

NICMOS Imaging of a $z > 4$ High-Redshift Ultraluminous Submillimeter Source

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Scientific Category: COSMOLOGY

Scientific Keywords: GALAXY FORMATION AND EVOLUTION, HIGH REDSHIFT GALAXIES,
HUBBLE DEEP FIELDS, IR-LUMINOUS GALAXIES, STARBURST GALAXIES

Instruments: NICMOS

Proprietary Period: 12

Orbit Request	Prime	Parallel
Cycle 16	16	0

Abstract

We propose 16 orbits of deep NICMOS 1.6 μm imaging of GOODS850-5, a unique $z > 4$ candidate SCUBA source that is bright in the submillimeter (submm) but extremely faint at all other wavelengths. GOODS850-5 is a 11 mJy 850 μm source discovered in our GOODS-N SCUBA survey. It does not have a radio counterpart and its accurate location was recently determined with the SMA interferometer. It is not detected by the GOODS-N HST ACS imaging and is just above the detection limit of the ultradeep Spitzer imaging at 3.6-24 μm . Its faint radio flux and its Spitzer color suggest a redshift of $z > 4$, and potentially even $z > 6$. It has an incredible star formation rate of ~ 1000 solar mass per year, and it can quickly grow into a $> 10^{11}$ solar mass massive galaxy. Radio faint submm sources like GOODS850-5 may be a new population of high-redshift massive galaxies that are not picked up by any of the previous optical, near-IR, and radio surveys, and therefore it is crucial to obtain the redshift of GOODS850-5. However, because of its extreme optical faintness, the only way to constrain its redshift is photometric redshift with the existing Spitzer photometry and the proposed NICMOS 1.6 μm photometry. NICMOS is the only instrument that can provide information about its redshift and morphology among all space-based and ground-based instruments at all wavelengths. The proposed observation will provide unique insight on galaxy evolution and mass assembly at high redshift.

Investigators:

	Investigator	Institution	Country
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CoI	Dr. Lennox L. Cowie	University of Hawaii	USA/HI
CoI	Dr. Amy J. Barger	University of Wisconsin - Madison	USA/WI

Number of investigators: 3

Target Summary:

Target	RA	Dec	Magnitude
GOODS850-5	12 36 33.4500	+62 14 8.60	predicted flux at 1.6um is 0.03 to 0.06 uJy

Observing Summary:

Target	Config Mode and Spectral Elements	Flags	Orbits
GOODS850-5	NIC3 Imaging F160W		16

Total prime orbits: 16