

THE PHOTOMETRIC AND SPECTRAL VARIABILITY OF THE PLANETARY NEBULA IC 4997

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ABSTRACT. Among the planetary nebulae showing noticeable long-time variations of brightness (see our foregoing contributed paper; *Astron. Circ. USSR*, No. 1430, 3, 1986, and earlier publications) the young stellar planetary IC 4997 is the most prominent. Our photoelectric observations revealed its rather surprising behaviour. During 1968-85 its total UVB-brightness was monotonously decreasing, especially in filter V: the reduction of the value Δv amounted $\sim 0^m5-0^m6$. The colour indices of the planetary showed that during the observation period the object as a whole, became definitely bluer. In 1985-86 our observations revealed an unexpected stop of mentioned brightness decrease, but in 1987 the object appeared to start brightening.

Beginning from 1972, we have systematically studied the spectrum of IC 4997, using the 50-cm Maksutov telescope with objective prism. These observations allowed to reveal noticeable changes both in certain nebular lines and in continuous spectrum of the central star. In particular there was found a systematical change of the line intensity relation:

$$R = \frac{F(\lambda 4363 [O III])}{F(H\gamma)},$$

indicating the excitation degree of the nebular spectrum. There were detected a noticeable increase of the absolute energy flux in the emission line $\lambda 4363 [O III]$, a marked growth of the relation:

$$\frac{F(\lambda 4363)}{F(\lambda 4959)} [O III],$$

and a rise of the relation:

$$\frac{F(\lambda 4363 [O III])}{F(\lambda 3727 [O II])}$$

which indicates a growth of the ionization degree in the nebula.

Besides, we observed an increase of the central star radiation flux in $\lambda_{ef} \approx 4220 \text{ \AA}$. Noteworthy, that during the whole observation period the intensity of hydrogen lines has almost not changed, but the intensity of helium line $\lambda 4471$ has somewhat increased.

The results of photoelectric and spectral observations permit to conclude that the revealed changes in brightness and spectrum of the nebula IC 4997 evidently reflect the changes in the central star radiation field, namely, the relative increase of ultraviolet radiation in its spectrum, which can indicate a growth of its effective temperature.