

## CCD PHOTOMETRY OF THE OPEN CLUSTER BE 69

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**Abstract.** The morphological features of CMDs of Be 69 are better understood in terms of convective overshooting. The comparison of CMDs with the convective overshoot models (Bertelli et al. 1994) produces a good fit for a metallicity  $Z=0.008$ , age = 0.8 - 1.0 billion yr and  $(m-M)=14.3$ , which corresponds to a distance of 2860 pc.

### 1. Observations and Results

With the aim to contribute to the progress in our understanding of intermediate age and old open cluster population we have undertaken an observational program to obtain reliable UBVR CCD photometry of those clusters which are unstudied or poorly studied. In this paper, we present CCD UBVR photometry for the open cluster Be 69 (C0521+ 326,  $l = 174^{\circ}.4$ ,  $b = -1^{\circ}.8$ ), for which no previous photometric studies could be found in the literature and compare its colour - magnitude diagram (CMD) with the theoretical ones. The observations were obtained using photometric CCD system at f/13 cassegrain focus of the 104-cm telescope of the Uttar Pradesh State Observatory (UPSO) on four nights during October-December 1990. Clean images have been obtained using the ESO MIDAS software package. The photometric reductions were made using the DAOPHOT profile fitting software (Stetson 1987).

A mean reddening of  $E(B-V)=0.65$  has been obtained using the colour-colour diagram. We first compare the CMD of Be 69 with the standard evolutionary model of Vandenberg (1985), (figure 1). The best comparison yields an age 0.8 - 1.0 billion yr and  $(m-M)=14.0$  for  $Z=0.006$ . However, more detailed inspection of the comparison manifests an apparent discrepancy between the shape of the turnoff and the isochrones. This has been noted before by several authors (e.g., Anthony -Twarog et al. 1991, Alfaro et al. 1992) and can be explained as a failure of the standard isochrones to include convective overshoot.

Theoretical isochrones with convective overshoot computed by Bertelli et al. (1994) have also been compared with the CMDs of Be 69. The best fit is obtained for  $Z=0.008$ ,  $(m-M)=14.3$  and age 0.8 -1.0 billion yr. The morphological features of the CMD match very well the theoretical tracks, predicted by this model (figure 2). The availability of two field regions at  $\sim 30'$  northward and southward

allows us to correct the MS star distribution for contamination due to presence of possible field stars. The integrated luminosity function (ILF) of the cluster has been obtained by subtracting the contribution of field stars. A comparison of the ILFs of Be 69 and Haffner 6 (age 1 billion yr) taken from Patat and Carraro (1994) manifests that the ILF of Be 69 is consistent with a Salpeter IMF  $x = 1.35$ .

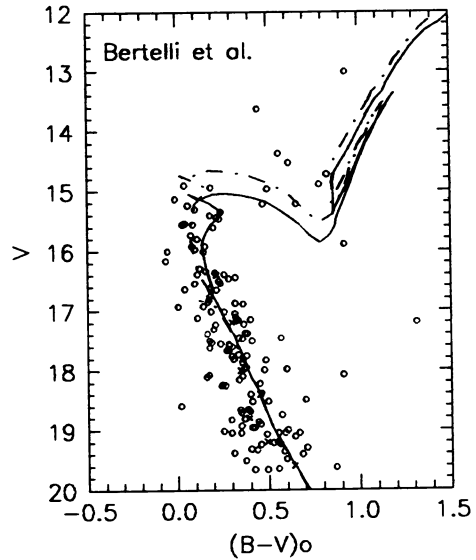
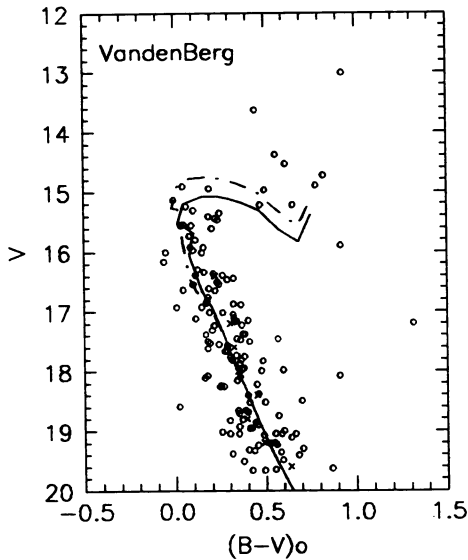


Figure 1. The color-magnitude diagram      Figure 2. The color-magnitude diagram

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