

INVESTIGATIONS OF DDDM 1; THE FOURTH HALO PLANETARY NEBULA

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ABSTRACT. Spectral ($\lambda\lambda$ 4100 - 7300 Å) and photoelectric observations of DDDM 1 ($61 + 41^\circ 1$; $\alpha_{1950} = 16^h 38^m 8$; $\delta_{1950} = +38^\circ 48'$) were made in 1985-86 on Crimean Station of Sternberg State Institute. Photographic absolute $H\beta$ flux is found to be $F(H\beta) = (3.0 \pm 0.57) 10^{-12} \text{ erg cm}^{-2} \text{ s}^{-1}$, angular radius $\phi = 1''.0 \pm 0''.5$. Interstellar reddening $E(B-V)$ for the object is found to be less than $0^m 02$. Integrated flux from central star and gaseous nebula was measured in UBV-filters $V = 14^m 71$, $B-V = 0^m 12$, $U-B = -0^m 9$.

Distance to DDDM1 in O'Dell's scale (optically thin case) equals 15.0 kpc, in Cudworth's scale (thick case) - 9.2 kpc. Nebular parameters $T_e[\text{O III}] = 9000 \text{ K}$, $N_e[\text{S II}] = 7000 \text{ cm}^{-3}$. The abundance of He (11.23 ± 0.11), O (7.7 ± 0.4), Ne (6.7 ± 0.2), Ar (4.3) (the scale $\log N(\text{H}) = 12.0$) of DDDM1 is similar to that of three other halo planetary nebulae K 648, 49 + $88^\circ 1$, 108 - $76^\circ 1$. Zanstra temperatures of central $T_H = (3.3 \pm 0.4) 10^4 \text{ K}$, $T_{\text{He I}} = (4.1 \pm 0.4) 10^4 \text{ K}$, $T_{\text{He II}} = 5.8 \times 10^4 \text{ K}$. Spectrophotometric temperature (4100 - 6700 Å) $T_{\text{sp}} = 3.5 \times 10^4 \text{ K}$. Using $d = 15 \text{ kpc}$ we obtain for the central star $M_V = -1^m 01$ and $\log L/L_\odot = 3.28$ (if $T_{\text{eff}} = 58000 \text{ K}$).