

PHOTOMETRY OF FAINT STARS IN GLOBULAR CLUSTERS USING THE SIX
METER TELESCOPE

N. Samus

Astronomical Council, USSR Academy of Science

Our program is based on photographic and photoelectric UBV photometry of globular cluster stars with the Soviet 6 m telescope. M 10 = NGC 6254 remains, regrettably, the only cluster for which we were able to gain photoelectric observational material sufficient for calibration of the photographic photometry for faint stars. Samus and Shugarov (1983) presented for M 10 a V, (B - V) diagram showing an unusually large magnitude difference between the main sequence turn-off point and the horizontal branch, $V(TO) - V(HB) \approx 3.8$ mag. It seemed of interest to compare M 10 and M 12 by their values of $V(TO) - V(HB)$. A preliminary calibration of the faint star photographic photometry in M 12 leads to $V(TO) - V(HB) \approx 4$ mag (Mironov et al., 1984). One may notice that in the classification introduced by Mironov and Samus (1974, 79), which is based mainly on the horizontal-branch morphology, both M 10 and M 12 belong to group I, presumably the older group. V, (B-V) diagrams were also published by us for NGC 288 and M 2 = NGC 7089 (Samus and Shugarov 1978, 79).

Two photographs of the globular cluster NGC 5053, one plate in B and one in V light, were taken on May 19/20 1980 at the primary focus of the 6 m telescope with the Pickering-Racine wedge. Unfortunately it turns out that the limiting magnitude of the plates, especially of the V plate, is far from the deepest possible for the telescope. The calibration is based on the photoelectric standards of Sandage et al. (1977) and on the electronographic observations of Walker et al. (1976). The main advantage of the present photometry in NGC 5053 is its practical completeness (in a round area of $\sim 10'$ diameter) to 20^m V. The color of the turn-off region, somewhat too blue, cannot be attributed real significance because of the calibration difficulties at that magnitude level. There is no indication of $V(TO) - V(HB)$ being unusual. NGC 5053 belongs to Group II (presumably the younger one) in our classification. The shape of the subgiant branch is in agreement with VandenBerg's isochrones for $Y = 0.2$, $Z = 0.0001$, $T = 15$ and 18

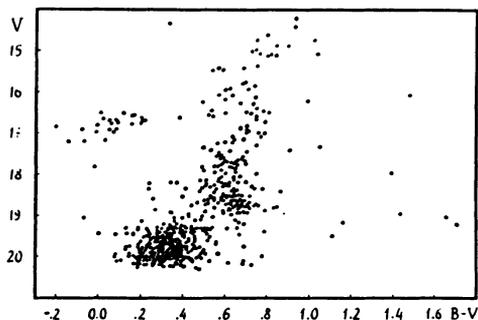


Fig.1. The V, (B-V) diagram for the globular cluster NGC 5053.

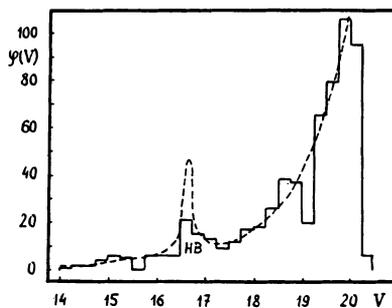


Fig. 2. The luminosity function for NGC 5053. No corrections of any kind have been applied. The dashed line shows the rescaled M 3 luminosity function (Sandage 1954).

billion years. The agreement of the luminosity function shape with that for M 3 (Sandage 1954) is surprisingly excellent.

Thanks are due to O. A. Baryshnikova and O. K. Silchenko who took part in the NGC 5053 studies.

REFERENCES

- Mironov, A. V. and Samus, N. N. 1974, Peremennye Zvezdy, 19, 337.
 Mironov, A. V. and Samus, N. N. 1979 in Star Clusters UrGU, Sverdlovsk, p. 118.
 Mironov, A. V., Samus, N. N., Shugarov, S. Yu. and Yuferov, A. O. 1984 Astron. Tsirkulyar, No. 1313.
 Samus, N. N. and Shugarov, S. Yu. 1978 Astron. Tsirkulyar No. 1023.
 Samus, N. N. and Shugarov, S. Yu. 1979 Astron. Zh. (USSR), 56, 1323.
 Samus, N. N. and Shugarov, S. Yu. 1983 Astron. Zh. (USSR), 60, 1091.
 A. R., Katem, B. and Johnson, H. L. 1977 Astron. J., 82, 389.
 VandenBerg, D. A. 1983 Astrophys. J. Suppl. 51, 29.
 Walker, M. F., Pike, C. D. and McGee, J. D. 1976 Monthly Notices Roy. Astron. Soc., 175, 525.