

SEARCH FOR VARIABLE STARS IN GLOBULAR CLUSTERS

M. L. Hazen-Liller
Harvard-Smithsonian Center for Astrophysics
60 Garden Street
Cambridge, MA 02138
U. S. A.

ABSTRACT. A program to search poorly studied southern globular clusters for variable stars is being carried out on the 1-m Yale telescope at CTIO. Recently two galactic bulge clusters of moderately high metallicity have been found to contain RR Lyrae variables; a cluster of similar metallicity a little farther from the galactic center apparently has none.

For the past decade, the 1-m Yale telescope at CTIO has been used in a program to photograph poorly studied southern globular star clusters in order to search for and to study their variable stars. Many of these clusters lie near the direction to the galactic center and thus are in crowded fields, making other types of studies of horizontal branch (HB) morphology very difficult.

The 1-m telescope at the Ritchey-Chretien focus (19 arc sec mm^{-1}) can reach a limiting magnitude of $B \sim 18.5-19.0$ in a reasonably short exposure time ($\sim 30-45$ min) on sensitized 103a-0 plates. Such a limit reaches possible HB variables in 90 per cent of the globulars listed in the compilation of Zinn (1985).

Data from the 1-m on the variables (or absence of variables) in some 15 globular clusters have been published over the last several years. The most recent work has involved studies of three clusters of moderately high metallicity: NGC 6569, $[\text{Fe}/\text{H}] = -0.86$; NGC 6388, $[\text{Fe}/\text{H}] = -0.74$; and NGC 6652, $[\text{Fe}/\text{H}] = -0.89$. The clusters are listed in order of distance from the galactic center: $R \sim 0.8, 3.8,$ and 5.2 kpc respectively. The $[\text{Fe}/\text{H}]$ and R are taken from Zinn (1985).

The study of NGC 6569 (Hazen-Liller 1985) reveals eight RR Lyrae stars that are probable members and four that are possible members of the cluster. (Membership criteria include proximity to the cluster center and similarity of mean brightness.) No other cluster of such a high metallicity has been previously found to contain HB variables. The result suggests that NGC 6569 has an unusually blue HB for its

metallicity. Recent, as yet unpublished, data for NGC 6388 indicate that this cluster, too, has at least five RR Lyrae stars that may be members. NGC 6388 has even higher metallicity than NGC 6569. On the other hand, preliminary investigation of NGC 6652 has failed to find any RR Lyrae stars in that cluster.

The results here agree with the study by Zinn (1980) that concluded that clusters lying near the galactic center have bluer HBs than clusters of similar metallicity lying farther from the galactic center. One possible explanation, following Zinn, is that the clusters with smaller R are older than those farther out.

REFERENCES

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