



6451 - The Onset of Environmental Quenching: Star Formation and Quenching Fractions in a Massive Galaxy Cluster at $z=1.75$

Cycle: 3, Proposal Category: GO

INVESTIGATORS

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Prof. Mark Brodwin (CoI)	University of Missouri - Kansas City
Dr. Peter Eisenhardt (CoI)	Jet Propulsion Laboratory
Ariane Trudeau (CoI)	University of Florida
Dr. Spencer Adam Stanford (CoI)	University of California - Davis

OBSERVATIONS

<i>Folder</i>	<i>Observation</i>	<i>Label</i>	<i>Observing Template</i>	<i>Science Target</i>
IDCSJ1426.5				
	6	NIRISS Slitless	NIRISS Wide Field Slitless Spectroscopy	(1) IDCSJ1426.5+3508
	7	NIRISS F440W	NIRISS Imaging	(1) IDCSJ1426.5+3508

ABSTRACT

We propose a program targeting the dense environments associated with the galaxy cluster IDCS J1426.5+3508 ($z=1.75$). This program will quantify the quenching timescales of cluster galaxies as functions of stellar mass and cluster-centric radius. Quenching is normally parameterized as an exponential decline in star formation with a quenching time-scale, which can be used to discriminate between various physical mechanisms that operate on different timescales. Observing a cluster near the transition epoch when cluster cores are in the process of transitioning from sites of active star formation and galaxy assembly to regions devoid of significant star formation activity enables robust constraint of the quenching timescale, as well as the ability to identify mergers and AGN that may be associated with tidal processes. With NIRISS we will be able measure star formation rates down to 5 Msun/yr using H-alpha for all cluster galaxies. In combination with existing HST data we will also be able to determine stellar

masses and morphologies for all cluster galaxies, and photometric redshifts for passive cluster members lacking H-alpha detections.

OBSERVING DESCRIPTION

We will target the massive galaxy cluster IDCS J1426.5+3508 ($z = 1.75$) using the combination of NIRISS spectroscopy and imaging. This cluster has extensive space-based and ground-based ancillary data sets.

For the NIRISS spectroscopy we will be using both the GR150C and GR150R grisms with the F200W blocking filter. The use of both grisms is important for disentangling spectra in the dense cluster environment. We select a MEDIUM dither pattern with 4 dither positions, and 6 groups per integration for the spectroscopy. The associated F200W direct imaging will be obtained with six groups per integration and the GRISM=BOTH option which results in a total exposure of 1072 s.

For the NIRISS F444W imaging we will use a medium dither pattern, four dithers, and 6 groups per integration for a total on-source exposure time of 1073 s.

Proposal 6451 - Targets - The Onset of Environmental Quenching: Star Formation and Quenching Fractions in a Massive Galaxy Clus...

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
	(1)	IDCSJ1426.5+3508	RA: 14 26 32.9500 (216.6372917d) Dec: +35 08 23.52 (35.13987d) Equinox: J2000		
<i>Comments:</i> Category=Clusters of Galaxies Description=[High-redshift clusters, Rich clusters] Extended=YES					

Proposal 6451 - Observation 6 - The Onset of Environmental Quenching: Star Formation and Quenching Fractions in a Massive Galax...

Thu May 23 22:00:09 GMT 2024

Observation	<p>Proposal 6451, Observation 6: NIRISS Slitless</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRISS Wide Field Slitless Spectroscopy</p>																																																										
Diagnostics	<p>(Visit 6:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 6:2) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 6:3) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p> <p>(Visit 6:4) Warning (Form): Overheads are provisional until the Visit Planner has been run.</p>																																																										
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Proposal 6451 - Observation 6 - The Onset of Environmental Quenching: Star Formation and Quenching Fractions in a Massive Galax...

Special Requirements

Group Visits within 53.0 Days
Aperture PA Range 30.56126717 to 37.56126717 Degrees (V3 30.0 to 37.0)
Aperture PA Range 47.56126717 to 55.56126717 Degrees (V3 47.0 to 55.0)
Aperture PA Range 60.56126717 to 65.56126717 Degrees (V3 60.0 to 65.0)
Aperture PA Range 102.56126717 to 118.56126717 Degrees (V3 102.0 to 118.0)
Aperture PA Range 138.56126717 to 156.56126717 Degrees (V3 138.0 to 156.0)
Aperture PA Range 188.56126717 to 240.56126717 Degrees (V3 188.0 to 240.0)
Aperture PA Range 294.56126717 to 329.56126717 Degrees (V3 294.0 to 329.0)
Aperture PA Range 348.56126717 to 0.46126717 Degrees (V3 348.0 to 359.9)
Visits Same PA

Proposal 6451 - Observation 7 - The Onset of Environmental Quenching: Star Formation and Quenching Fractions in a Massive Galax...

Thu May 23 22:00:09 GMT 2024

Observation	<p>Proposal 6451, Observation 7: NIRISS F440W</p> <p>Diagnostic Status: Warning</p> <p>Observing Template: NIRISS Imaging</p>									
Diagnostics	(Visit 7:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.									
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Dithers	#	Image Dithers				Pattern Size				
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Spectral Elements	#	Filter	Grism	Readout Pattern	Groups/Int	Integrations/Exp	Total Dithers	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
	1	F444W		NISRAPID	24	1	4	4	1073.677	
Special Requirements	<p>Aperture PA Range 30.56126717 to 37.56126717 Degrees (V3 30.0 to 37.0) Aperture PA Range 47.56126717 to 55.56126717 Degrees (V3 47.0 to 55.0) Aperture PA Range 60.56126717 to 65.56126717 Degrees (V3 60.0 to 65.0) Aperture PA Range 102.56126717 to 118.56126717 Degrees (V3 102.0 to 118.0) Aperture PA Range 138.56126717 to 156.56126717 Degrees (V3 138.0 to 156.0) Aperture PA Range 188.56126717 to 240.56126717 Degrees (V3 188.0 to 240.0) Aperture PA Range 294.56126717 to 329.56126717 Degrees (V3 294.0 to 329.0) Aperture PA Range 348.56126717 to 0.46126717 Degrees (V3 348.0 to 359.9)</p>									