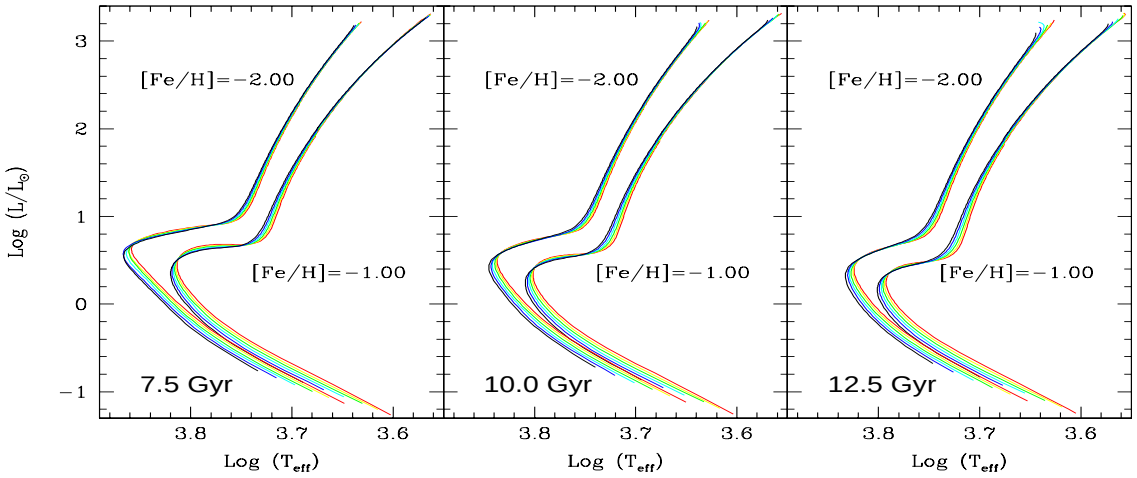

Fig. 1. Isochrones for 7.5, 10.0, and 12.5 Gyrs with [Fe/H]=−2.00, and −1.00. Colors represent different initial helium abundances: 0.245 (red), 0.270 (yellow), 0.295 (green), 0.320 (cyan), 0.345 (blue), and 0.370 (black).

$T_{\rm eff}$ when Y is higher, the difference in L between them at the medium $T_{\rm eff}$ is small. This difference is more prominent for low ages, or for high metallicities.

Low Red Giant Branch (RGB): In the low RGB there are three important effects to be considered when Y is increased: (i) the minimum luminosity almost does not depend on Y, but depends on [Fe/H], and the age; (ii) $T_{\rm eff}$ on the base of the RGB increases with Y and age. However, the $T_{\rm eff}$ difference between isochrones with different Y increases for higher ages; (iii) the absolute value of the low RGB slope is affected by the increase in Y being greater for low helium abundances. Second, and third effects are more prominent for higher metallicities.

High RGB: Above the RGB Bump, the difference in helium does not induce any great difference in the RGB slope being the only observable effect the luminosity of the RGB Tip which decreases for high helium abundances. Although this reduction on the RGB Tip luminosity should be very difficult to observe in CMD of GCs due to the small amount of stars in this point, it could be used to constrain the minimum initial helium abundance of GCs stars if its compared with other zones of CMDs.

ZAHB: Effects of different Y in ZAHB loci have been previously studied by (Sweigart 1987) which, although several input physics have been updated, the main effects are similar (see Figure 2). When Z is constant is observed that ZAHB luminosities for high helium abundances are greater for cooler HB stars (more massive), while luminosities are lower for hotter stars (less massive). Moreover, the L difference between ZAHB with different Y depends on the metallicity which for lower Z this difference is also lower for reddest HB stars, while for bluest HB stars it is greater.

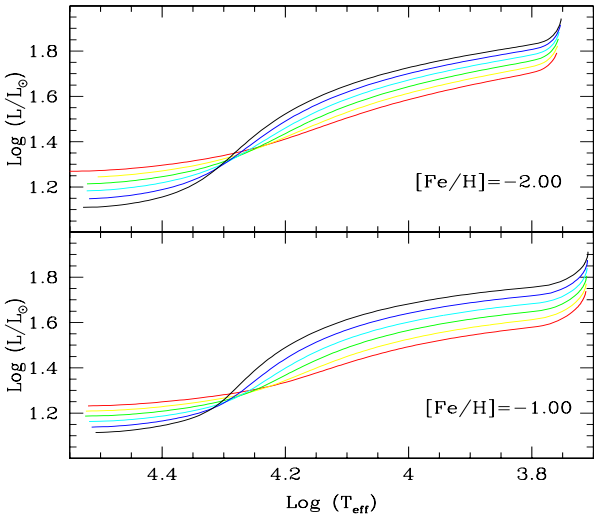

Fig. 2. ZAHB loci for [Fe/H]=−2.00 (upper panel), and −1.00 (lower panel). Colors represent the same Y value than in Figure 1.

Support for A.A.R.V. and M.C. is provided by MIDEPLAN's Programa Iniciativa Científica Milenio through grant P07-021-F, awarded to The Milky Way Millennium Nucleus

REFERENCES

Carretta, E., et al. 2009, A&A, 505, 117
Piotto, G., et al. 2007, ApJ, 661, L53
Sweigart, A. V. 1987, ApJS, 65, 95