STAR DENSITY DISTRIBUTION IN YOUNG AND OLD GLOBULAR CLUSTERS OF THE LARGE MAGELLANIC CLOUD

E.H. Geyer
Sternwarte der Universität Bonn -
Observatorium Hoher List, D-5568 Daun, FRG

U. Hopp, M. Kiehl and S. Witzigmann
Wilhelm Foerster Sternwarte
1000 Berlin

SUMMARY

The star density distribution in NGC 1818, 2004, 1806 and 1846, which are representative for the "blue" and "red" globular clusters of the LMC, have been determined from star counts on B- and V- ESO Schmidt telescope plates. These have limiting magnitudes of about 21, thus stars with absolute magnitudes of about $M_V \sim +2$ are reached. It was found that the two cluster types can be treated as "polytropic stargas spheres" according to the Schuster law with an index $n \sim 2.75$.

The red clusters resemble each other very much and seem to be well relaxed dynamically. This conforms to their evolutionary status. The comparison of the density distribution in the two spectral regions of the "red" clusters shows that more or less a segregation within their red and blue stellar content has taken place: the blue stars are more concentrated toward the cluster center. According to the limit of this investigation this observable blue stellar content is made up more or less of horizontal branch stars. This means from the dynamical point of view that they are originally the more massive stars. Therefore the time scale for the forming of horizontal branch stars is much less than the relaxation time of globular clusters.

On the other hand the "blue" globular clusters behave more as individuals and show not only a different star density distribution, but also the red and blue stars in them are uniformly distributed. This might be indicative that their dynamical status at the phase of their forming is more or less preserved presently.
(The paper has appeared in *Astron. and Astrophys.* 77, 61, 1979).

James E. Hesser (ed.), Star Clusters, 341.