FUNDAMENTAL PARAMETERS OF MCP STAR HD 17330 WITH WIDE DEPRESSION IN THE CONTINUUM

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We present a measurement of fundamental parameters and magnetic field of the CP star HD 17730 with broad flux depression centered at 5200 Å. This work continues the series of papers about detailed study of individual magnetic CP stars with large flux depressions [1, 2].

Keywords: Stars—Chemically peculiar stars—Fundamental parameters—Magnetic field

1. INTRODUCTION

In the work by Cramer & Maeder [3] a correlation between the photometric parameter Δa and the strength of the surface magnetic field B_s was introduced. The first attempt to find any correlations between these parameters was made in the paper by Kudryavtsev et al. [4]. However, more statistics are needed to quantify this relation.

2. OBSERVATIONS

Spectropolarimetric data were obtained with the Main Stellar Spectrograph (MSS) [5] installed in the Nasmyth-2 focus of the 6-m telescope. 22 circularly polarized spectra for this star were taken during the observational program. Main characteristics of the spectra see in Table 1.

The observational technique and data reduction had been described in paper [6].

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Table 1. Main characteristics of spectra from MSS

Spectral range	4400-4970 Å, 3950-4365 Å
Resolution	15 000
Signal-to-noise	300-400

3. METHODS AND RESULTS

The fundamental parameters were estimated using the following technique: T_{eff} and log g were determined using both model atmospheres of the polarized spectra and photometric calibrations (see Figure 1).

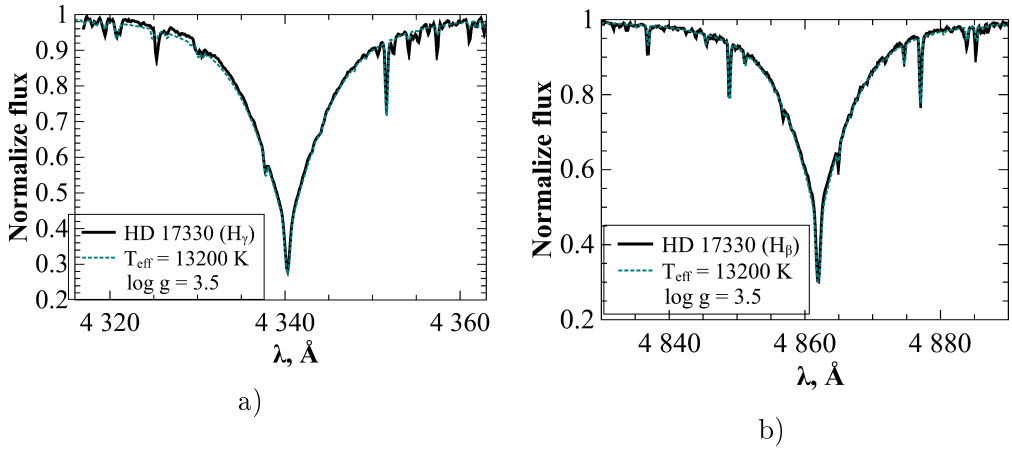

Fig. 1. Determination of T_{eff} and log g using model atmospheres. Two spectral lines were used for the estimation: H_γ (a) and H_β (b).

Luminosity and radius were determined by using fundamental laws (see e.g. [7]). After this, using evolution tracks from [8] we determined mass and age of the star (see Figure 2).

We measured magnetic field using two methods: standard Babcock's method [12] and regression method, implemented by Bagnulo et al. [13]. In Table 2 the RMS magnetic field is shown [14]. We are unable to find any periodic variations for this star using obtained magnetic measurements. Taking into account small $v \sin i$, HD 17330 can be a slow rotator or the star which is seen from the pole. More detailed study is needed to distinguish between these two assumptions.

Table 2 summarizes all the parameters found for HD 17330.

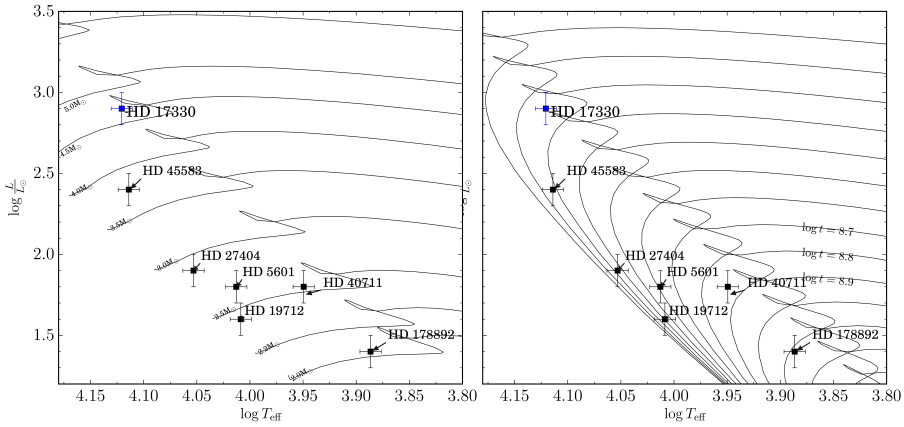

Fig. 2. Evolution tracks for HD 17330 and other stars with large flux depressions.

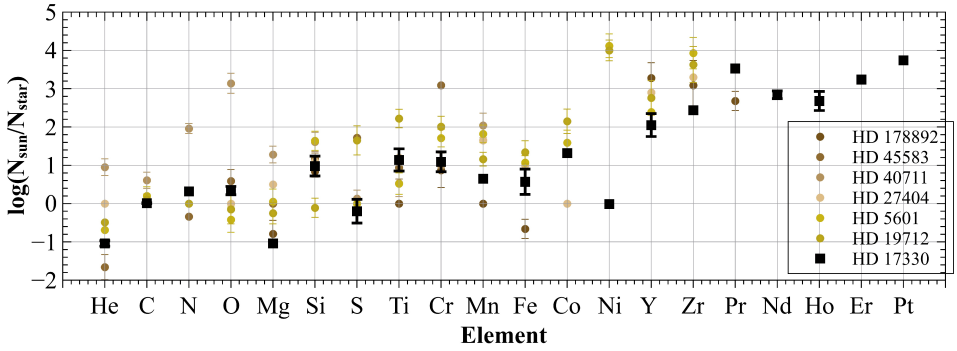

Fig. 3. Chemical composition of HD 17330.

Table 2. HD 17330 summary

T_{eff}(sp)/(phot)	13200±210 / 8500±113	$v_e \sin i$, km s^{-1}	<20
log g(sp)/(phot)	3.5±0.2 / 3.8±0.3	log$L/L_\odot$	2.9±0.2
M, M$_\odot$	4.6±0.4	R, R$_\odot$	5.4±0.5
$(<B_e^2>)^{1/2}$ (cog)/(regr), Gs	394±61 / 366±28	χ^2/n (cog)/(regr)	6.5 / 13.1
log t	8.2		

4. ACKNOWLEDGEMENT

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