# THE LUMINOSITY FUNCTION OF THE SMC CLUSTERS NGC152 AND K3

M. Kontizas, E. Kontizas and N. Stewart
University of Athens, Observatory of Athens,
University of Edinburgh.

## INTRODUCTION

In a previous investigation of the Luminosity Functions (LF) it was found that some SMC clusters show significant characteristics like the very large number of stars at $M_V$ = 0.0mag and a gap just below the Horizontal Branch (HB) like feature of their colour-magnitude ( c-m ) diagram ( Kontizas and Kontizas, 1982 ).

NGC152 is a very unusual cluster and its c-m diagram has been studied by several authors ( Kontizas, 1976, 1980; Stewart, 1980; Hodge, 1981 ). From a dynamical study of the SMC clusters ( Kontizas, 1983 ) NGC152 was difficult to be classified as a disc or halo cluster being like the old open clusters but having dynamical parameters of a true globular. The next cluster K3 is one of the most populous, halo globular of the SMC often studied by Gascoigne ( 1966, 1980 ) Walker (1972) and Stewart (1980).

## OBSERVATIONS

The LF of NGC152 and K3 have been produced from V and B plates taken with the ATT 3.8 m telescope in Australia. Photographic photometry of all good stellar images were carried out with an irisphotometer in circular areas around each cluster and in two corresponding adjoining fields ( Stewart, 1980 ). Star counts in the same areas have provided the completion factors and the derived LFs of each cluster field were normalised to equal areas. The bolometric correction curve used was that adopted for our galactic globulars extrapolated to the bright red end by the measurements of the red stars studied by Mould and Aaronson (1980).



A. Maeder and A. Renzini (eds.), Observational Tests of the Stellar Evolution Theory, 121–122.

## DISCUSSION

From the LFs of the clusters NGC152 and K3 and their adjoining fields the following points can be outlined.

a) The LFs of both fields are very similar and seem to be typical of the halo SMC stellar content ( Brück and Marsoglu, 1978 ).

b) The very red bright stars in both clusters are cluster members and not field stars.

c) The LF of the cluster NGC152 shows two characteristic features (1) a clear gap below the giant branch clump and (2) the number of stars at the top of the main sequence ( $M_V = 1.00 \pm 0.5$ mag ) is smaller than the number of stars in the clump. This is an indication that this cluster is younger than K3 and seems to fit the isochrone $t = 5 \times 10^8$ years given by Faulkner and Cannon (1973) for the old open clusters.

d) The cluster K3 exhibits a LF where the red giants and the HB clump are much more populated than the field giving evidence of being younger than the old halo SMC stars, but older than NGC152.

## REFERENCES

Brück, M. T., and Marsoglu, A. : 1978, Astron. and Astroph. 68, 193.
Faulkner, D. J., and Cannon, R.D. : 1973, Ap. J., 180, 435.
Gascoigne, S. C. B. : 1966, MNRAS, 134, 59.
Gascoigne, S. C. B. : 1980, IAU Symp. No 85 ( ed. J. Hesser) pp. 305.
Hodge, P. W. : 1981, Ap. J., 247, 894.
Kontizas, M. : 1976, PhD Thesis, University of Edinburg.
Kontizas, M. : 1980, Astron. and Astrophys. Ser. 40, 151.
Kontizas, M. : 1983, Astron. and Astrophys. (submitted).
Kontizas, M. , Kontizas E. : 1982, Astron. and Astrophys. 108, 314.
Mould, J., and Aaronson, M. : 1982, Ap. J., 263, 629.
Stewart, N. : 1980, PhD Thesis, University of Edinburgh.
Walker, M. :1972, MNRAS, 159, 379.

https://doi.org/10.1017/S0074180900030692 Published online by Cambridge University Press