Astronomical and Astrophysical Transactions, 1998, Vol. 15, pp. 71–73
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PHOTOMETRY OF STARS IN GLOBULAR CLUSTERS: RESULTS AND PROSPECTS

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(Received May 14, 1996)

We briefly describe the principal results of the first years of our cooperative programme of globular cluster studies. The new $V - (B - V)$ diagram is presented for the globular cluster NGC 1904.

KEY WORDS Cluster: globular — globular clusters: individual (NGC 1904)

The cooperation of the Isaac Newton Institute (Chile), Sternberg Astronomical Institute, and Institute of Astronomy of the Russian Academy of Science (Moscow), devoted to studies of southern globular clusters, was initiated almost four years ago. We are undertaking photographic photometry of many stars using the Sternberg Institute's automatic measuring machine AMD and multicolour CCD photometry of globulars in our Galaxy and in the Magellanic Clouds. Observations are being acquired with the large telescopes of the Chilean observatories.

Presently, we have published or submitted the results for nine globular clusters: NGC 3201, NGC 4833, NGC 5286, NGC 5927, NGC 6139, NGC 6584, NGC 6656 (M 22), NGC 7099 (M 30), and Kron 3 (the Small Magelanic Cloud). CCD photometry for the cluster NGC 1841, associated with the Large Magellanic Cloud, and for the Milky Way cluster NGC 1904 is being analysed. These objects not only belong to different galaxies but also differ considerably by their principal parameters, and some of them were earlier studied only very poorly.

Let us summarize the main results of our investigations during the recent years.

(1) We have obtained the first deep colour–magnitude diagrams, reaching the main sequence, for the globular clusters NGC 4833, NGC 5286, and NGC 5927; we have also obtained a more representative deep diagram for M 22. From isochrone fitting, we have arrived at age estimates for NGC 5286 and NGC 5927.

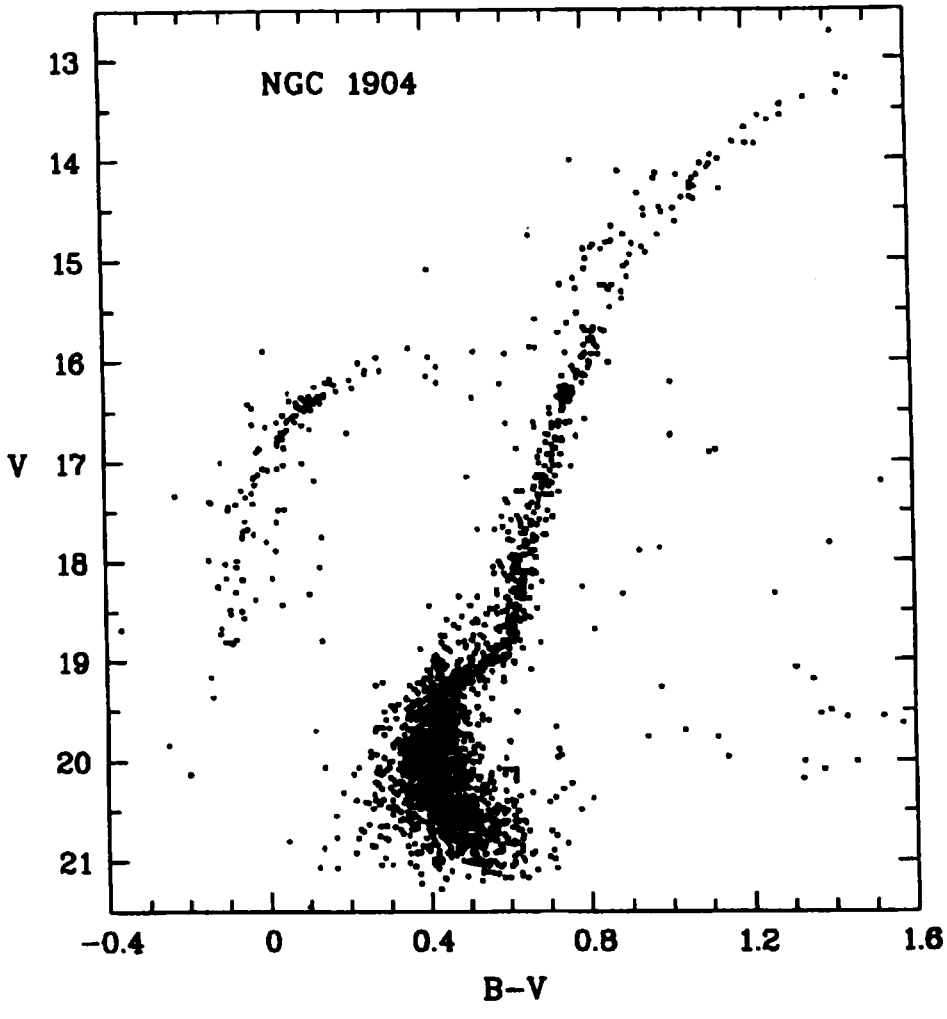

Figure 1 The $V-(B-V)$ diagram of the globular cluster NGC 1904.

(2) On the basis of $V-(B-V)$ diagrams, we have carried out the first photometric study of NGC 6139 and an independent study of NGC 6584.

(3) Fitting isochrones to the colour–magnitude diagrams of M 30 and Kron 3 derived from our multicolour photometry, we have been able to improve age estimates for these clusters.

(4) We have revealed radial variations of horizontal branch morphology for NGC 5927 and Kron 3.

(5) We have discovered several new variables and rediscovered a number of lost variable stars in the globular cluster M 22. We have determined equato-

rial coordinates for all known variables in the clusters M 22, NGC 3201, and NGC 6584 (in cooperation with Yu. A. Shokin, N. M. Evstigneeva, and V. Strelnikov). Studies aimed at determinations of variable star coordinates in several other clusters are under way at the Sternberg Institute and Institude of Astronomy (Moscow) within other programmes.

Figure 1 presents, as an example, the $V - (B - V)$ diagram of the globular cluster NGC 1904 based on our CCD photometry.

The principal results of our studies have been published mainly in *Astronomy and Astrophysics Supplement Series* and *Astronomy Letters.*