

SEARCH FOR THE YOUNG PLANETARY NEBULAE. PRELIMINARY RESULTS

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Abstract. Some criteria based on the model calculations and observational data were used to choose preplanetaries and young planetary nebulae. Observational results for the object TH4-4 are presented. The spectral and photometric variations of TH4-4 are discussed.

1. Introduction

The spectral survey of starlike planetary nebulae have been carried out to distinguish the objects being at the early stage of evolution. The low central star temperatures and as a result of that the low-excitation spectra of nebulae have been used as the main criterion to select objects for the further detail study.

2. Observations

The spectral survey have been taken out with the slit spectograph and with image-tube on 0.7m reflector. The spectrograms have been obtained with dispersions $16 - 300 \text{ \AA/mm}$, resolution was equal to $1 - 20 \text{ \AA}$ in dependence of dispersion. The full wavelength range covered $3700 - 8200 \text{ \AA}$

3. Results

We present the spectral and photometric data for object TH4-4 from Catalogue of planetary nebulae. On the Palomar Survey Plates this object looks like the star $m_{pg} = 15.3$, $m_r = 13.0$. We have derived the very first spectrograms of TH4-4 in 1970. There were strong stellar continuum, some HeI, FeII, [FeII] emission lines and wide HI emissions in spectrum. $2\delta\lambda(H\alpha) = 5.5 \pm 0.2 \text{ \AA}$. $T_{eff} = 22000 \text{ K}$ (by HIZanstra method) $C(H\beta) = 1.2 \pm 0.2$ (by comparing of the star energy distribution curve with that of blackbody for $T = 22000 \text{ K}$). At that time TH4-4 have been classified as Be-star. Beginning from 1975 the integral brightness of the object became to decline and some spectral variations have been marked, such as raise of HeI intensities (relatively to that of $H\beta$), appearance and following increasing of [OIII] lines, recently HeII emission has been recorded. All these changing indicate the increase of ionizing flux temperature.

4. Discussion

During about 20 years the integral light of TH4-4 has dropped from 13.4 to 15.3 mag. and T_{eff} has raised more than twice. It is evidently that stellar radius had to decrease as a factor of 10 or so. The real compression and heating of star in so short period are quite doubtful. Perhaps we have watched the detachment of some dense envelope which surrounded the star at the early stage of our observations. This event would lead to variations like those remarked in case of TH4-4.