

## ON THE COLOR EXCESSES OF GLOBULAR CLUSTERS

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The interstellar reddening of globular clusters of the Galaxy is still an important unresolved problem, especially for metal-rich objects that are found usually at low galactic latitudes in the general direction of the galactic center. Their color excesses are needed in order to correct their color-magnitude diagrams and to determine their intrinsic integrated color indices. For this we need some method which is not related to measures of the cluster stars. One such method is to use foreground field stars in the direction of the globular cluster to measure the interstellar reddening. Because most of the globular clusters lie outside the galactic plane, we need information about the reddening in all the layer of absorbing dust in different directions. This information can be obtained by investigating stars which are at different distances from the Sun up to the edge of the absorbing dust layer. On the other hand, these stars should be as close as possible to the position of the globular cluster to avoid possible variations in the interstellar reddening in the area of the cluster.

The Vilnius photometric system offers an excellent possibility of doing such research since it gives spectral and luminosity classes, absolute magnitudes and interstellar reddening for stars of all spectral types. The only problem is to achieve a deep enough limiting magnitude and to go far enough from the galactic plane. With this aim we have started a program for the investigation of interstellar reddening in the direction of a number of low latitude globular clusters using photoelectric photometry of stars in the Vilnius photometric system with the 1 m telescope of our institute placed on Maidanak Mountain Observatory in Uzbekistan. The work has been completed for three areas in the direction of the globular clusters M 56, M 71 and NGC 6712. In each area about 100 stars down to  $V = 13$  have been investigated, all of them within 30 min. of the center of the cluster. The results for the cluster M 71 have been published (Janulis and Straižys 1984, Janulis 1984). The results for the cluster M 56 are in press (Janulis 1986). The results for NGC 6712 will be published later.

The investigation leads to the following conclusions:

1. In all the investigated areas the interstellar reddening of stars shows a considerable scattering of points in the plot of color excess vs. distance. This scattering for the cluster M 71 is between  $E_{(B-V)} = 0.12$  and  $0.32$  and this exceeds the errors of the reddening determination. This means that the column density of the interstellar dust shows variations in different parts of the area by a factor of 3. Probably this is a result of the cloud structure of the interstellar dust. For a more exact determination of the cluster reddening a much small area around it should be studied.

2. The mean values of the interstellar reddening determined for the stars beyond the main bulk of the galactic dust layer are somewhat less than the reddening values determined by other methods, e.g. by the method of integrated color indices. This may mean that we encounter a selection effect caused by the limiting magnitude. To check this explanation we have to extend the measurements to fainter stars.

3. Both the problems listed above could be overcome by using CCD photometry in the Vilnius system down to  $V = 17$  or  $18$  magnitude. This would give two-dimensional classification of stars and the interstellar reddening up to the edge of the Galaxy.

#### REFERENCES

- Janulis, R. 1984 Bull. Vilnius Obs. No. 67, 18.  
Janulis, R. 1986 Bull. Vilnius Obs. No. 75 (in press).  
Janulis, R., and Straižys, V. 1984 Astrophys. Space Sci. 100, 95.