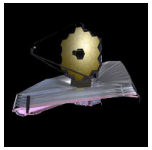

6078 - Confirmation of a Jovian Planet Analog Orbiting a White Dwarf, Rare Low-mass Neutron Star or Black Hole

Cycle: 3, Proposal Category: GO

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	477 NIRCAM SUB400P	NIRCam Imaging	(1) MOA-2010-BLG-477

ABSTRACT

Blackman et al. (2021) have discovered the first Jovian-analog planet orbiting a white dwarf, MOA-2010-BLG-477b. This is the first example of an exoplanet that resembles the predicted fate of Jupiter in our own Solar System. Discovered by gravitational microlensing, constraints on the microlensing parallax signal due to the orbital motion of the Earth rule out host stars more massive than the Sun as well as brown dwarf hosts. Meanwhile, Keck adaptive optics observations set an upper limit on the lens brightness that excludes main sequence host stars, leaving a white dwarf or very low-mass neutron star or black hole host as the only remaining possibilities. Confirming its nature will provide the first observed example of the end stage of a planetary system like our own and is a unique opportunity to constrain the pollution and long-term dynamical evolution of planets in wide orbits. In the unlikely case the host is not a white dwarf, the outstanding discovery of a planet around a low-mass Neutron star or black hole would nonetheless be significant.

OBSERVING DESCRIPTION

This proposal aims at detecting the white dwarf (or low mass neutron star/black hole) in the exoplanetary microlensing event MOA-2010-BLG-477 using four short and four long NIRCam filters. Two sets of observations are planned, one deep observation to detect the target and a second short set of exposures on the same field in order to avoid saturating reference stars needed for flux calibration and characterizing the point-spread function.

Proposal 6078 - Targets - Confirmation of a Jovian Planet Analog Orbiting a White Dwarf, Rare Low-mass Neutron Star or Black Hole

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	MOA-2010-BLG-477	RA: 18 06 7.4700 (271.5311250d) Dec: -31 27 16.17 (-31.45449d) Equinox: J2000		

Comments:
Category=Star
Description=[M dwarfs, White dwarfs]

Observation

Proposal 6078, Observation 1: 477 NIRCAM SUB400P

Thu Sep 05 16:00:53 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Diagnostics

(477 NIRCAM SUB400P (Obs 1)) Warning (Form): NGROUPS=1 may suffer from low calibration accuracy.
(477 NIRCAM SUB400P (Obs 1)) Warning (Form): NGROUPS=1 may suffer from low calibration accuracy.
(477 NIRCAM SUB400P (Obs 1)) Warning (Form): NGROUPS=1 may suffer from low calibration accuracy.
(477 NIRCAM SUB400P (Obs 1)) Warning (Form): NGROUPS=1 may suffer from low calibration accuracy.
(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)	MOA-2010-BLG-477	RA: 18 06 7.4700 (271.5311250d) Dec: -31 27 16.17 (-31.45449d) Equinox: J2000		

Comments:
Category=Star
Description=[M dwarfs, White dwarfs]

Template

Module	Subarray
B	SUB400P

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	INTRAMODULEBOX	4	SMALL-GRID-DITHER		9

Spectral Elements

#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	F070W	F300M	DEEP8	3	2	72	36	5844.689	
2	F090W	F360M	DEEP8	3	2	72	36	5844.689	
3	F115W	F430M	DEEP8	3	2	72	36	5844.689	
4	F200W	F480M	DEEP8	3	2	72	36	5844.689	
5	F070W	F300M	RAPID	1	1	36	36	119.987	
6	F090W	F360M	RAPID	1	1	36	36	119.987	
7	F115W	F430M	RAPID	1	1	36	36	119.987	
8	F200W	F480M	RAPID	1	1	36	36	119.987	

Special Requirements

Aperture PA Range 74.3025525 to 87.3025525 Degrees (V3 74.0 to 87.0)
Aperture PA Range 89.3025525 to 95.3025525 Degrees (V3 89.0 to 95.0)
Aperture PA Range 264.3025525 to 268.3025525 Degrees (V3 264.0 to 268.0)