sample consists of 4 K giants, all close to the northern CVZ. Each star will be observed with the MRS, utilizing a self TA and in all three MRS grating settings. All TAs will use the neutral density filter. The observations consist of one or two short integrations with 5-8 groups in four dither positions in each grating setting.

This program does not have any special requirements, and it does not use simultaneous imaging.

Proposal 2050 - Targets - Mid-infrared molecular absorption in the atmospheres of K giants

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HR6348	RA: 17 01 16.9261 (255.3205254d) Dec: +60 38 55.52 (60.64876d) Equinox: J2000	Proper Motion RA: -44.483 mas/yr Proper Motion Dec: 38.977 mas/yr Parallax: 0.0098773" Epoch of Position: 2000	
Comments: Coordinates from Gaia DR2. *Category=Star* *Description=[K giants]* *Extended=NO*				
(2)	HR7341	RA: 19 18 37.8722 (289.6578008d) Dec: +49 34 10.04 (49.56946d) Equinox: J2000	Proper Motion RA: 21.433 mas/yr Proper Motion Dec: 44.605 mas/yr Parallax: 0.0073359" Epoch of Position: 2000	
Comments: Coordinates from Gaia DR2. *Category=Star* *Description=[K giants]* *Extended=NO*				
(3)	HD166780	RA: 18 08 38.8451 (272.1618546d) Dec: +57 58 46.86 (57.97968d) Equinox: J2000	Proper Motion RA: -33.760 mas/yr Proper Motion Dec: -8.480 mas/yr Parallax: 0.0028605" Epoch of Position: 2000	
Comments: Coordinates from Gaia DR2. *Category=Star* *Description=[K giants]* *Extended=NO*				
(4)	HD173511	RA: 18 41 40.5913 (280.4191304d) Dec: +61 32 47.09 (61.54641d) Equinox: J2000	Proper Motion RA: -16.915 mas/yr Proper Motion Dec: 60.446 mas/yr Parallax: 0.0043438" Epoch of Position: 2000	
Comments: Coordinates from Gaia DR2. *Category=Star* *Description=[K giants]* *Extended=NO*				

Observation

Proposal 2050, Observation 1: HR 6348

Wed May 24 01:00:30 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

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)	HR6348	RA: 17 01 16.9261 (255.3205254d) Dec: +60 38 55.52 (60.64876d) Equinox: J2000	Proper Motion RA: -44.483 mas/yr Proper Motion Dec: 38.977 mas/yr Parallax: 0.0098773" Epoch of Position: 2000	

Comments: Coordinates from Gaia DR2.
Category=Star
Description=[K giants]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	61485.13

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
ALL	NO	FULL	NEUTRAL

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	LONG(C)	MRSLONG		FASTR1	7	2	1	Dither 1	4	8	166.502	61485
1	LONG(C)	MRSSHORT		FASTR1	7	2	1	Dither 1	4	8	166.502	61485
2	MEDIUM(B)	MRSLONG		FASTR1	6	2	1	Dither 1	4	8	144.302	61485
2	MEDIUM(B)	MRSSHORT		FASTR1	6	2	1	Dither 1	4	8	144.302	61485
3	SHORT(A)	MRSLONG		FASTR1	6	2	1	Dither 1	4	8	144.302	61485
3	SHORT(A)	MRSSHORT		FASTR1	6	2	1	Dither 1	4	8	144.302	61485

Observation

Proposal 2050, Observation 2: HR 7341 Wed May 24 01:00:30 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

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
(2)	HR7341	RA: 19 18 37.8722 (289.6578008d) Dec: +49 34 10.04 (49.56946d) Equinox: J2000	Proper Motion RA: 21.433 mas/yr Proper Motion Dec: 44.605 mas/yr Parallax: 0.0073359" Epoch of Position: 2000	

Comments: Coordinates from Gaia DR2.
Category=Star
Description=[K giants]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	61486.13

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
ALL	NO	FULL	NEUTRAL

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	SHORT(A)	MRSLONG		FASTR1	5	2	1	Dither 1	4	8	122.102	61486
1	SHORT(A)	MRSSHORT		FASTR1	5	2	1	Dither 1	4	8	122.102	61486
2	MEDIUM(B)	MRSLONG		FASTR1	5	2	1	Dither 1	4	8	122.102	61486
2	MEDIUM(B)	MRSSHORT		FASTR1	5	2	1	Dither 1	4	8	122.102	61486
3	LONG(C)	MRSLONG		FASTR1	6	2	1	Dither 1	4	8	144.302	61486
3	LONG(C)	MRSSHORT		FASTR1	6	2	1	Dither 1	4	8	144.302	61486

Observation

Proposal 2050, Observation 3: HD 166780

Wed May 24 01:00:30 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
(3)	HD166780	RA: 18 08 38.8451 (272.1618546d) Dec: +57 58 46.86 (57.97968d) Equinox: J2000	Proper Motion RA: -33.760 mas/yr Proper Motion Dec: -8.480 mas/yr Parallax: 0.0028605" Epoch of Position: 2000	

Comments: Coordinates from Gaia DR2.
Category=Star
Description=[K giants]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	61487.13

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
ALL	NO	FULL	NEUTRAL

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	LONG(C)	MRSLONG		FASTR1	8	1	1	Dither 1	4	4	88.801	61487
1	LONG(C)	MRSSHORT		FASTR1	8	1	1	Dither 1	4	4	88.801	61487
2	MEDIUM(B)	MRSLONG		FASTR1	7	1	1	Dither 1	4	4	77.701	61487
2	MEDIUM(B)	MRSSHORT		FASTR1	7	1	1	Dither 1	4	4	77.701	61487
3	SHORT(A)	MRSLONG		FASTR1	6	2	1	Dither 1	4	8	144.302	61487
3	SHORT(A)	MRSSHORT		FASTR1	6	2	1	Dither 1	4	8	144.302	61487

Observation

Proposal 2050, Observation 4: HD 173511

Wed May 24 01:00:30 GMT 2023

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

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)	HD173511	RA: 18 41 40.5913 (280.4191304d) Dec: +61 32 47.09 (61.54641d) Equinox: J2000	Proper Motion RA: -16.915 mas/yr Proper Motion Dec: 60.446 mas/yr Parallax: 0.0043438" Epoch of Position: 2000	

Comments: Coordinates from Gaia DR2.
Category=Star
Description=[K giants]
Extended=NO

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	FND	FAST	4	1	1	11.1	61488.14

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
ALL	NO	FULL	NEUTRAL

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	LONG(C)	MRSLONG		FASTR1	7	2	1	Dither 1	4	8	166.502	61488
1	LONG(C)	MRSSHORT		FASTR1	7	2	1	Dither 1	4	8	166.502	61488
2	MEDIUM(B)	MRSLONG		FASTR1	6	2	1	Dither 1	4	8	144.302	61488
2	MEDIUM(B)	MRSSHORT		FASTR1	6	2	1	Dither 1	4	8	144.302	61488
3	SHORT(A)	MRSLONG		FASTR1	6	2	1	Dither 1	4	8	144.302	61488
3	SHORT(A)	MRSSHORT		FASTR1	6	2	1	Dither 1	4	8	144.302	61488