

# TRIDIMENSIONAL SPECTROSCOPY OF IONIZED GASES SURROUNDING THE LOW LUMINOSITY SEYFERT 2 NUCLEUS OF NGC2273

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## 1. Introduction

Seyfert galaxies often have extended emission line regions around their nucleus. We started an observation program of optical tridimensional spectroscopy for circumnuclear regions of nearby Seyfert galaxies to investigate the ionization source of the gas of just vicinity (typically several hundred pc) of nucleus.

NGC2273 is a nearby barred spiral galaxy with a Seyfert 2 AGN. Emission of  $H\alpha + [N II]\lambda\lambda 6548, 6583$  exhibit an extended distribution around nucleus while  $[O III]\lambda 5007$  show a point-like image at the nucleus (Mulchey, Wilson & Tsvetanov 1996).

## 2. Observation and Reduction

A spectroscopic observation of NGC2273 was carried out with the Kyoto 3D Spectrograph (Ohtani et al. 1994) attached to the 1.88m telescope of the Okayama Astrophysical Observatory. We employed the micro-lenses array

0.54:	*	*	1.03
0.80	*	*	0.76:
	0.79		

*Figure 1.* [N II] $\lambda$ 6583/H $\alpha$ -intensity-ratio map of a vicinity of the nucleus of NGC2273. Each box corresponds to 1".3 square region and the central 4 boxes(\*) are assumed as an unresolved nucleus.

mode whose principle is same as that of the TIGER spectrograph(Bacon et al. 1995). We obtained sixteen spectrum over a 5".2  $\times$  5".2(600pc) region surrounding the nucleus with a 1".3 spacial sampling under 1".7 FWHM seeing condition. Images were reproduced for H $\alpha$ , [N II] $\lambda$ 6583, continuum near H $\alpha$  and [O III] $\lambda$ 5007, and a velocity field of ionized gas was derived from H $\alpha$ .

### 3. Results and Discussion

The images of H $\alpha$ , [N II] $\lambda$ 6583 and a continuum near H $\alpha$  are found very similar to one another. For [O III] $\lambda$ 5007, we detected only a central unresolved source.

The heliocentric velocity at the point of H $\alpha$  peak intensity is 1818km/s. The velocity field is normal as a spiral galaxy. These results are consistent with the HI observation by van Driel and Buta(1991).

The central four pixels of the H $\alpha$  and [N II] $\lambda$ 6583 images are dominated by the unresolved Seyfert nucleus. We fitted them to Gaussian profiles and subtracted them from the corresponding overall images. From the results, the distribution of the intensity ratio of [N II] $\lambda$ 6583/H $\alpha$  for a vicinity of the nucleus is obtained(Fig.1). Most of the pixels have values more than 0.6. Considering together the fact that [O III] is not extended, the circum-nuclear region has a LINER like spectrum. The most probable explanation of this is that the nuclear ionizing radiation is the source of the ionization of these gases with low ionization parameters. Thus this object seems an intermediate object of Seyfert and LINER.

### References

- Ohtani, H., Sasaki, M., Aoki, K., Takano, E., & Kiyohara, M. (1994) *Instrumentation in Astronomy VIII*, 229
- Bacon, R., Adam, G., Baranne, A., Courtés G., Dubet, D., Dubois, J.P., Emsellem, E., Ferruit, P., Georgelin, Y., Monnet, G., Pécontal, E., Rousset, A., & Sayède, F. (1995) *A&AS* **112**, 1
- Mulchaey, J.S., Wilson, A.S., & Tsvetanov, Z. (1996) *ApJS*, **102**, 309
- van Driel, W., & Buta, R.J. (1991) *A&A*, **245**, 7