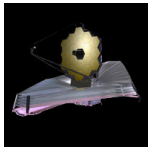

2507 - Thermal Emission from the First Planet Transiting a White Dwarf

Cycle: 1, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
Dr. Andrew Vanderburg (PI)	**Massachusetts Institute of Technology**
Dr. Caroline Morley (CoI)	University of Texas at Austin
Dr. Laura Kreidberg (CoI) (ESA Member)	Max Planck Institute for Astronomy
Dr. Peter Gao (CoI)	Carnegie Institution of Washington
Dr. Tansu Daylan (CoI)	Washington University in St. Louis
Dr. Siyi Xu (CoI)	NOIRLab - Gemini North (HI)
Ryan J MacDonald (CoI)	University of Michigan
Ms. Juliette Campbell Becker (CoI)	University of Michigan

OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
WD 1856 transit block				
	1		NIRSpec Bright Object Time Series	(1) LP-141-14

ABSTRACT

We request 1.5 hours of JWST observations to characterize a newly discovered planet around the white dwarf star WD 1856+534. The planet, called WD 1856 b, is about the size of Jupiter and has a mass less than 14 times that of Jupiter at 95% confidence. The planet orbits only 0.02 AU from the white dwarf, close enough that it must have originally orbited beyond 1 AU and migrated inwards to avoid being engulfed when the progenitor star evolved into a red giant. How the planet may have migrated is an active area of debate. We propose to use JWST/NIRSPEC to detect features in WD 1856 b's thermal emission spectrum. A detection will measure the planet's mass and probe the atmospheric composition, while a non-detection provides tight enough constraints on the planet's mass to rule out certain formation scenarios. Either way, JWST observations will help us understand this unique planet and the processes that shape planetary systems after the main sequence.

OBSERVING DESCRIPTION

We request 1.66 hours of NIRSPEC bright object itme series observations with the G395 grism of the planet hosting star WD 1856+534. We will observe one transit of the planet WD 1856 b. Transit times are predicted using an updated ephemeris listed in the scientific justifiation and given as a special constraint.

The transit duration is only 8 minutes so we include an hour of out-of-transit baseline to reduce scheduling overheads. We also add 30 minutes of observations before the transit to let the detector settle into a steady state. We will acquire on the target star.

Proposal 2507 - Targets - Thermal Emission from the First Planet Transiting a White Dwarf

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	LP-141-14	RA: 18 57 39.7620 (284.4156750d) Dec: +53 30 32.49 (53.50903d) Equinox: J2000	Proper Motion RA: 0.02698958032562631 sec of time/yr Proper Motion Dec: -0.05251399995813699 arcsec/yr Parallax: 0.0403983" Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Exoplanet Systems, White dwarfs]
Extended=NO

Observation

Proposal 2507, Observation 1

Tue Mar 07 16:00:26 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRSpec Bright Object Time Series

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)	LP-141-14	RA: 18 57 39.7620 (284.4156750d) Dec: +53 30 32.49 (53.50903d) Equinox: J2000	Proper Motion RA: 0.02698958032562631 sec of time/yr Proper Motion Dec: -0.05251399995813699 arcsec/yr Parallax: 0.0403983" Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Exoplanet Systems, White dwarfs]
Extended=NO

Acquisition

#	Target	TA Method	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	1 LP-141-14	WATA	SUB32	CLEAR	NRSRAPID	3	1	1	0.08	60592

Template

Subarray
SUB2048

Spectral Elements

#	Grating/Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	G395M/F290LP	NRSRAPID	16	414	1	1	414	6356.755	60592

Special Requirements	
	Phase 0.95659534845451277 to 0.98618942905370865 with period 1.407939217 Days and zero-phase 2459038.4358981 HJD Time Series Observation No Parallel Attachments