HB MORPHOLOGY AND INTEGRATED SPECTRA OF GLOBULAR CLUSTERS: A THEORETICAL APPROACH

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Abstract.
The aim of the project is to investigate the role of different horizontal branch morphologies on the integrated light of globular clusters.

1. Preliminary results

The evolutionary phase of HB stars is a fundamental testing ground for evaluating the parameters of population II globular clusters. In particular, it plays a relevant role in the determination of the contributions to the synthetic integrated spectral energy distribution (SED's) of different Horizontal Branch (HB) morphologies. Indeed, dating back to the HB classification of Dickens (1972), moving from the blue to the red types, the physical parameter governing the HB morphology is the metal content. This theoretical explanation does not reproduce properly the HB morphologies of the intermediate metallicity globular clusters, for which a second parameter is advocated to explain the non-monotonic behaviour of Dickens's classification. Therefore the appropriate HB morphology should be taken into account to obtain reliable evaluations of globular cluster metallicities and reddenings, based on observational integrated spectral types.

To build up a synthetic HB, a set of HB evolutionary tracks (Castellani et al. 1991) has been computed. The grid of models is available for different metallicities (Z= .0001, .0004, .001, .003, .006, .02) and a helium content Y=.23, so that it can be usefully adopted for population synthesis ranging from low to high metallicity stellar systems. The core masses and the extra-helium contents due to the first dredge-up event have been obtained from H-burning models reaching the tip of the red giant branch in 15 Gyr.

A synthetic HB, computed for Z = 0.02, has been populated with 1000 objects; a linear mass distribution in the range 0.55 - 0.80 $M\odot$ has been adopted. From the theoretical HB, the synthetic integrated spectral energy distributions are computed, by using a newly available set of theoretical fluxes computed from stellar model atmosphere by Kurucz (1992).

Here we present some preliminary results, computed for the case of solar chemical composition, for a synthetic horizontal branch of the intermediate type. Figure 1 shows the integrated SED for this case.

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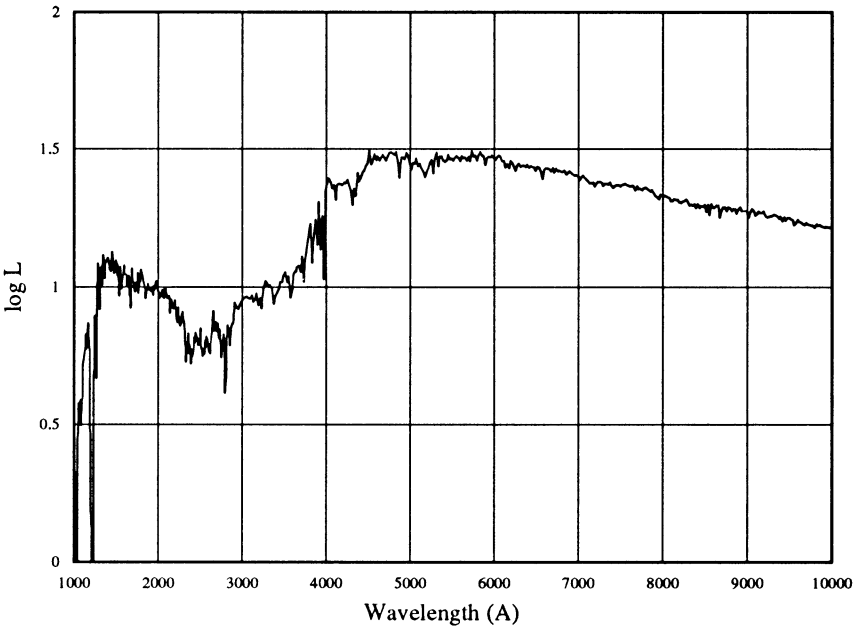

Fig. 1. Synthetic integrated spectral energy distribution

References

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