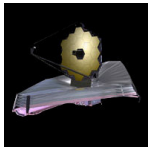

3577 - Complete NIRCam Grism Redshift Survey (CONGRESS)

Cycle: 2, Proposal Category: GO

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
goods-n-F356W				
	2	GOODS-N	NIRCam Wide Field Slitless Spectroscopy	(2) GOODS-N-CENTER

ABSTRACT

A series of early JWST observations have clearly shown that galaxies with strong rest-frame optical emission lines are highly abundant at high redshift. This is in great contrast to the rapid decrease in number of galaxies with bright rest-frame UV continua toward the epoch of reionization. This makes the NIRCam/Grism Wide Field Slitless Spectroscopy (WFSS) mode highly efficient and effective in sampling galaxies at high redshift. Here, we propose to conduct a NIRCam WFSS survey over the GOODS-N fields using the F356W filter (line flux limit: ~ 2e-18 erg cm-2 s-1;

survey area: ~60 arcmin^2 in total). We will specifically target the areas that have been observed in the same observing mode using the F444W filter (GO-1895 FRESCO). The combination of the F356W and F444W filters covering 3-5 microns (R~1600) will produce a massive legacy sample of line-emitting galaxies over a wide redshift range with simple selection functions and rich ancillary data (~2500 galaxies from z=1 to 9; ~300 H-alpha emitters at z=3.8-5.0; ~300 [OIII] 5007 emitters at z=5.3-7.0). Such a data set will allow a variety of science programs probing the physical properties of galaxies (e.g., production and escape of ionizing photons, gas excitation and metallicity, line-luminosity functions, morphology and kinematics of ionized ISM, and clusters/proto-clusters/HII bubbles).

OBSERVING DESCRIPTION

2024-01-05 Changes (FS & EE):

1. Narrowed down the allowed PA range from 220-230 deg to 225-229 deg. This will ensure that our PA will be a few degrees off from that of FRESCO (#1895; 230 deg) so that the resultant overlap pattern of spectra in the obtained NIRCam WFSS data will be different. The effect on the visibility window is minimal: it will change from Feb 10-26, 2024 to Feb 11-24, 2024, changing the end date of the current plan window (Feb 16-25) by only 1 day (from Feb 25 to Feb 24).

2. Changed the following mosaic spacing parameters to achieve a better spatial overlap with the FRESCO (#1895) data with the modified PA range: Row Overlap: 20% -> 4%; Column Overlap: 75% -> 77%

3. Changed two of the SW imaging filters from F150W/F200W to F115W to optimize the dropout selection for galaxies at z~8-9, i.e., the highest-redshift range explored by this program. F090W has been kept as it is.

4. Changed the readout pattern of the grism exposures from 5-group MEDIUM2 to 9-group SHALLOW4 to improve the 1/f noise removal and cosmic-ray rejection. This will also bring up the charged time (26.5 -> 27.2 hours) closer to the allocated one (27.6 hours).

5. Removed the description on GOODS-S & MIRI in the proposal abstract because those components were dropped from the program upon its acceptance.

The total charged time is 27.2 hours with the smart accounting.

----------Original Observing Description----------

We will use the NIRCam WFSS mode with the F356W filter to observe the GOODS-N/S fields at 3.1-4.0 um over a total sky area of 120 arcmin^2. Together with the FRESCO coverage in the F444W band, the proposed program will achieve a continuous wavelength coverage from 3.1 to 5.0 um. We will use both modules of the NIRCam to maximize the survey area. Grism R will be used as required by our mosaic design.

Based on our analysis of the FRESCO NIRCam F444W WFSS data, we have measured a median (i.e., 50th percentile) 5-sigma line-flux sensitivity of 2e-18 erg cm-2 s-1 around 4.2 micron. Our goal is to achieve a similar depth with the F356W filter, producing a NIRCam WFSS data set with a nearly uniform line-flux sensitivity over the combined wavelength range of 3.1-5.0 um.

We will integrate for 450.9 s per image, using the medium2 readout mode with 5 groups (good cosmic-ray removal requires 5 groups). The same readout mode has been used by FRESCO which yielded successful cosmic-ray rejections. At each dither position, we will obtain two grism images with simultaneous SW imaging with the F090W and F150W filters. We will use the 4-point intramodulebox primary-dither pattern to fill the gaps between the four SW detectors while maximizing the area of full depth with the LW Grism data. The total NIRCam/Grism integration time is therefore 1 hr per visit. We have computed the map of grism exposures, and the >50% of the survey area will be integrated for 2 hrs at least. We expect a 50-th percentile detection limit of emission line (5, point source) of 1.8 × 1018 erg cm-2 s1 around 3.6 m.

The mosaic designs of our NIRCam WFSS observations coincidentally lead to a continuous MIRI parallel coverage of 20 arcmin2 per GOODS field. Taking advantage of this, we will obtain MIRI imaging observations with the F770W and F1800W band, providing a valuable dataset for the studies of AGNs and DSFGs around z~2 in the GOODS fields where deep X-ray to radio observations are available. F770W observations will be obtained in parallel to the first half of the grism exposure, and F1800W observations will be obtained in the second half and direct/out-of-field imaging.

The total observing time is 27.4hrs for each of the GOODS fields (15 hrs on-sky). The total charged time is 54.8 hrs, similar to that of FRESCO (53 hrs).

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	GOODS-N-CENTER	RA: 12 36 45.9803 (189.1915846d) Dec: +62 14 49.32 (62.24703d) Equinox: J2000		

Comments:
Category=Unidentified
Description=[Blank field]

Observation

Proposal 3577, Observation 2: GOODS-N Tue Jan 09 19:01:07 GMT 2024

Diagnostic Status: Warning

Observing Template: NIRCam Wide Field Slitless Spectroscopy

Diagnostics

(GOODS-N (Obs 2)) Warning (Form): Use of only one of GRISMR or GRISMC may result in spectral overlap from multiple sources that can't be corrected. Users should address this issue in their proposal text.
(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:3) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:4) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:5) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:6) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:7) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:8) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:9) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:10) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:11) Warning (Form): Overheads are provisional until the Visit Planner has been run.
(Visit 2:12) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	GOODS-N-CENTER	RA: 12 36 45.9803 (189.1915846d) Dec: +62 14 49.32 (62.24703d) Equinox: J2000		

Comments:
Category=Unidentified
Description=[Blank field]

Template

Module	Subarray	Grism (Long Wavelength)
ALL	FULL	GRISMR

Mosaic

Rows	Columns	Row Overlap %	Column Overlap %	Row shift (deg)	Column shift (deg)	Tile Order
4	3	4.0	77.0	0.0	0.0	DEFAULT

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Positions
1	INTRAMODULEBOX	4	NONE

Direct Image

#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	Grism (Long Wavelength)	Exposure Type	Total Dithers
1	F115W	F356W	SHALLOW4	6	1	1	311.366		GRISMR	Direct Image	1

Spectral Elements

#	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID	Grism (Long Wavelength)	Exposure Type	Total Dithers
1	F090W	F356W	SHALLOW4	9	1	4	1889.672		GRISMR	Grism (Long Wavelength)	4
2	F115W	F356W	SHALLOW4	9	1	4	1889.672		GRISMR	Grism (Long Wavelength)	4
3	F115W	F356W	SHALLOW4	6	1	2	622.733			Out of Field	2

Special Requirements

Group Visits within 53.0 Days
Aperture PA Range 225 to 229 Degrees (V3 225.0 to 229.0)
Visits Same PA