

## DETECTION AND STUDY OF SECONDARY STRUCTURES IN SOME PLANETARY NEBULAE

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In order to detect faint nebulosities associated with planetary nebulae, long exposure plates are made on nine selected nebulae, using a large bandwidth ( $\Delta\lambda = 50 \text{ \AA}$ ) interference filter coupled with an ITT image tube. Some peculiar features are observed, but they do not all account for "secondary structures" following Louise's terminology. We discuss the difficulties encountered by the photographic method.

Spectrophotometric observations are made for one nebula, IC 418. Contour map of (NII)/H $\alpha$  ratio is derived. It is shown that this ratio increases towards the outer extended envelope of the nebula. These observations are made with the IDS system of the ESO in Chile. We obtained 65 spectra covering the outer parts of IC 418.

One of the typical features of secondary structures is the enhancement of (NII) line with respect to H $\alpha$ . In addition, filamentary structures appear sharper in (NII) than in H $\alpha$ . This is fairly illustrated by NGC 650-1.

## HIGH-SPATIAL RESOLUTION OBSERVATIONS OF PLANETARY NEBULAE

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Monochromatic images in H $\alpha$ , H $\beta$ , (NII)  $\lambda$  6584, (SII)  $\lambda$  6717 and (OIII)  $\lambda$  5007 lines are presented for morphological study of planetary nebulae. Narrow bandpass ( $\Delta\lambda = 5$  to  $10 \text{ \AA}$ ) interference filters are generally used in order to discriminate peculiar structures existing in different emission lines. However, large bandwidths ( $\Delta\lambda = 50 \text{ \AA}$ ) along with long exposures, are also necessary in searching for faint nebulosities associated with planetaries.

Three faint objects of the Abell's list of old planetary nebulae have been observed through narrow band filters, by means of an image tube (A33, A36 in Chile) or the image photon counting device (A79 at the Haute Provence Observatory). Following the  $H\alpha/(NII)$  intensity ratio, a discussion is given about the distance previously derived with some assumptions concerning the measured red fluxes.

#### KINEMATICS OF ABELL 30

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We have obtained seeing limited spectra of the (OIII)  $\lambda$  5007 Å line at a velocity resolution of  $18 \text{ km s}^{-1}$  over the envelope of Abell 30.

The compact system of ansae near to the central star has been studied in some detail, and individual ansae are shown to be moving, relative to the star, with a line of sight velocity of 22 to  $25 \text{ km s}^{-1}$ .

Two of the four ansae previously identified (Jacoby, 1979; Hazard et al., 1980) are shown to form a pair, expanding symmetrically with respect to the star with a radial velocity of  $\pm 25 \text{ km s}^{-1}$ . The brighter of the other two ansae has a radial velocity of  $+ 22 \text{ km s}^{-1}$ , and the symmetric disposition of these ansae about the star (Jacoby, 1979) is suggestive that these also form a symmetrically expanding pair.

The outer envelope is shown to be expanding at  $40 \text{ km s}^{-1}$  with an age of  $10^4$  to  $10^5$  years. The age of the ansae is  $\sim 1.5 \times 10^3$  years, consistent with them being ejected at a late epoch from an evolved star.