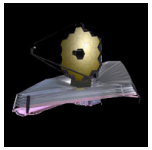

2919 - Life After Death: Finding Water in a Planetary Disk around a White Dwarf

Cycle: 2, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
GD362 NSpec + MIRI MRS + phot				
	1	NIRSpec Prism	NIRSpec Fixed Slit Spectroscopy	(1) GD-362
	2	MIRI MRS to 17 um	MIRI Medium Resolution Spectroscopy	(1) GD-362
	3	MIRI Imaging	MIRI Imaging	(1) GD-362

ABSTRACT

The InfraRed Spectrograph (IRS) on the Spitzer Space Telescope provided low-resolution spectroscopy of eight dusty white dwarfs. However, only two had sufficient signal-to-noise ratio for a mineralogical analysis, G29-38 and GD 362, and only one (GD 362) shows potential emission features near 6 microns that could be due to water vapor. We propose to obtain high signal-to-noise ratio, medium resolution spectroscopy of GD 362 with the JWST to detect, for the first time, the water vapor features at high significance, resolve them, and constrain the abundance of water in a remnant

planetary disk around a white dwarf. This is a unique opportunity: GD 362 is a unique target, and the JWST spectroscopy will enable us to constrain the composition of the disk, including water ice, water vapor, hydrated minerals, and aqueous alterations, as well as gas phase species. Even a non-detection of water would be significant as it would constrain the origin of the tidally disrupted exomoons and exo-asteroids around this white dwarf. The long term evolution of disks around white dwarfs is also of prime interest; by modeling the silicate emission feature, we will constrain any mineralogical differences compared to the Spitzer IRS observations of GD 362 from early 2000s.

OBSERVING DESCRIPTION

We will observe GD 362, a nearby, dusty white dwarf with a precise position, parallax, and proper motion from Gaia DR3. We will use NIRSpec and MIRI to obtain the complete spectral energy distribution from 0.6 to 25 microns. To minimize telescope and slew overheads, we request the observations to be an uninterrupted sequence such that the NIRSpec and MIRI observations are performed on the same visit. However, splitting these observations is also acceptable, as it would not impact our science goals.

Proposal 2919 - Targets - Life After Death: Finding Water in a Planetary Disk around a White Dwarf

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	GD-362	RA: 17 31 34.3480 (262.8931167d) Dec: +37 05 17.35 (37.08815d) Equinox: J2000	Proper Motion RA: 0.002006580574031611 sec of time/yr Proper Motion Dec: -0.2169769998999982 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Circumstellar disks, Circumstellar dust, White dwarfs]

Observation

Proposal 2919, Observation 1: NIRSpec Prism

Wed Apr 10 23:00:28 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRSpec Fixed Slit 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)	GD-362	RA: 17 31 34.3480 (262.8931167d) Dec: +37 05 17.35 (37.08815d) Equinox: J2000	Proper Motion RA: 0.002006580574031611 sec of time/yr Proper Motion Dec: -0.2169769998999982 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Circumstellar disks, Circumstellar dust, White dwarfs]

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	CLEAR	NRSRAPIDD6	3	1	1	0.26	145975.2

Template

Slit	Subarray
S200A1	SUBS200A1

Dithers

#	Primary Dither Positions	Sub-Pixel Pattern
1	5	NONE

Spectral Elements

#	Grating/Filter	Slit	Readout Pattern	Groups/Int	Integrations/Exp	#	Autocal	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	PRISM/CLEAR	S200A1	NRSRAPID	16	1	1	NONE	5	5	132.532	145975.1

Observation

Proposal 2919, Observation 2: MIRI MRS to 17 um

Wed Apr 10 23:00:28 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Medium Resolution Spectroscopy

Comments: MRS SHORT not ran through ETC. Set by MRS LONG ETC calculations.

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)	GD-362	RA: 17 31 34.3480 (262.8931167d) Dec: +37 05 17.35 (37.08815d) Equinox: J2000	Proper Motion RA: 0.002006580574031611 sec of time/yr Proper Motion Dec: -0.2169769998999982 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Circumstellar disks, Circumstellar dust, White dwarfs]

Acquisition

#	Target	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	F560W	FAST	4	1	1	11.1	145975.4

Template

Primary Channel	Simultaneous Imaging	Imager Subarray	Grating Wheel Direction
All MRS	YES	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		IMAGER	F560W	FASTR1	24	14	1	Dither 1	4	56	3873.956	
1	SHORT(A)	MRSLONG		SLOWR1	20	2	1	Dither 1	4	8	3917.947	197423.21
1	SHORT(A)	MRSSHORT		SLOWR1	20	2	1	Dither 1	4	8	3917.947	
2		IMAGER	F770W	FASTR1	24	14	1	Dither 1	4	56	3873.956	
2	MEDIUM(B)	MRSLONG		SLOWR1	20	2	1	Dither 1	4	8	3917.947	197423.22
2	MEDIUM(B)	MRSSHORT		SLOWR1	20	2	1	Dither 1	4	8	3917.947	
3		IMAGER	F1000W	FASTR1	24	14	1	Dither 1	4	56	3873.956	
3	LONG(C)	MRSLONG		SLOWR1	28	2	1	Dither 1	4	8	5446.902	197423.23
3	LONG(C)	MRSSHORT		SLOWR1	28	2	1	Dither 1	4	8	5446.902	

Observation

Proposal 2919, Observation 3: MIRI Imaging

Wed Apr 10 23:00:28 GMT 2024

Diagnostic Status: Warning

Observing Template: MIRI Imaging

Comments: filter 21 um is SNR=100
filter 25 um is SNR=50

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)	GD-362	RA: 17 31 34.3480 (262.8931167d) Dec: +37 05 17.35 (37.08815d) Equinox: J2000	Proper Motion RA: 0.002006580574031611 sec of time/yr Proper Motion Dec: -0.2169769998999982 arcsec/yr Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Circumstellar disks, Circumstellar dust, White dwarfs]

Template

Subarray
FULL

Dithers

#	Dither Type	Starting Point	Number of Points	Points	Starting Set	Number of Sets	Optimized For	Direction	Pattern Size
1	CYCLING	1	4						LARGE
2	CYCLING	10	17						LARGE
3	CYCLING	20	4						DEFAULT
4	2-Point								DEFAULT

Spectral Elements

#	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Dither	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	F2100W	FASTR1	21	1	1	Dither 1	4	4	233.103	145975.7
2	F2550W	FASTR1	14	2	1	Dither 2	17	34	1368.095	145975.8
3	F1800W	FASTR1	13	1	1	Dither 3	4	4	144.302	145975.11