



3337 - Solving a Solar Neighborhood Crime Scene by Imaging 14 Her c

Cycle: 2, Proposal Category: GO

INVESTIGATORS

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Dr. Timothy D Brandt (CoI)	University of California - Santa Barbara
Dr. Brianna Irene Lacy (CoI)	University of California - Santa Cruz
Dr. Jacqueline Kelly Faherty (CoI)	American Museum of Natural History
Dr. Elisabeth C Matthews (CoI) (ESA Member)	Max Planck Institute for Astronomy
Dr. Aarynn L Carter (CoI)	Space Telescope Science Institute
Dr. Emily Rickman (CoI) (ESA Member)	Space Telescope Science Institute - ESA - JWST
Dr. Brendan Bowler (CoI)	University of Texas at Austin
Dr. Clemence Fontanive (CoI) (CSA Member)	Universite de Montreal

OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
14 Her Observations				
	1	14 HER -- ROLL 1	NIRCam Coronagraphic Imaging	(1) -14-HER
	2	14 HER -- ROLL 2	NIRCam Coronagraphic Imaging	(1) -14-HER
PSF Reference Observations				
	3	HD144002 -- PSF REF 14 HER	NIRCam Coronagraphic Imaging	(2) HD-144002

ABSTRACT

We propose to directly image 14 Her c, the outer planet of the clearest example of a system survivor of dynamical disruption potentially undergoing Kozai-Lidov oscillations. With one image from JWST/NIRCam we will be able to detect one of only two field-age giant exoplanets amenable for direct imaging. This image will constrain the relative astrometry between the star and the planet, crucially improving our posteriors of planet mass and inclination, as well as all orbital parameters. The 14 Her system will serve as a crucial benchmark: the first well-characterized system across multiple techniques (accelerations, RV, direct imaging) with two mutually perpendicular, wide-separation planetary orbits to inform dynamical mechanisms that may be more widespread across planetary scales.

Additionally, we will contextualize this planet in a color-magnitude diagram with Y dwarfs of similar temperature (many of them targeted with JWST GO programs) and Eps Indi Ab, the other field-age giant planet scheduled for direct imaging with JWST. Our observations provide a rare opportunity to probe an exoplanetary system contemporary to our own.

OBSERVING DESCRIPTION

We propose to image 14 Her c with NIRCam using the F444W filter and the MASK335R round mask coronagraph. We will use the F200W filter simultaneously with the F444W filter thanks to the NIRCam dichroic and use this image to rule out background stars. We will combine angular and reference differential imaging (ADI+RDI) to detect 14 Her c with a standard detector setup.

Proposal 3337 - Targets - Solving a Solar Neighborhood Crime Scene by Imaging 14 Her c

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	-14-HER	RA: 16 10 24.5043 (242.6021013d) Dec: +43 48 58.90 (43.81636d) Equinox: J2000	Proper Motion RA: 0.012172195047917354 sec of time/yr Proper Motion Dec: -0.2970250000771557 arcsec/yr Parallax: 0.05574" Epoch of Position: 2015.5	
<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=Star Description=[Exoplanet Systems, Exoplanets, K stars] Extended=NO</p>				
(2)	HD-144002	RA: 16 01 32.6362 (240.3859842d) Dec: +47 08 33.47 (47.14263d) Equinox: J2000	Proper Motion RA: -4.966 mas/yr Proper Motion Dec: 10.382 mas/yr Parallax: 0.002306" Epoch of Position: 2000	
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Fixed Targets

Proposal 3337 - Observation 1 - Solving a Solar Neighborhood Crime Scene by Imaging 14 Her c

Fri Apr 05 20:02:02 GMT 2024

Observation	<p>Proposal 3337, Observation 1: 14 HER -- ROLL 1</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>																																							
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Proposal 3337 - Observation 1 - Solving a Solar Neighborhood Crime Scene by Imaging 14 Her c

Special Requirements

Offset -0.006 arcsec, -0.012 arcsec

Sequence Observations 1, 2, 3, Non-interruptible

Aperture PA Offset 1 from 2 by 10 to 14 Degrees (Same offsets in V3)

Proposal 3337 - Observation 2 - Solving a Solar Neighborhood Crime Scene by Imaging 14 Her c

Fri Apr 05 20:02:02 GMT 2024

Observation	<p>Proposal 3337, Observation 2: 14 HER -- ROLL 2</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCcam Coronagraphic Imaging</p>																													
Diagnostics	<p>(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(14 HER -- ROLL 2 (Obs 2)) Informational (Form): The Visit Planner and Spike may produce different schedulability results.</p>																													
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Proposal 3337 - Observation 2 - Solving a Solar Neighborhood Crime Scene by Imaging 14 Her c

Special Requirements

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Sequence Observations 1, 2, 3, Non-interruptible

Aperture PA Offset 1 from 2 by 10 to 14 Degrees (Same offsets in V3)

Proposal 3337 - Observation 3 - Solving a Solar Neighborhood Crime Scene by Imaging 14 Her c

Fri Apr 05 20:02:02 GMT 2024

Observation	<p>Proposal 3337, Observation 3: HD144002 -- PSF REF 14 HER</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCam Coronagraphic Imaging</p>																													
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