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A HOMOGENEOUS STELLAR SAMPLE FOR THE STUDY OF METAL-RICH POPULATIONS

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RESUMEN

Reportamos resultados preliminares de un proyecto cuyo objetivo es construir una base de datos espectroscópica homogenea de estrellas supermetálicas (SMR). La base de datos servirá como herramienta para el estudio de poblaciones estelares viejas. Utilizando el método de ajuste de flujo hemos comparado datos espectroscópicos de resolución intermedia de una muestra de estrellas clasificadas como SMR con una red de espectros sintéticos y derivado simultáneamente los tres parámetros atmosféricos fundamentales ($T_{\rm eff}$, $\log g$, [M/H]).

ABSTRACT

We report on preliminary results of a project intended to construct a homogeneous spectroscopic data base of super metal-rich stars (SMR). The data base will serve as a tool for studies of old stellar populations. Using the flux fitting method we have compared mid-resolution spectroscopic data of a sample of SMR candidates with a grid of synthetic spectra and derived simultaneously the three leading atmospheric parameters ($T_{\rm eff}$, $\log g$, [M/H]).

Key Words: **GALAXIES: STELLAR CONTENT — STARS: FUNDAMENTAL PARAMETERS**

1. INTRODUCTION

The investigation of integrated spectrophotometric properties of stellar populations using the method of population synthesis requires several important components like: a) a complete and homogeneous stellar data base which could be empirical and/or theoretical and b) a set of reliable atmospheric parameters associated with each spectrum in the data base. Current empirical libraries widely used for population studies are rather incomplete in some regions of the parameter space, in particular for the very metal-poor and metal-rich stars. The construction of empirical data bases has to overcome another difficulty related to the non-uniqueness of the parameters available in the literature, even for the so-called prototype stars (see Taylor 1991 for a discussion of μ Leo). The selection of parameters is seldom an easy task and authors have to either select the values they believe more reliable, or to average the available values for a single star. Both procedures introduce uncertainties with unknown effects on integrated properties such as age or global chemical composition. Motivated by the increasing evidence that super solar chemical composition exists in galactic and extragalactic populations, we have undertaken a project to create a large stellar data base with the aim of providing the basic tools to

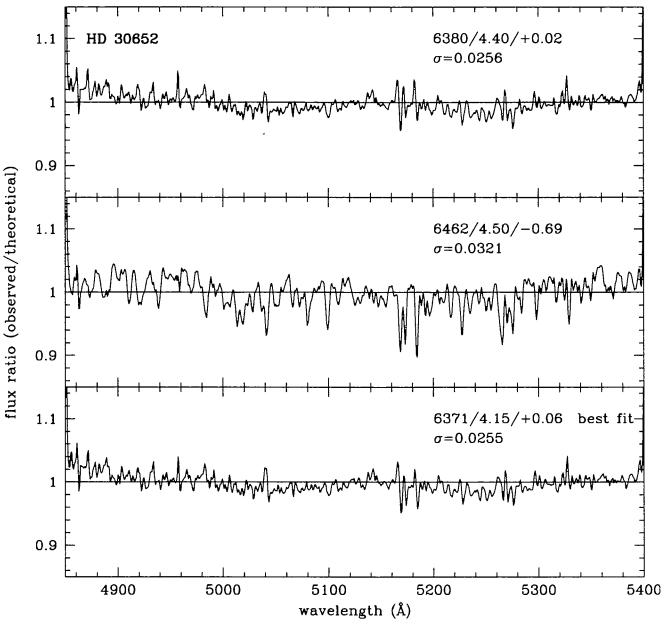

Fig. 1. Comparison between the observed flux of HD 30652 and three synthetic spectra computed for two sets of parameters listed in the Cayrel et al. (1997) and our best fit.

understand the properties of metal-rich populations and to define the metallicity scale of super-solar stars.

2. OBSERVATIONS AND COMPARISON WITH THEORETICAL SPECTRA

A sample of 139 SMR candidates selected from three sources in the literature (see Chávez et al. 1996 for details on selection criteria) were observed at the Guillermo Haro observatory with the 2.12m telescope. We used a Böller & Chivens spectrograph and a 300 gr/mm grating to obtain spectra in the interval 4850-5400 Å at a resolution of 2.5 Å (FWHM).

For the comparison we used the grid of synthetic spectra described by Chávez et al. (1997). The spectra in the grid were properly degraded with a gaussian filter and rebinned to match the observations. The fitting procedure was done following the prescription of Malagnini & Morossi (1983). The least square code to carry out the fitting was conveniently modified to work at the resolution of the observations and to give as output the three leading parameters for each star. In Figure 1 we display the results for the star HD 30652. The three panels show the flux ratio between the observed spectrum and three theoretical spectra computed considering two sets of parameters from Cayrel et al. (1997) and our best fit. The parameters in the form $T_{\rm eff}/\log g/[M/H]$ and the dispersion of the ratios are indicated at the top right of each panel. Results for the full sample will be presented in Malagnini et al. (2000).

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