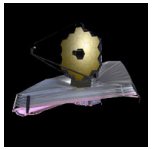

3589 - How big do stars get? A NIRCam view of cool supergiants in, NGC 4449, a key low-metallicity environment

Cycle: 2, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
NGC4449-1				
	1	NGC4449	NIRCam Imaging	(2) NGC-4449

ABSTRACT

The currently detected black-hole, black-hole (DBH) merger population have brought to focus the lack of understanding of how massive stars end their lives in the >30 solar mass regime, both as single stars and within binary systems. In this respect, the empirically observed limit on the luminosity of cool supergiant stars (CSGs), the Humphreys-Davidson (HD) limit, is of primary importance, particularly given the tension between

the stellar evolutionary model predictions and observations at sub-solar metallicities. This brings about the question: how large and luminous do massive-star progenitors of black holes become at low metallicity? The most well studied examples of sub-metallicity massive star populations (in the Large and Small Magellanic clouds) have proved insufficient to rule out brief violations of the HD limit, which is the result of low number statistics. To this end, we propose to observe the complete CSG population of the LMC-like starburst galaxy NGC 4449 with NIRCam. These observations will allow the identification of the CSG population and the reconstruction of the optical-to-infrared spectral energy distributions to accurately determine their luminosities. As well as having a high legacy value, these observations will allow us to determine, to a much greater level of statistical accuracy whether nature permits violations of the HD limit, which directly impacts both the interpretation of the observed core-collapse supernova population and the feasibility of DBH formation channels.

OBSERVING DESCRIPTION

We request NIRCam photometry covering the full spatial extent of the galaxy NGC4449. These observations are specifically tailored to obtain accurate photometry for the brightest stars in this galaxy.
To avoid any saturation of the brightest targets we use the SUB640 subarray and a 2x5 mosaic pattern.

Point spread function photometry will be extracted using the most recent version of the DOLPHOT NIRCam module, which has been demonstrated with JWST Early Release Science observations.
With the galaxy-wide photometic catalogues, we will construct galaxy-wide IR CMDs diagram to characterise the stellar population of NGC4449.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	NGC-4449	RA: 12 28 10.9440 (187.0456000d) Dec: +44 05 41.28 (44.09480d) Equinox: J2000	Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Galaxy
Description=[Dwarf galaxies]

Observation

Proposal 3589, Observation 1: NGC4449

Mon Sep 25 15:01:08 GMT 2023

Diagnostic Status: Warning

Observing Template: NIRCam Imaging

Diagnostics

(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:3) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:4) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:5) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:6) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:7) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:8) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:9) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 1:10) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

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Category=Galaxy
Description=[Dwarf galaxies]

Template

Module	Subarray	Target Placement
B	SUB640	Module Gap

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
2	5	5.0	5.0	0.0	0.0	DEFAULT

Dithers

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

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	F480M	BRIGHT2	4	1	16	16	603.089	147247
2	F150W	F250M	BRIGHT2	4	1	16	16	603.089	147247

Special Requirements	
	Group Visits within 53.0 Days Aperture PA Range 100 to 150 Degrees (V3 99.97786814 to 149.97786814) Aperture PA Range 293.0 to 330.0 Degrees (V3 292.97786814 to 329.97786814) Visits Same PA