MAHALO-Subaru: [OII] emission survey in the CL0332-2742 cluster at z=1.61

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Abstract
We conduct a deep survey for star-forming galaxies in a cluster CL 0332-2742 at z=1.61. With a narrow-band filter (NB973; λ=9755 Å, Δλ=202 Å) and broad-band filter (z0) on Subaru/Suprime-Cam, we select 44 [OII] emitters down to a 3σ limiting flux of 2.5x10^-17 ergs/cm^2 in the cluster. Because the cluster resides in the GOODS-South region, deep multi-wavelength data are available. We then find that there are a lot of [OII] emitters in this cluster at z=1.61, suggesting that galaxies at z=1.61 still keep the active star formation even in high-density region. This fact supports the several recent results that clusters at z>1.5 have conducted the active star formation (Hayashi+10, Hilton+10, Tran+10).

The color-magnitude diagram shows that there is no red [OII] emitter. Such red emitters are seen in XMMXCS J2215.9-1738 clusters at slightly lower redshift of z=1.46 (Hayashi+10). Blue [OII] emitters in CL0332 cluster tend to be fainter by ~1.0 mag in K-band than those in XCS2215 cluster. In addition, HST/ACS z850 image shows that the morphology of many [OII] emitters seems to be irregular, and that [OII] emitters with a close galaxy have higher star formation rates than those of isolated [OII] emitters. This may suggest that the interaction induce the starburst in galaxies in high-density region.

Introduction

- Star forming activity of local galaxies is strongly dependent on environment.
- Local passive ellipticals prefer to be in higher density region. (e.g., Dressler+97)
- Investigation of star formation activity as a function of environment and cosmic time would provide us important clues to understanding the galaxy formation and evolution.

MAHALO-Subaru: MAparing HApha and Lines of Oxygen with Subaru
(PI: T. Kodama)

This project aims to map the star formation activity in clusters and fields at 0.4<z<2.5 by narrow-band imaging.

Target

- CL 0332-2742 cluster @ z=1.61

This cluster is found in GOODS-South region. (Kurk et al. 2009)

Observation and Data

- Observation
  - 2010.10.06-08
    - Subaru / Suprime-Cam

- Data

  Integration
  - 86min  56min  130min  320min
  - Mag. limit (σ)
  - 27.98  26.27  25.88  25.94

  * All magnitude, 1.4 aperture, 3σ

  - Public data (GOODS-South region)
    - catalog: GOODS-MUSIC catalog (Santini et al. 2009)
      - UV, BViz, JHK [3,6,4,5,5.8,8.0, 24]
      - spec-z (if any), photo-z
    - optical images: HST/ACS images (BViz)
    - near-infrared images: VLT/ISAAC images (JHK)

Selection of NB973 emitters

We find 44 (204) [OII] emitters in the GOODS-South region (Suprime-Cam FoV) around CL0332 cluster.

Distribution of [OII] emitters

There are a lot of [OII] emitters even in the high density region at z=1.61.

Other related presentations

- T. Kodama, "MAHALO-Subaru: Narrow-band mapping of star formation at the peak epoch of galaxy evolution"

- Y. Koyama, "MAHALO-Subaru: A panoramic H-alpha imaging survey for the Abell 851 cluster at z=0.41"

- K. Tadaki, "MAHALO-Subaru: [OII] emission survey in the CIGJ0218.3-0510 cluster at z=1.62"