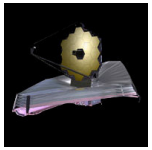

10248 - The Last Breath of a Dying World: A Phase Curve of WASP-12b

Cycle: 5, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	WASP-12b Phase Curve	NIRSpec Bright Object Time Series	(1) WASP-12

ABSTRACT

WASP-12b is the only known planet to be at the end of its life cycle. We propose a NIRSpec G395H spectroscopic phase curve observation to study the interior, exterior, and atmospheric dynamics of this keystone planet. First, our white light phase curve would strongly constrain the planet's second Love number, allowing us to contextualize the ``fuzzy cores'' of Jupiter and Saturn. Second, the spectroscopic phase curve would allow us to definitively measure the thermal emission spectrum of WASP-12b as a function of orbital phase, allowing us to constrain chemistry (and in particular C/O) as a function of longitude -- resolving the mystery of the planet's weak 4.5 micron emission. Third, our observations would definitively determine the nature of WASP-12b's peculiar double-harmonic phase curve at 4.5 micron. In all, our observations would definitively resolve a number of Spitzer-era mysteries for WASP-12b, bringing this keystone planet into the JWST era at last.

OBSERVING DESCRIPTION

We will observe a phase curve of WASP-12b with NIRSpec BOTS/G395H. We will begin the observation with a 0.5 hr buffer for detector settling before integrating for half an eclipse duration before a secondary eclipse event. We will then observe for a full orbital phase, and conclude the observation half an eclipse duration after the next seocndary eclipse event. This is a well-tested setup for spectroscopic phase curve observations that minimizes risk. The eclipse timings take into account the known orbital decay. We acquire on a nearby target within splitting distance. Finally we note that due to the long scheduling duration relative to the gap between acceptable phase ranges, we have doubled the period and halved both components of the phase range for the time-critical constraint as required to schedule the eclipse correctly per the JDox.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	WASP-12	RA: 06 30 32.7966 (97.6366525d) Dec: +29 40 20.26 (29.67229d) Equinox: J2000	Proper Motion RA: -1.519 mas/yr Proper Motion Dec: -6.761000054211763 mas/yr Parallax: 0.0024213" Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.* *Category=Star* *Description=[F stars, G stars]*				
(2)	2MASS-J06303255+2940301	RA: 06 30 32.5332 (97.6355550d) Dec: +29 40 30.10 (29.67503d) Equinox: J2000	Proper Motion RA: -0.088 mas/yr Proper Motion Dec: 0.027 mas/yr Parallax: 5.108000000000001E-4" Epoch of Position: 2000	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. *SIMBAD listed proper motion for this target. When retrieving targets with PM from SIMBAD, APT requests the coordinates be calculated with an epoch of the year 2000. Do not modify this epoch. Always review coordinates using the Target Confirmation tool, which graphically displays the PM.* *Category=Star* *Description=[M stars]*				

Observation

Proposal 10248, Observation 1: WASP-12b Phase Curve Tue May 12 22:00:10 GMT 2026

Diagnostic Status: Warning

Observing Template: NIRSpec Bright Object Time Series

Diagnostics

(WASP-12b Phase Curve (Obs 1)) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.

(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)	WASP-12	RA: 06 30 32.7966 (97.6366525d) Dec: +29 40 20.26 (29.67229d) Equinox: J2000	Proper Motion RA: -1.519 mas/yr Proper Motion Dec: -6.761000054211763 mas/yr Parallax: 0.0024213" Epoch of Position: 2000	

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Category=Star
Description=[F stars, G stars]

Acquisition

#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	Optional ETC ID
1	2 2MASS-J06303255+2940301	WATA	SUB2048	F110W	NRSRAPID	3	1	1	3.628	277410

Template

Subarray
SUB2048

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	Optional ETC ID
1	G395H/F290LP	NRSRAPID	30	4210	1	1	4210	117806.241	277410

Special Requirements	
	Phase 0.1927351191 to 0.2118234128 with period 2.182838732 Days and zero-phase 2461376.1825 HJD Time Series Observation No Parallel Attachments