



# 1556 - A Time Series Calibration of Medium Resolution Spectroscopy with MIRI

Cycle: 1, Proposal Category: GO

## INVESTIGATORS

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## OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
Observation Folder				
	1		MIRI Medium Resolution Spectroscopy	(1) RCMA
	2		MIRI Medium Resolution Spectroscopy	(1) RCMA

## ABSTRACT

We propose to test the stability of MIRI Medium Resolution Spectroscopy for time series observations, such as for transiting exoplanets. Being a calibration proposal, we observe a control-type source that exhibits a small variation whose characteristics are known. We will observe the bright Algol-type eclipsing binary R Canis Majoris over an 9.5-hour period spanning secondary eclipse, using one grating position. The primary technical goals of our observations are: 1) to define the limiting instrumental noise (“noise floor”) in time-series observations over small wavelength scales (pixel-to-pixel) that are the most relevant for spectroscopy, 2) to determine how to decorrelate and remove the instrumental noise, 3) to define the

temporal stability of the instrumental fringing, and 4) to explore the implications of our results for exoplanet spectroscopy. The secondary star in R CMa is a K-dwarf, that will exhibit weak (0.4-percent) rotational lines of OH in its emergent spectrum. In addition to our primary technical goals, a secondary goal is a technical demonstration: we will use the secondary eclipse technique to measure the OH line spectrum of the K-dwarf in this binary system, just as exoplanet observers will seek to measure the emergent spectra of exoplanets in the thermal infrared. By demonstrating that we can derive an astrophysically credible spectrum of the K-dwarf to high signal-to-noise ratio, we will further validate the process of observing exoplanetary spectra with MRS. We will produce specific deliverables, including a python code to extract spectra from the focal plane images, with instrumental noise removed.

### **OBSERVING DESCRIPTION**

9-hour time series plus 30 minutes at the start to allow for detector stabilization. Only the A grating setting for MRS. No dithering, no simultaneous imaging. Some partial saturation is expected at the shortest wavelengths, but Ngroups = 30 will give overall optimum performance. This is a technical calibration observation, not a science proposal.

Calibration proposals require consultation with the instrument team, via the Help Desk. We did that, and the reference ticket is INC0162498.

# Proposal 1556 - Targets - A Time Series Calibration of Medium Resolution Spectroscopy with MIRI

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	RCMA	RA: 07 19 28.3570 (109.8681542d) Dec: -16 23 45.05 (-16.39585d) Equinox: J2000	Proper Motion RA: 0.011532995737310623 sec of time/yr Proper Motion Dec: -0.1385099998794578 arcsec/yr Epoch of Position: 2015.5	
	<i>Comments: This object was generated by the target selector and retrieved from the SIMBAD database.</i> Category=Star Description=[Eclipsing binary stars] Extended=NO				

# Proposal 1556 - Observation 1 - A Time Series Calibration of Medium Resolution Spectroscopy with MIRI

Thu Sep 16 19:00:21 GMT 2021

<b>Observation</b>	<b>Proposal 1556, Observation 1</b> <b>Diagnostic Status: Warning</b> Observing Template: MIRI Medium Resolution Spectroscopy																																																		
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# Proposal 1556 - Observation 2 - A Time Series Calibration of Medium Resolution Spectroscopy with MIRI

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