STELLAR POPULATIONS IN THE LOCAL GROUP GALAXY NGC 185

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ABSTRACT. We present a study of stars in the central ($2.2' \times 3.5'$) area of NGC 185 using *BVRI* CCD photometry obtained at the prime focus of the CFHT 3.6m.

NGC 185, a companion to the Andromeda galaxy in the Local Group, has been known to be a peculiar elliptical galaxy (dE3pec), because of the presence of blue stars, dust clouds, HI gas, and a possible supernova remnant.

The reddening of the bright foreground stars has been determined using the $(B-V)$–$(V-I)$ diagram to be $E(B-V) = 0.19 \pm 0.03$, which is the same as the value derived from the HI method.

The color-magnitude diagrams show three different stellar populations: (1) a small contribution of young stars having blue to yellow colors, (2) a first red giant branch (RGB) population, the tip of which is found to be at $I = 20.25 \pm 0.05$ and $(V-I) = 1.93$, and (3) a bright population of stars located above the tip of the RGB, possibly of intermediate age (consisting of extended asymptotic giant branch stars, carbon stars) in addition to long period variables, similar to those observed in old metal-rich globular clusters of our Galaxy.

The distance has been estimated using the brightness of the tip of the RGB following the recipe given in Da Costa and Armandroff (1990), giving $(m-M)_o = 23.90 \pm 0.15$, corresponding to 600 kpc. For comparison, the distance based on the photometry of RR Lyraes (Saha and Hoessel 1990) is $(m-M)_o = 23.96 \pm 0.25$, if one adopts $M_V(\mathrm{RR}) = 0.60$ mag.

The mean metallicity has been determined by using the median $(V-I)$ color of stars at $M_I = -3.5$, $(V-I)_{-3.5} = 1.71$, giving [Fe/H]$= -1.3$. The observed dispersion in color $\Delta(V-I)_{-3.5} = 0.31$ (=0.18 after allowing for the photometric error (including crowding error) of 0.25), yields a metallicity range of $-1.9 <$ [Fe/H] < -0.9.

Surface photometry shows that the color becomes bluer slowly toward the center of the galaxy in the outer regions, getting rapidly blue inside $10''$.

References

Saha, A., and Hoessel, J. G. 1990, AJ, 99, 97

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