

AN INTERESTING PAIR OF ACTIVE GALAXIES

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ABSTRACT. A pair of emission-line galaxies with separation 7.1 arcseconds was found from the survey of the UK Schmidt objective-prizm plates. The spectroscopic observations by the 1.88m reflector of the Okayama Observatory show the same emission-line features with $Z=0.0441$.

1. INTRODUCTION

Using objective-prizm plates taken with the UK 1.2m Schmidt telescope on the Siding Spring Mountain in Australia, a systematic survey for emission-line objects has been made in a 25 square degree field centred on 10^h40^m and $5^\circ00'$. The survey work was carried out in the Royal Observatory, Edinburgh and the Peking Observatory, and checked in the Kiso Observatory. A pair of emission-line galaxy candidates numbered as No.34 and No.35 was found in this survey with positions as following,

No.34 $10^h30^m51^s.61$ $7^\circ23'38''.1$
No.35 $10^h30^m51^s.64$ $7^\circ23'31''.1$ (1950.0)

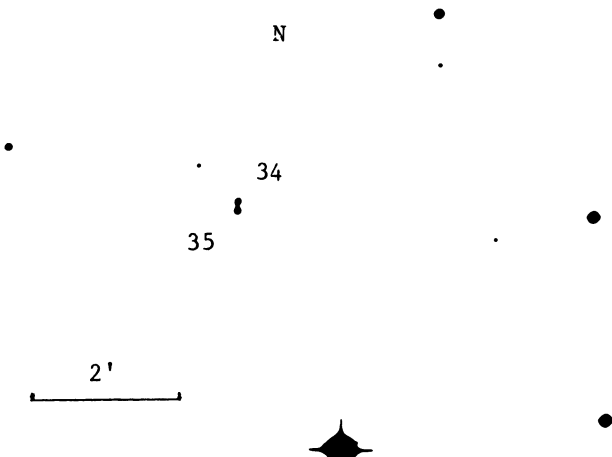


Figure 1. Finding chart of the two galaxies No.34 and No.35

2. SPECTROSCOPIC OBSERVATION

Both galaxies were observed on April 13, 16 of 1985 and April 12 of 1986 using a Cassegrain spectrograph with an image intensifier attached to the Okayama 1.88m reflector. The exposure time were 111 min, 60 min and 120 min respectively with IIA-0 plates. The wavelength range is $\lambda\lambda$ 3500-7500 Å with dispersion 237 Å/mm at $H\beta$. Both objects show the same emission-line features.

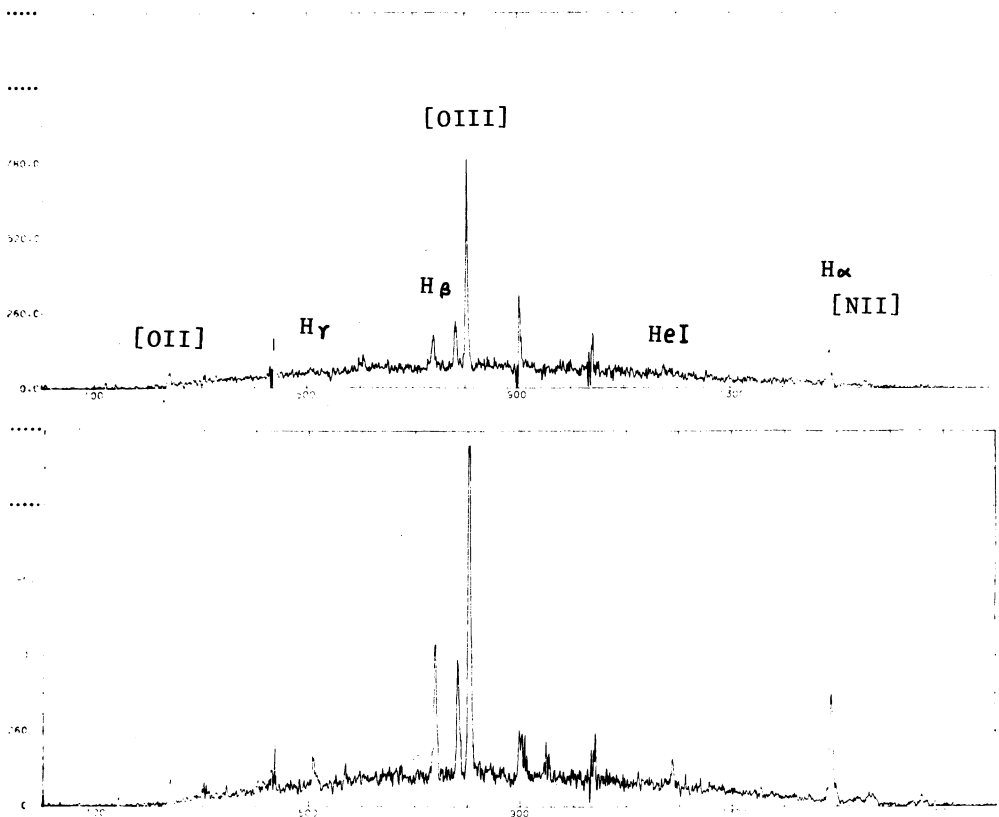


Figure 2. The tracing of the spectra for No.34 (above) and No.35 (down) without spectrophotometric correction taken on April 12 of 1986.

The emission lines and the relative strengths calibrated spectrophotometrically are listed in Table 1. There are emission line (1), observed wavelength (2), redshift Z (3), equivalent width (4), relative strength (5) and ratio with $H\beta$ (6) in the table. Each column has two figures, the left one represents galaxy No.34 and right one No.35. The figures with bracket are uncertain.

The spectral classification is mainly based on the ratios of the line intensities (Baldwin et al 1981). The line [NII] 6584 is unresolved which is as a weak red wing on $H\alpha$. The [NII]/ $H\alpha$ is only about 0.1 which likes HII region, also the absence of [NeV] and [OI] would argue against as a nonthermal power source. Both objects may be classified as

extragalactic HII regions except $[OIII] 5007/H\beta$ is smaller than typical HII regions (Veron and Veron 1985). This pair is quite similar with 1300+361 A,B (Halpern et al 1984). In the Virgo cluster region we have found ten similar compact, metal-poor, extragalactic HII regions (He and Impey 1986). We will refer to members of this class as blue compact dwarf galaxies (BCG).

The redshifts of both galaxies are exactly same as $Z=0.0441+0.0002$.

TABLE I Emission-lines, relative strengths and Redshifts

| Emission line (1) | Wavelength of Obs. (2) | | Z (3) | | E.W. (4) | | I (5) | | I/I (6) | |
|----------------------|------------------------------|------|----------|-------|-------------|------|----------|-------|------------|------|
| | (34) | (35) | (34) | (35) | (34) | (35) | (34) | (35) | (34) | (35) |
| [OII] 3227 | 3891 | 3891 | 0.044 | 0.044 | (24) | (30) | (631) | (948) | 1.58 | 1.01 |
| H γ 4340 | 4529 | 4529 | 0.044 | 0.044 | 5 | 10 | 100 | 211 | 0.25 | 0.26 |
| H β 4861 | 5076 | 5076 | 0.044 | 0.044 | 21 | 39 | 399 | 858 | 1.00 | 1.00 |
| [OIII]4959 | 5178 | 5178 | 0.044 | 0.044 | 20 | 28 | 400 | 644 | 1.00 | 0.75 |
| [OIII]5007 | 5227 | 5227 | 0.044 | 0.044 | 83 | 126 | 1884 | 3276 | 4.72 | 3.83 |
| HeI 5876 | | 6136 | | 0.044 | | 14 | | 385 | | 0.45 |
| H α 6563 | 6853 | 6853 | 0.044 | 0.044 | 111 | 192 | 2830 | 7200 | 7.10 | 8.39 |
| [NII] 6584 | 6867 | 6872 | 0.043 | 0.044 | 13 | 16 | 331 | 600 | 0.82 | 0.70 |
| [SII] 6717 | 7014 | 7018 | 0.044 | 0.045 | (7) | (16) | (191) | (611) | 0.48 | 0.71 |

3. Photometric Observation

The photometric calibration was made using the plates taken with the Kiso 105cm Schmidt telescope. The magnitudes in B-band are $16.89+0.43$ (No.34) and $16.09+0.43$ (No.35). The absolute magnitudes ($H=50, q_0=1$) are $-20.23+0.43$ and $-21.03+0.43$

The brightness does not show variable to compare the photographic plates of April 2 1986 with March 28 1984.

The separation between the two galaxies is only 7.1 arcseconds and about 3.0×10^4 ly due to the distance of 8.7×10^8 ly

4. Summary

A pair of blue compact dwarf galaxies
 $Z=0.0441+0.0002$ and separation = $7''.1$
 $m_b=16.89+0.43$ (No.34) $M_b=-20.23+0.43$ (No.34)
 $16.09+0.43$ (No.35) $-21.03+0.43$ (No.35)

References

Baldwin, J., Phillips, M. and Terlevich, R. 1981, P.A.S.P., **93**, 5.
 Halpern, J., Marshall, H. and Oke, J. 1984, A.J., **89**, 1802.
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 Veron, M.-P. and Veron, P. 1985, ESO Scientific Report No.4.

DISCUSSION

VERON: Can you say anything about the $[NII]/H\alpha$ ratio which would tell if these objects are extragalactic HII regions or Seyfert 2?

HE: Yes, according to the ratios of line intensities both objects may be classified as extragalactic HII regions.