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STUDY OF SPECTRAL VARIABILITY OF THE PLANETARY NEBULA IC 4997 OVER 25 YEARS (1972–1996)

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The spectrum of the planetary nebula IC 4997 was observed photographically in Crimea in 1972–1996. The objective prism spectrograms were used for estimation of the flux in eleven bright emission lines of the nebula and in the continuum of the central star. Most spectral characteristics were found to change in time. The ratio R of the [O III] λ4363 and $H\gamma$ fluxes exhibited the greatest change over 1972–1996; this ratio reached a maximum ($\log R = +0.28$) in 1992. In the next years it began to decrease. Increases in the excitation and ionization degrees of the nebula were detected.

The change in the main physical parameters of the object was estimated. Over the period 1972 – 1992 the total electron density changed from $N_e \simeq (2\text{–}6) \times 10^5$ cm^{-3} to $N_e \simeq (1\text{–}3) \times 10^6$ cm^{-3}, and the total electron temperature rose from $T_e \simeq 12\,000$ K to $T_e \simeq 14\,000$ K. The set of spectroscopic data suggests that the effective temperature of the central star rose from $T_* \simeq 40\,000$ K to $T_* \geq 60\,000$ K, over the period 1972–1992.

The intensification of the nebula's spectral activity, which started in the late 1960's, appears to have stopped in the early 1990's, while in 1993–2000 the activity began to decrease.

Our photometric and spectral study of the nebula IC 4997 is in progress. The results of spectral study of IC 4997 are published in Kostyakova (1999).

Results of our photometric UBV study of variability in the planetary nebula NGC 6572, IC 4997, Hu 2-1, NGC 6891, IC 3568, NGC 6720, and NGC 6543, over 30 years are published by Kostyakova (1990, 1991, 1997) and Archipova et al. (1994).

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