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THE PHYSICAL BASIS OF THE SPECTRAL CLASSIFICATION OF A, F AND G STARS

G. Dalle Mese,¹ O. López-Cruz,¹ W. Schuster,² and G. García^{2,†}

We present the first results of a precise scheme for spectral classification for the late B, A, F and early G-type stars. We have used ~ 15000 well classified stars from (Hauck & Mermilliod 1998) and with the Strömrgren ($b-y$), $[c_1]$ and $[m_1]$ indices (Strömrgren 1951) to define the regions in the $[m_1]$ - $[c_1]$ diagram. We also generate calibrations for the effective temperature (T_{eff}) and the surface gravity.

For this work we have taken data from (Hauck & Mermilliod 1998) which contains ~ 63000 stars. We have looked for spectral type on SIMBAD and our final list with well defined spectral types and photometric measurements contains ~ 15000 stars. We corrected for galactic extinction as (Crawford 1975) and (Strömrgren 1966).

To get the physical parameters we have used CHORIZOS (Maíz-Apellániz 2004), a Chi-square code for parameterized modeling and characterization of photometry and Spectrophotometry to obtain the T_{eff} and the surface gravity. This code compares photometric data with model spectra energy distributions. The code calculates the likelihood for the full specified parameter ranges, thus allowing for the identification of multiple solutions for the derived parameters of a single solution.

In Figure 1 we can see the histograms of m_1 color for each F3V and F5V stars as an example, we have taken the mean values of the Strömrgren colours to use it in CHORIZOS to get the T_{eff} .

In Figure 2 we present our preliminary results of this calibration of the MK system for B7-G5 main sequence stars in terms of the $(b-y)_0$ vs. T_{eff} . We can see the trend of the T_{eff} to increase from G type stars to B type. We also have shown the effectiveness of the Strömrgren system in the investigation of the physical properties of the stars. We will be applying this system to open clusters, globular clusters and galaxies in clusters. To complete this work we are doing an exhaustive correction for the extinction of the $(b-y)_0$ color.

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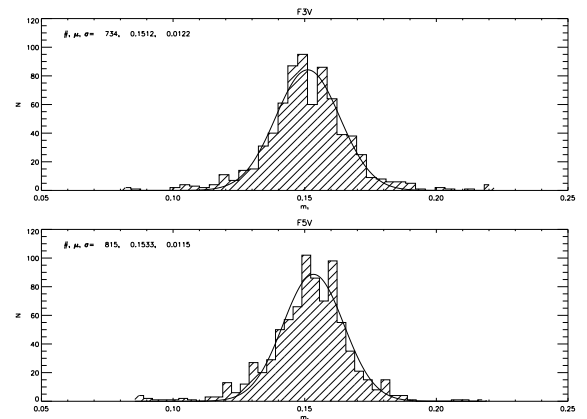


Fig. 1. Examples of the mean values of the index $[m_1]$ for stars of F3V and F5V spectral types.

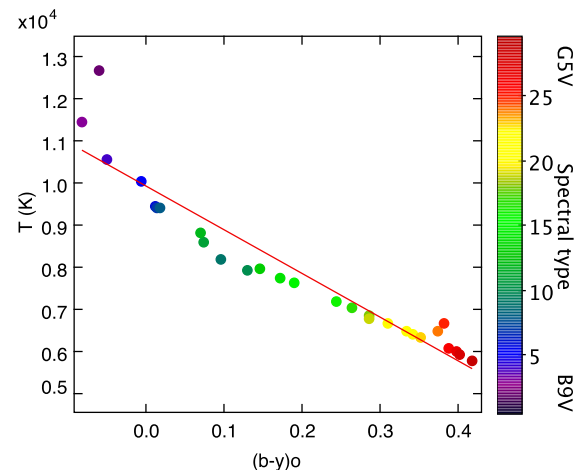


Fig. 2. This figure shows the dependence of the spectral type $(b-y)_0$ with the derived T_{eff} .

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