

N31a The chromospheric helium line at 10830 Å: observational trends with stellar parameters and the synthetic spectra

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The stellar helium abundance is an essential parameter which is expected to provide important clues on several important astrophysical questions. They include 1) the formation of more than one main-sequences/red-giant-branches observed in nearly all the globular clusters, and 2) the double red clumps found in a part of the Milky Way bulge. Helium abundance is believed to be enhanced in the second (and later) generation(s) in globular clusters and one of the double red clump, though the latter is still under intense debate. However, it is hard to determine the helium abundance of a late-type star spectroscopically. Previous studies show that the chromospheric helium line at 10830 Å has the potential to be used as a helium abundance indicator, but observations of this line have been insufficient. We observed the helium line of more than 150 late-type stars covering a wide range of stellar parameters using WINERED. We found that its equivalent width shows a systemic variation with effective temperature and metallicity. This systematic variation indicates that the structure of the stellar chromosphere also depends on effective temperature and metallicity in a systematic way. Once we construct the stellar chromosphere model for a given star, we can determine the helium abundance based on the helium 10830 Å line by using the spectral synthesis, for which we are going to present some results obtained with the NLTE spectrum synthesis program, PANDORA, by Dr. E. Avrett and collaborators.