ELLIPTICITIES OF "BLUE" AND "RED" GLOBULAR CLUSTERS IN THE SMC

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ABSTRACT

The projected ellipticities of twenty four "blue" and "red" globular clusters of various ages and positions in the SMC have been found using isodensity contours. The derived ellipticities have shown that the globular clusters of the SMC are more elliptical than their counterparts of the Large Magellanic Cloud (LMC) and our Galaxy. The observed ellipticities for both cluster types, do not support any age dependence.

OBSERVATIONS

Twenty five "blue" and "red" globular clusters were studied on film copies of B and V plates taken with the 1.2 m U.K. Schmidt Telescope in Australia. The quality of both plates was discussed by Kontizas (1980). Each cluster was scanned with an isodensitometer at the National Observatory of Athens. Two to three isophotes were produced for each cluster for $r > r_c$ (where r_c is the core radius of the cluster) and the mean values of the corresponding ellipticities ($\varepsilon = \frac{b}{a}$) of the best fit ellipses were found for B and V plates respectively.

For comparison the ellipticity of the galactic globular cluster 47 TUC was calculated as well. The derived value $\varepsilon = 0.046 \pm 0.05$ agrees very well with that given by Da Costa (1982).

ELLIPTICITIES

The relative frequency distributions of the ellipticities of the SMC clusters studied here is given in Fig. 1a by solid line whereas the relative frequency distribution of the ellipticities of the LMC clusters studied by Frenk et al (1982) is given in the same diagram by dashed line. From this diagram it can be seen that although the range of

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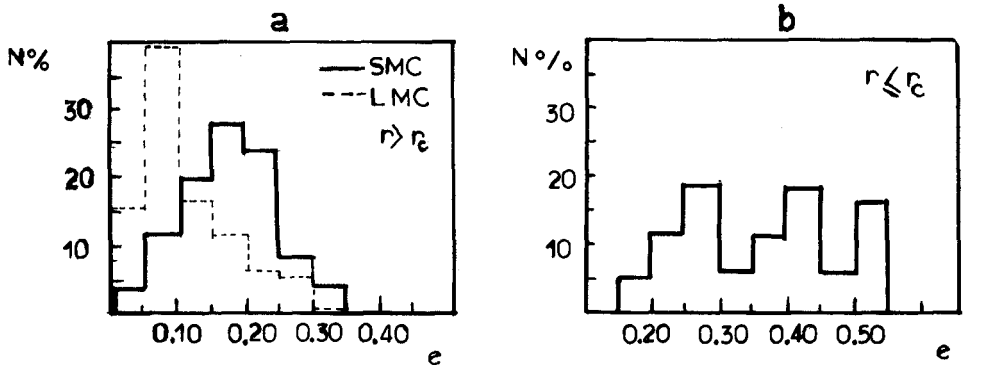

Fig. 1. Relative distributions of the ellipticities for the SMC globular clusters (solid line) and the LMC (dashed line). a) For isophotes with $r>r_c$ and b) For isophotes with $r<r_c$.

ellipticities for LMC and SMC is the same, the SMC clusters are more elliptical than the LMC. This result is verified by a statistical test. The analysis of the frequency distribution of the "blue" and "red" clusters do not show any statistical significant difference and their mean ellipticities are $\bar{\epsilon}_{mean}$ (Halo) = 0.18±0.07 and $\bar{\epsilon}_{mean}$ (disk) = 0.17±0.07. Geyer and Richtler (1981) has reached the same conclusion for the "red" and "blue" LMC clusters. For sixteen of the clusters studied here, ellipticities were found for $r \simeq r_c$, and their frequency distribution is plotted in Fig. 1b. Evidently there is no significant departure from uniformity and the ellipticities of the central part of the clusters are higher than the ellipticities of the outer parts.

ACKNOWLEDGEMENTS

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DISCUSSION

M. SANTANGELO: Coming inward to the core from the outer regions, have you found any twisting of the isophotes?

E. KONTIZAS: Yes, there is a random twisting of the isophotes going inward of the cluster. The orientation of all the major axes for all isophotes and for all the studied clusters (twenty five so far) is within a cone of 30°, that might have some cosmological meaning.

H.T. MACGILLIVRAY: What is the resolution at which you have scanned the plates and could this have affected your isodensity contours?

E. KONTIZAS: The isodensity contours are a smooth picture of the clusters and the used beam was 1-10 times bigger than the size of a bright stellar image of the cluster.

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