exposures (30 sec and 2 min, R filter) of the source near minimum brightness (V = 13.8) on August 12, 1989. No evidence of nebulosity around PKS 2155-30, down to a surface brightness of $m_R \approx 23$ mag/sq. arcsec is present, but in both images, a relatively faint ($m_R \approx 19$) object, about 4.5 arcsec east of the nucleus, is clearly seen (Fig. 1). This object is marginally resolved with some elongation in the east-west direction.

Thus the redshift reported by Bowyer et al. (1984), according to the quoted slit position, is more likely attributable to the angularly close object, now seen in our CCD frames, rather then to the BLL itself. Spectroscopy of the newly discovered object around PKS 2155-30 is being obtained.

References

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Possible Transition Objects Discovered with the NTT

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The 3.5-m NTT with EFOSC2 has been used to make images of about 280 planetary nebulae (PN) in two narrow passbands centred on Hα and [O III] 5007. These data will be published in the near future in the form of a pictorial atlas. Since both [O III] and Hα images were taken, a map of the high excitation gas can be made by dividing the frames; an example has been presented by (1).

Previously unknown faint haloes around PN have also been found during our survey. These haloes are important for the "missing mass" problem in PN: the mass of an average AGB (Asymptotic Giant Branch) star is greater than the combined masses of the central star (white dwarf) and nebula of typical PN. Haloes can contain up to ten times more mass than the bright central nebula (2).

There are many other interesting problems which can be addressed using these images, especially when combined with other data. Here I will discuss one application: the study of transition objects or proto-PN. Transition objects or TOBs are those rare objects that are in the rapid evolutionary phase between upper AGB and PN. They have started to produce a fast, tenuous wind which interacts with the old, slow and dense wind to form shocked ansae and bubbles. The importance that the study of these TOBs has, lies in the possible impact on our ideas about PN formation and, more generally, on the poorly understood final evolutionary stages of all intermediate mass stars. Observationally, these objects are characterized by a bipolar shape, usually with ansae formed by shocked gas, a strong far IR, and a smaller optical or near IR excess and emission lines at very high velocities.

Several such objects have been found using the NTT/EFOSC2 combination, mainly due to the superb seeing at this telescope. Figure 1 shows an Hα image of He2-1312, a PN which was previously classified as stellar. The seeing was

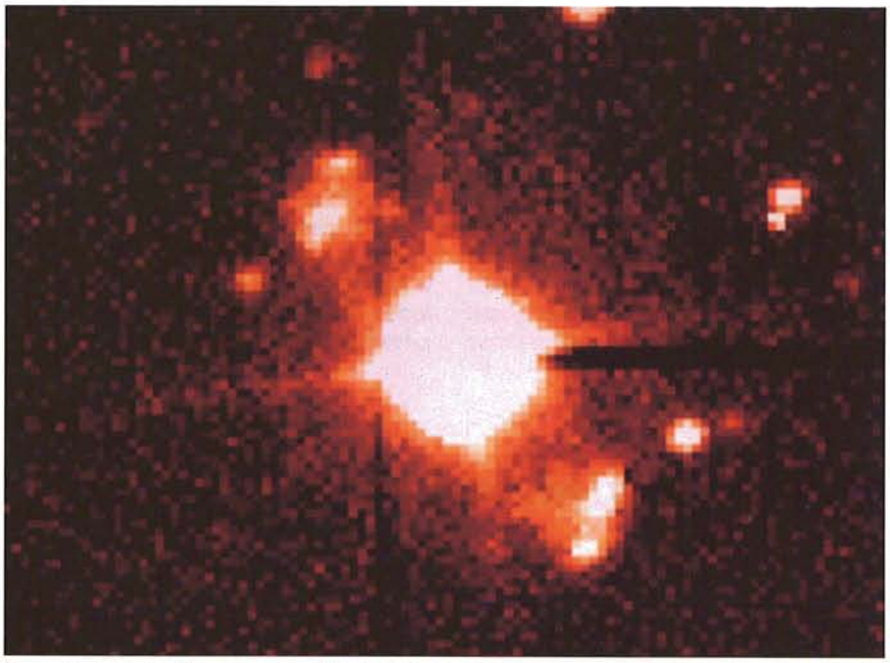

Figure 1: *A 2-min Hα exposure of He2-1312. Seeing is about 0.75 arcsec FWHM. This object was previously classified as a point source.*

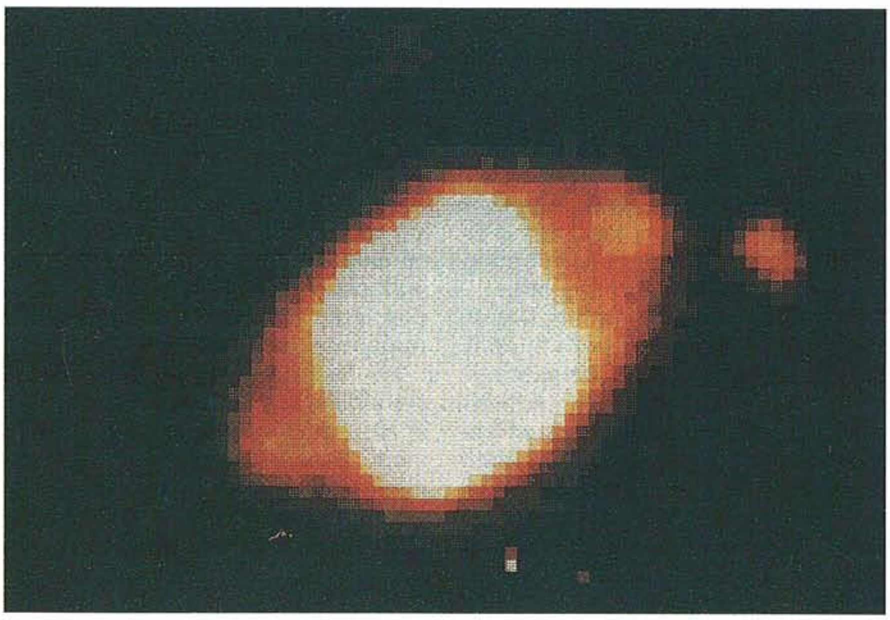

Figure 2: *A 10-min Hα exposure of 19+5°1. Seeing is 0.8 arcsec FWHM. Note the faint, high excitation blobs.*

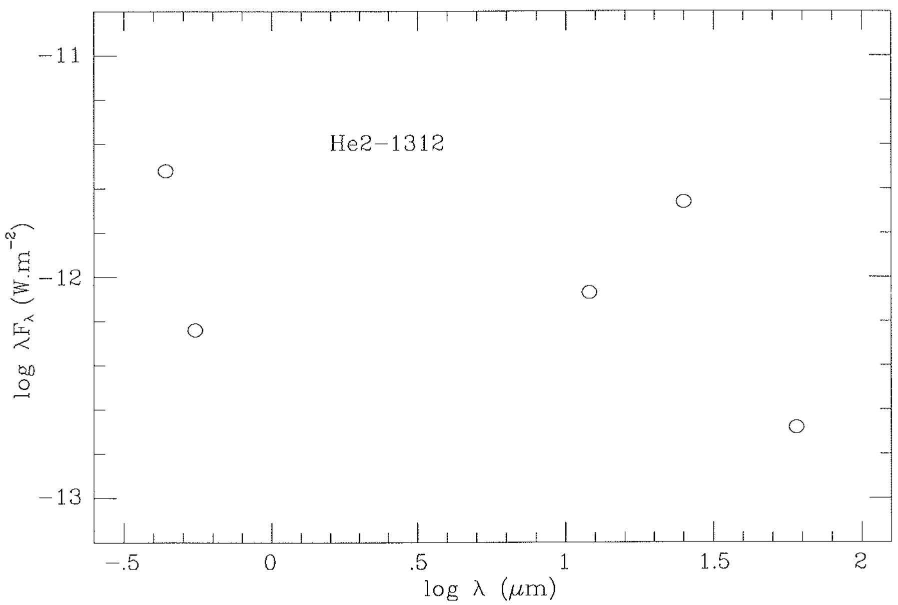

Figure 3: *The energy distribution of He2-1312. Note the strong far IR excess.*

about 0″.75 FWHM. Figure 2 is a recently discovered PN (19+5°.1) which was described as having a FWHM of 3″.5 with 2″.2 field stars (3)! In the NTT image, with a seeing of 0″.8, the object shows intricate structure consisting of two ansae connected by faint emission to a cross shaped central structure. The overall size is about 10″.

Spectroscopy of both sources, again using the NTT/EFOSC2, indicates a complicated velocity structure with velocity differences of up to 560 km s^{-1}. Emission lines typical of PN are present, with strong [O III], Hβ, [N II] lines and Hα. In He2-1312, [O III] is absent in the outer ansae.

The sources are both in the IRAS PSC and the partial energy distribution of He2-1312 is shown in Figure 3, and is typical of this kind of object.

More data are clearly needed, kinematic mapping, near IR photometry, optical photometry and CO measurements are all useful to characterize these sources. On the basis of the evidence collected so far, I will stick my neck out and say that 19+5°.1 and He2-1312 are transition objects.

Considering the preliminary state of the NTT/EFOSC2 at the time of observing (no instrument rotator, no active optics operative, no spectral calibration lamps), the high quality of the obtained data points to a very rosy future for what without a doubt now is the best telescope in the world.

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Narrow-Band Imaging of M87 with the NTT

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Already during the current installation phase (August 1989), ESO's New Technology Telescope (NTT) presents an opportunity for useful science due to its large aperture and good tracking (no autoguider yet) on a site of excellent seeing. The greatest limitation is the lack of a field rotator which severely limits the maximum exposure times possible without obtaining unacceptably trailed images. Over most of the observable sky, this maximum exposure time is less than 5 minutes if one is to avoid more than 1 arcsecond of trailing one arcminute from the field centre.

With these points in mind, in August 1989, EFOSC 2, equipped with an RCA CCD (0″.259 pixel^{-1}) was used to image the peculiar galaxy M87 (Virgo A, NGC 4486, and whose nuclear spectrum has similarities to a Seyfert galaxy's nucleus) through narrow-band filters centred at the galaxy's redshifted wavelengths of [O III] (5007 Å), [N I] (5200 Å), H_α (6563 Å), and [S II] (6716 + 6731 Å). Spectra of the core region of M87 taken earlier by the author with EFOSC 1 at the 3.6-m also showed the presence of strong [N II] (6584 Å) lines. Since the FWHM of the H_α filter was about 70 Å, centred at redshifted H_α, the light of [N II] was also passed, making it difficult to separate the relative contributions from these two lines (see note 1).

Figure 1 shows the average of two 5-minute exposures of M87 (lightly smoothed) in the light of H_α + [N II]. The background galaxy has been removed by the subtraction of a near continuum image taken at 6480 Å. Note that due to the late time of the year at which these observations were made, the altitude of M87 was never more than 25°. However, even at this extreme airmass, the seeing was still better than 1″!

The interesting feature in Figure 1 is the extensive fine filamentary structure of H_α + [N II], which, although concentrated towards the centre of M87, extends more than 1′ to the southeast of the nucleus terminating in a bright three knot structure. There is also a bright "jet-like" feature pointing in a NW direction from the core and inclined about 20° to the N of the well-known radio and optical jet.

The [O III] emission, shown in Figure 2, is also very interesting. This figure is the same as Figure 1 except that the [O III] emission is shown as an insert as observed relative to the H_α + [N II] features. The [O III] is extended symmetrically about the broadband photometric centre of M87 and very closely aligned with the H_α + [N II] feature and not the radio structure. This is very curious in view of recent work by Haniff, Wilson and Ward (1988) and also by Wilson and Baldwin (1989). Haniff et al. found that in a sample of 10 galaxies with "linear" radio sources, *all* showed alignment (within measurement errors) of the [O III] emission line region and the radio structures. Wilson and Baldwin's observations of another Seyfert galaxy, 0714-2914 showed the same effect, i.e. alignment of [O III] emission with the radio. Moreover, Whittle et al. showed in a sample of 11 Seyferts that several showed clear evidence for double-lobe

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Note 1: Meisenheimer and Hippelein (*Sterne und Weltraum,* May, 1989, p. 292) report that I ([N II])/I (H_α) ≃ 2.