RevMexAA (Serie de Conferencias), **40**, 277–277 (2011)

A STELLAR POPULATION SYNTHESIS MODEL THAT INCLUDES BINARY INTERACTION

F. C. Hernández[1,2] and G. Bruzual[1,3]

By means of evolutionary population synthesis models (PSMs) which include evolutionary tracks for interacting binary pairs, we compute isochrones and derive integrated spectral energy distributions and colors corresponding to these populations. By comparing with a pure single star population we derive the trends introduced by the presence of interacting binary stars in the spectral and color evolution.

We compute the evolution in the HR diagram of interacting pairs by means of the Hurley et al. (2002) BSE code. With a modified version of the Bruzual & Charlot (2003) code which includes the interacting binary star tracks, we compute isochrones, spectral energy distributions (SED), and color evolution.

In Figure 1, isochrones at 1 Gyr with their corresponding SEDs are shown. Each isochrone contains a population of 10^6 $M_\odot$. In one case (open gray triangles), the binary population is computed in the form described above. In the other case (black dots) the whole population consists of single stars. The contribution of interacting binaries is evident. In the UV range the emission is higher in a population with binary interactions, because of the presence of Blue Stragglers (BSs) and Extreme Horizonal Branch (EHB) stars.

Figure 2 shows the evolution of the 1500-V and 2300-V colors. It is evident from this figure that a PSM which includes binary star interactions is bluer than the corresponding model considering only single star evolution.

Finally we conclude that it is important to include binary interactions in PSMs because they change the integrated properties of galaxies. Binary star interactions change drastically the evolutionary track of a star and can explain the formation of BSs and EHBs and the presence of this stars makes the population bluer.

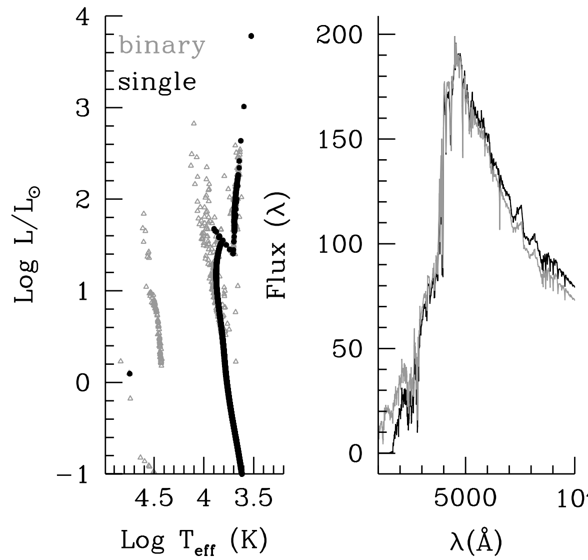

Fig. 1. Single and binary isochrones with their SEDs.

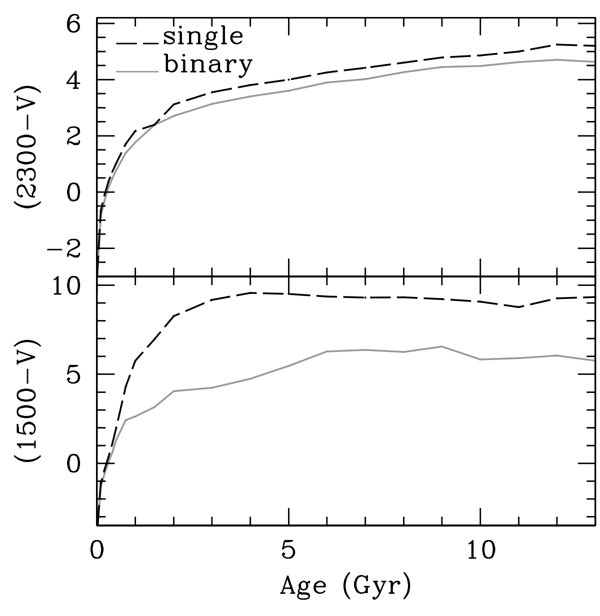

Fig. 2. Evolution in time of the 1500-V and 2300-V colors.

[1]Centro de Investigaciones de Astronomía, Av. Alberto Carnevalli, Sector La Hechicera, Apdo. Postal 264, Mérida 5101-A, Venezuela (fhernandez@cida.ve).
[2]Universidad de los Andes, Colombia.
[3]Centro de Radioastronomía y Astrofísica, Universidad Nacional Autónoma de México, Mexico.

REFERENCES

Bruzual, G., & Charlot, S. 2003, MNRAS, 344, 1000
Hurley, J., Tout, C., & Pols, O. 2002, MNRAS, 897, 928