MAHALO-Subaru:

[OII] emission survey in the CIGJ0218.3-0510 cluster at z=1.62

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Abstract

We present a narrow-band survey of [OII] emitters in the CIGJ0218-0510 cluster at z=1.62 with Suprime-Cam on Subaru telescope. The survey reached a 3σ limiting line flux of \(2.0 \times 10^{-17}\) erg s\(^{-1}\) cm\(^{-2}\) over a 900 arcmin\(^2\) area. From this survey, we identified 351 [OII] emitters and 267 red galaxies in “red sequence” on the color-magnitude diagram. From these two samples, we find that [OII] emitters are distributed even in cluster core (r < 1 arcmin), and that the fraction of [OII] emitters to red galaxies somewhat increases in high density region. This suggests that only some star-forming galaxies evolve into the passive phase at z=1.6, unlike low-z clusters. On the other hand, we also find that the mass of [OII] emitters in this cluster is slightly smaller than that of [OII] emitters in XCS2215 cluster at z=1.47 (Hayashi et al. 2010). It seems that this difference between two clusters at similar redshift is caused by the variety of galaxy clusters. Targeting even more distant clusters and general field, MAHALO-Subaru project will provide us to more comprehensive view of galaxy evolution in their most active phase of star formation and mass assembly.

Observation

- Date: 2010.10.6-8
- Instrument: Subaru / Suprime-Cam
- Filter: z_r (\(\lambda_{eff} = 9860\) Å, \(\Delta\lambda = 590\) Å)
- Integration: 327 min (~5.5h)
- Seeing: 0.5-0.7"
- Limiting magnitude: 25.4 (AB, 5σ, 2"
- Area: 900 arcmin\(^2\)

Data

- BVRiz
- z_r
- NB973
- J-HK
- X-ray

Target selection

- [OII] emitter selection
- red sequence galaxy selection

Distribution of [OII] emitters and red galaxies

[OII] emitters distributed in cluster center region. While some groups around cluster are seen in the left panel ([OII] emitter), there is no pronounced structure in the right panel (red sequence galaxy).

Color-magnitude diagram

The fraction of [OII] emitter increases in high density region.

Environmental dependence

- star formation rate
- stellar mass
- [OII] emitter fraction

The difference between [OII] emitters with same color implies that there is a variety of clusters in same epoch.