



5293 - Galactic Winds in the Early Universe: observing outflows in emission and absorption in a typical $z \sim 6$ galaxy

Cycle: 3, Proposal Category: GO

INVESTIGATORS

| <i>Name</i> | <i>Institution</i> |
|--|---|
| Dr. Xinfeng Xu (PI) | Northwestern University |
| Dr. Alaina L. Henry (CoI) (CoPI) | Space Telescope Science Institute |
| Dr. Dan Coe (CoI) (ESA Member) | Space Telescope Science Institute - ESA - JWST |
| Dr. Brian Welch (CoI) | University of Maryland |
| Timothy M. Heckman (CoI) | The Johns Hopkins University |
| Prof. John Chisholm (CoI) | University of Texas at Austin |
| Dr. Matilde Mingozi (CoI) (ESA Member) | Space Telescope Science Institute - ESA - JWST |
| Dr. Bethan Lesley James (CoI) (ESA Member) | Space Telescope Science Institute - ESA - JWST |
| Dr. Danielle Berg (CoI) | University of Texas at Austin |
| Namrata Roy (CoI) | The Johns Hopkins University |
| Prof. Pascal Oesch (CoI) (ESA Member) | University of Geneva, Department of Astronomy |
| Dr. Lukas Jonathan Furtak (CoI) | Ben-Gurion University of the Negev |
| Prof. Christopher Conselice (CoI) (ESA Member) | University of Manchester |
| Dr. Jose M. Diego (CoI) (ESA Member) | Instituto de Fisica de Cantabria |
| Prof. Adi Zitrin (CoI) | Ben Gurion University of the Negev |
| Prof. Thomas J. Broadhurst (CoI) (ESA Member) | University of the Basque Country |
| Dr. Eros Vanzella (CoI) (ESA Member) | INAF - Osservatorio di Astrofisica e Scienza dello Spazio |
| Yolanda Jimenez-Teja (CoI) (ESA Member) | Instituto de Astrofisica de Andalucia (IAA) |
| Prof. Rogier A. Windhorst (CoI) | Arizona State University |
| Dr. Vasily Kokorev (CoI) | University of Texas at Austin |
| Dr. Wenlei Chen (CoI) | Oklahoma State University Main Campus |

JWST Proposal 5293 (Created: Thursday, December 12, 2024, 4:00:23PM Eastern Standard Time) - Overview

| <i>Name</i> | <i>Institution</i> |
|---|---|
| Dr. Abdurro'uf Abdurro'uf (CoI) | The Johns Hopkins University |
| Dr. Pratika Dayal (CoI) (ESA Member) | Kapteyn Astronomical Institute |
| Dr. Larry Bradley (CoI) | Space Telescope Science Institute |
| Dr. Erik Zackrisson (CoI) (ESA Member) | Uppsala Astronomical Observatory |
| Prof. Sune Toft (CoI) (ESA Member) | University of Copenhagen, Niels Bohr Institute |
| Dr. Megan Donahue (CoI) | Michigan State University |
| Prof. Massimo Ricotti (CoI) | University of Maryland |
| Dr. Yoshinobu Fudamoto (CoI) | Chiba University |
| Ms. Rachana Bhatawdekar (CoI) (ESA Member) | ESA-European Space Astronomy Centre |
| Dr. Jane R. Rigby (CoI) | NASA Goddard Space Flight Center |
| Dr. Seiji Fujimoto (CoI) (CSA Member) | University of Toronto |
| Prof. Allison L. Strom (CoI) (US Admin CoI) | Northwestern University |
| Dr. Angela Adamo (CoI) (ESA Member) | Stockholm University |
| Prof. Tucker Jones (CoI) | University of California - Davis |
| Prof. Daniel P. Stark (CoI) | University of Arizona |
| Dr. Keerthi Vasan G.C. (CoI) | Carnegie Institution for Science, Observatories |

OBSERVATIONS

| <i>Folder</i> | <i>Observation</i> | <i>Label</i> | <i>Observing Template</i> | <i>Science Target</i> |
|--------------------|--------------------|----------------------|---------------------------|-----------------------|
| Observation Folder | | | | |
| | 1 | NIRSPEC-IFU | NIRSpec IFU Spectroscopy | (1) MACS0308-ZD1 |
| | 2 | NIRSPEC-IFU-G140H-BK | NIRSpec IFU Spectroscopy | (1) MACS0308-ZD1 |
| | 5 | NIRCam Imaging | NIRCam Imaging | (1) MACS0308-ZD1 |

ABSTRACT

Galactic winds have long been identified to provide various feedback effects that impact the galaxy evolution. While galactic winds have been intensely studied in the low- z universe given abundant spectroscopic data, their properties at the highest redshifts ($z > \sim 6$) are largely unknown. This is because the predominant diagnostics of outflows - blueshifted UV absorption lines - are not feasible for high spectral resolution observations due to the faint UV continuum. One solution is to search for highly magnified galaxies, where strong gravitational lensing can uncover early galaxies that are bright enough for detailed UV+optical spectroscopic analyses. Toward this goal, we propose to observe the strongly lensed galaxy MACS0308-

zD1. Given an AB magnitude of 23.4, a confirmed spectroscopic redshift of 6.2 from ALMA, and a magnification of 20 times, MACS0308-zD1 serves as the brightest known lensed galaxy at $z > 6$. Additionally, the delensed UV luminosity of MACS0308-zD1 is around L_{star} , indicating that it is a typical galaxy for its redshift. We propose for NIRSpec/IFU spectra to map its rest-UV to -optical range and aim to get the most robust outflow analyses so far for any $z > 6$ galaxy. This includes spatially resolved measurements of outflow kinematics, column and number density, sizes, and outflow rates. This will be aided with short NIRCам observations to characterize the stellar populations that power the outflows. This investigation will serve as an essential pathfinder for future JWST followup of strongly lensed high- z galaxies discovered by Euclid and the Roman Space Telescope.

OBSERVING DESCRIPTION

This proposal includes:

NIRSpec IFU high-resolution mode for one galaxy

NIRCам imaging for the same galaxy

Proposal 5293 - Targets - Galactic Winds in the Early Universe: observing outflows in emission and absorption in a typical z~6 galaxy

| Fixed Targets | # | Name | Target Coordinates | Targ. Coord. Corrections | Miscellaneous |
|---------------|-----|--------------|---|--------------------------|---------------|
| | (1) | MACS0308-ZD1 | RA: 03 08 53.4300 (47.2226250d) Dec: +26 44 58.80 (26.74967d) Equinox: J2000 <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=Galaxy Description=[High-redshift galaxies] Extended=YES | Epoch of Position: 2000 | |

Proposal 5293 - Observation 1 - Galactic Winds in the Early Universe: observing outflows in emission and absorption in a typical z~6 g...

Thu Dec 12 21:00:24 GMT 2024

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|-----------------------------|---|-----------------------|--|-------------------|--------------------------|---------------------------------|-------------------------|----------------|----------------------|---------------------------|----------------------------|-------------------------|
| Observation | <p>Proposal 5293, Observation 1: NIRSPEC-IFU</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSPEC IFU Spectroscopy</p> | | | | | | | | | | | |
| Diagnostics | (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) | MACS0308-ZD1 | RA: 03 08 53.4300 (47.2226250d) Dec: +26 44 58.80 (26.74967d) Equinox: J2000 | | | Epoch of Position: 2000 | | | | | | |
| | <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Category=Galaxy</i></p> <p><i>Description=[High-redshift galaxies]</i></p> <p><i>Extended=YES</i></p> | | | | | | | | | | | |
| Template | TA Method | | | | | | HFF Readout Mode | | | | | |
| | NONE | | | | | | false | | | | | |
| Dithers | # | Dither Type | | Size | Starting Point | | Number of Points | | Points | | | |
| | 1 | CYCLING | | SMALL | 1 | | 6 | | | | | |
| Spectral Elements | # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Ex p | Leakcal | Dither | Autocal | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | G395H/F290LP | NRSIRS2 | 15 | 1 | false | true | NONE | 6 | 6 | 6652.534 | |
| | 2 | G235H/F170LP | NRSIRS2 | 15 | 1 | false | true | NONE | 6 | 6 | 6652.534 | |
| | 3 | G140H/F100LP | NRSIRS2 | 15 | 1 | false | true | NONE | 6 | 6 | 6652.534 | |
| Special Requirements | Group Observations 1, 2, Non-interruptible | | | | | | | | | | | |

Proposal 5293 - Observation 2 - Galactic Winds in the Early Universe: observing outflows in emission and absorption in a typical z~6 g...

Thu Dec 12 21:00:24 GMT 2024

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|-----------------------------|---|-----------------------|--|-------------------|-------------------------|---------------------------------|-------------------------|-------------------------|----------------------|---------------------------|----------------------------|-------------------------|
| Observation | <p>Proposal 5293, Observation 2: NIRSPEC-IFU-G140H-BK</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRSPEC IFU Spectroscopy</p> | | | | | | | | | | | |
| Diagnostics | (Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. | | | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | | | Targ. Coord. Corrections | | | Miscellaneous | | | |
| | (1) | MACS0308-ZD1 | RA: 03 08 53.4300 (47.2226250d) Dec: +26 44 58.80 (26.74967d) Equinox: J2000 | | | Epoch of Position: 2000 | | | | | | |
| | <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Category=Galaxy</i></p> <p><i>Description=[High-redshift galaxies]</i></p> <p><i>Extended=YES</i></p> | | | | | | | | | | | |
| Template | TA Method | | | | | | HFF Readout Mode | | | | | |
| | NONE | | | | | | false | | | | | |
| Dithers | # | Dither Type | | Size | | Starting Point | | Number of Points | | Points | | |
| | 1 | NONE | | | | | | | | | | |
| Spectral Elements | # | Grating/Filter | Readout Pattern | Groups/Int | Integrations/Exp | Leakcal | Dither | Autocal | Total Dithers | Total Integrations | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | G140H/F100LP | NRSIRS2 | 15 | 1 | false | false | NONE | 1 | 1 | 1108.756 | |
| Special Requirements | <p>Offset 50.0 arcsec, -50.0 arcsec</p> <p>Group Observations 1, 2, Non-interruptible</p> | | | | | | | | | | | |

Proposal 5293 - Observation 5 - Galactic Winds in the Early Universe: observing outflows in emission and absorption in a typical z~6 g...

Thu Dec 12 21:00:24 GMT 2024

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|-----------------------------|---|----------------------------|--|------------------------|---------------------------------|-------------------------|---------------------------|---------------------------|----------------------------|-------------------------|
| Observation | <p>Proposal 5293, Observation 5: NIRCam Imaging</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRCam Imaging</p> | | | | | | | | | |
| Diagnostics | (Visit 5:1) Warning (Form): Overheads are provisional until the Visit Planner has been run. | | | | | | | | | |
| Fixed Targets | # | Name | Target Coordinates | | Targ. Coord. Corrections | | | Miscellaneous | | |
| | (1) | MACS0308-ZD1 | RA: 03 08 53.4300 (47.2226250d) Dec: +26 44 58.80 (26.74967d) Equinox: J2000 | | Epoch of Position: 2000 | | | | | |
| | <p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Category=Galaxy</i></p> <p><i>Description=[High-redshift galaxies]</i></p> <p><i>Extended=YES</i></p> | | | | | | | | | |
| Template | Module | | Subarray | | | Target Placement | | | | |
| | ALL | | FULL | | | Module Gap | | | | |
| Dithers | # | Primary Dither Type | | Primary Dithers | Subpixel Dither Type | | Dither Size | Subpixel Positions | | |
| | 1 | INTRAMODULEX | | 3 | STANDARD | | | 1 | | |
| Spectral Elements | # | Short Filter | Long Filter | Readout Pattern | Groups/Int | Integrations/Exp | Total Integrations | Total Dithers | Total Exposure Time | ETC Wkbk.Calc ID |
| | 1 | F115W | F410M | SHALLOW4 | 7 | 1 | 3 | 3 | 1095.151 | |
| | 2 | F150W | F300M | SHALLOW4 | 7 | 1 | 3 | 3 | 1095.151 | |
| | 3 | F200W | F250M | SHALLOW4 | 10 | 1 | 3 | 3 | 1578.305 | |
| Special Requirements | Offset -120.0 arcsec, -45.0 arcsec | | | | | | | | | |