

Through the looking GLASS: a JWST exploration of galaxy formation and evolution from cosmic dawn to present day

Scientific Category: Galaxies and the IGM

Scientific Keywords: Chemical Abundances, Emission-Line Galaxies, Galaxy Formation and Evolution, Star-Formation Histories

Alternate Category: Cosmology

Instruments: NIRSPEC, NIRISS, NIRCAM

Proprietary Period: 0 months

Allocation Information (in hours): Prime

Parallel

Science Time: 24.3

22.1

Charged Time: 32.4

Abstract

We propose a carefully designed set of observations of the lensing cluster Abell 2744 to study intrinsically faint magnified galaxies from the epoch of reionization to redshift of 1, demonstrating and characterizing complementary spectroscopic modes with NIRSPEC and NIRISS. The observations are designed to address the questions: 1) when did reionization happen and what were the sources of reionizing photons? 2) How do baryons cycle in and out of galaxies? This dataset with deep spectroscopy on the cluster and deep multiband NIRCAM imaging in parallel will enable a wealth of investigations and will thus be of interest to a broad section of the astronomical community.

The dataset will illustrate the power and challenges of: 1) combining rest frame UV and optical NIRSPEC spectroscopy for galaxies at the epoch of reionization, 2) obtaining spatially resolved emission line maps with NIRISS, 3) combining NIRISS and NIRSPEC spectroscopy. Building on our extensive experience with HST slitless spectroscopy and imaging in clusters of galaxies as part of the GLASS, WISP, SURFSUP, and ASTRODEEP projects, we will provide the following science-enabling products to the community: 1) quantitative comparison of spatially resolved (NIRISS) and spectrally resolved (NIRSPEC) spectroscopy, 2) Object based interactive exploration tools for multi-instrument datasets, 3) Interface for easy forced extraction of slitless spectra based on coordinates, 4) UV-optical spectroscopic templates of high redshift galaxies, 5) NIRCAM parallel catalogs and a list of 26 $z \geq 9$ dropouts for spectroscopic follow-up in Cycle-2.

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