DEEP CCD PHOTOMETRY IN ω CEN AND NGC 3201[+]

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About 30 deep B and V CCD images, obtained at the 3.6 m ESO telescope, with the EFOSC in the focal reducer option, have been used to obtain color-magnitude diagrams and luminosity functions for the main sequence of the globular clusters ω Cen and NGC 3201. Two fields per cluster, at different distances from the center (25'- 30' for ω Cen and 7!5 - 9' for NGC 3201) were observed and separately reduced.

In Fig. 1-2 preliminary c-m diagrams of the inner fields are presented. Fig. 1 shows the ω Cen c-m diagram with VandenBerg and Bell (1985) isochrone superimposed (Y=0.2, [Fe/H]=-1.77, 16 Gyr). A reddening of 0.11 mag. and a distance modulus $(m-M)_V$=14.0 mag., as deduced from PLA method (Gratton, 1985), were assumed. The agreement is surprisingly good. The two lines on the lower blue side of the diagram are the mean lines for DA and DB white dwarfs assuming the same distance of the cluster (Sion and Liebert, 1977). The dots represent good stellar-shape images, possible white dwarf candidates of the cluster.

The c-m diagram of NGC 3201 is plotted in Fig. 2. A reddening of 0.21 mag. and a distance modulus $(m-M)_V$=14.15 mag. (Gratton, 1985, PLA method) were assumed to superimpose the VandenBerg and Bell isochrone with [Fe/H]=-1.3, Y=0.2 and 16 Gyr.

The luminosity functions, as derived from the c-m diagrams, corrected by crowding effects from experiments with artificial stars created with DAOPHOT, are represented in Fig. 3, compared with 47 Tuc (Ortolani, unpublished data) and with the theoretical predictions (McClure et al., 1986). The luminosity functions are corrected by field stars using the data from Ratnatunga and Bahcall's (1985) tables, after testing the consistency with the observed number of field stars on the red side of the main sequences.

They are consistent with an approximately Salpeter mass function index and much steeper than 47 Tuc luminosity function.

No appreciable variations have been found between the two fields.

(+) Based on observations obtained at the European Southern Observatory La Silla, Chile.

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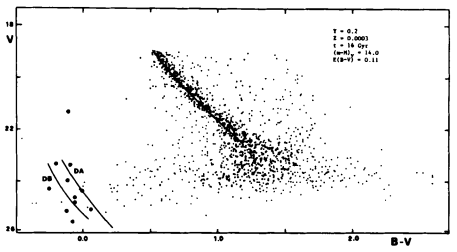

Fig. 1. c-m diagram of ω Cen. The theoretical isochrone from VandenBerg and Bell (1985), is superimposed. The two lines on the blue side are DA and DB white dwarfs mean loci from Sion and Liebert (1977).

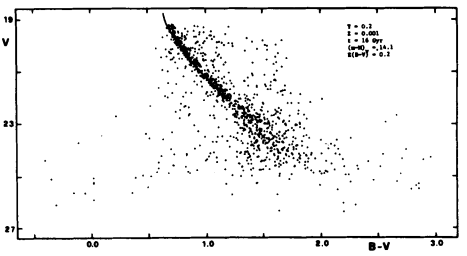

Fig. 2. c-m diagram of NGC 3201. The theoretical isochrone from VandenBerg and Bell is superimposed.

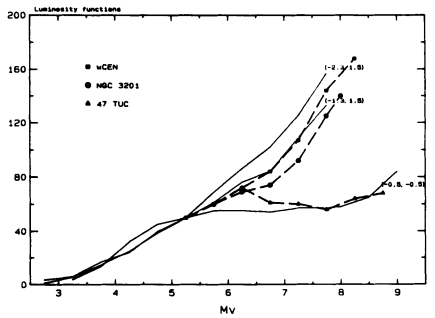

Fig. 3. Differential luminosity functions for the ω Cen, NCG 3201 and 47 Tuc main sequences, normalized at M_V=5.25. The continuous lines are the theoretical predictions from McClure et al. (1986): the numbers indicate metal abundance and power mass index.

REFERENCES

Gratton, R. 1985 Astron. Astrophys. 147, 169.
McClure, R. D., VandenBerg, D. A., Smith, G. H., Fahlman, G. G., Richer, B. B., Hesser, J. E., Harris, W. E., Stetson, P. B. and Bell, R. A. 1986 Astrophys. J. Letters 307, L49.
Ratnatunga, K. V. and Bahcall, J. N. 1985 Astrophys. J. Suppl. 59, 63.
VandenBerg, D. A. and Bell, R. A. 1985 Astrophys. J. Suppl. 58, 561.
Sion, E. M. and Liebert, J. 1977 Astrophys. J. 213, 468.

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