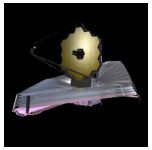

# 3849 - A Pristine IMF Probe of the Star-Forming Conditions in the Early Universe

Cycle: 2, Proposal Category: GO

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**OBSERVATIONS**

| ***Folder*** | ***Observation*** | ***Label*** | ***Observing Template*** | ***Science Target*** |
|---|---|---|---|---|
| Observation Folder | | | | |
| | 1 | | NIRCam Imaging | (1) BOOI |


**ABSTRACT**

Ultra-faint dwarfs (UFDs) are exquisite relics of the high-redshift Universe. Their remnant stellar populations preserve the star-formation conditions from a time prior to the epoch of reionization. Using these fossils, we can quantify how the state of the early interstellar medium affected the process of star formation.

The impact of this primordial setting, with gas kinematics and metallicity distinct from today's Milky Way environments, is expected to be encoded in the Initial Mass Function. However, before the advent of JWST, it has been impossible to robustly probe IMF variations beyond the Milky Way using the simple and direct method of counting stars. Resolved stellar population studies with HST have only scratched the surface of possible IMF variations within the Local Group. We propose deep JWST/NIRCam imaging observations to study the stellar initial-mass function (IMF) of the Bootes I UFD satellite, using resolved star counts.

JWST/NIRCam can improve our knowledge of the IMF by providing the necessary sensitivity to go beyond the IMF peak, as well as a large field of view in the infrared. Deep and wide IR imaging is necessary to precisely estimate IMF parameters. Bootes I is the ideal candidate in terms of proximity and luminosity, and its ancient star-formation history ended before the onset of reionization. Our study will provide a benchmark for interpreting JWST observations of high-redshift galaxies caught in the act of forming stars, allowing a better characterization of the cosmic history of baryons.


**OBSERVING DESCRIPTION**

We request JWST/NIRCam imaging observations of the dwarf Milky Way satellite Bootes I.

The target will be observed in full frame with the 2 NIRCam modules A and B.

We will obtain simultaneous observations in the F150W (Short wavelength channel) and F332W2 (Long Wavelength channel) passbands.
Bootes I is close to the Milky Way (66 kpc) and subtends a large area on the sky. We thus request a mosaic of 2x3=6 pointings.
To reach our required SNR, we will execute 20 dithers for each mosaic tile.
Each exposure consists in 9 groups, with the MEDIUM8 readout pattern.

We do not request any coordinated parallel observations.

**Fixed Targets**

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---|---|---|---|---|
| (1) | BOOI | RA: 14 00 4.0000 (210.0166667d)<br>Dec: +14 30 47.00 (14.51306d)<br>Equinox: J2000 | | |

*Comments:*
*Category=Galaxy*
*Description=[Dwarf spheroidal galaxies]*

## Observation

**Proposal 3849, Observation 1**

Fri May 10 22:00:42 GMT 2024

**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.

## Fixed Targets

| # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
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*Comments:*
*Category=Galaxy*
*Description=[Dwarf spheroidal galaxies]*

## Template

| Module | Subarray | Target Placement |
|---|---|---|
| ALL | FULL | Module Gap |

## Mosaic

| Rows | Columns | Row Overlap % | Column Overlap % | Row shift (deg) | Column shift (deg) | Tile Order |
|---|---|---|---|---|---|---|
| 3 | 2 | 0.0 | 0.0 | 0.0 | 0.0 | DEFAULT |

## Dithers

| # | Primary Dither Type | Primary Dithers | Subpixel Dither Type | Dither Size | Subpixel Positions |
|---|---|---|---|---|---|
| 1 | NONE | | STANDARD | | 20 |

## Spectral Elements

| # | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F150W | F322W2 | MEDIUM8 | 9 | 1 | 20 | 20 | 18896.715 | |

| Special Requirements | Group Visits within 53.0 Days<br>Visits Same PA |
|---|---|