Contrib. Astron. Obs. Skalnaté Pleso **48**, 294 – 295, (2018)

Physical properties of three young magnetic chemically peculiar stars

E. Semenko[1] **and E. Semenova**[2]

[1] *Special Astrophysical Observatory, Nizhnii Arkhyz, Russia, 369167, (E-mail: sea@sao.ru)*

[2] *Kazan Federal University, Kazan, Russia, 420008*

Received: November 9, 2017; Accepted: January 2, 2017

Abstract. We report the recent measurements of a longitudinal effective magnetic field and the estimations of physical parameters for three young chemically peculiar stars.

Key words: stars: atmospheres – stars: magnetic field

1. Stars selection and observations

The origin of magnetic fields in early-type stars remains an open question, and magnetic chemically peculiar stars are perfect test-beds here.

We have searched the catalog by Renson & Manfroid (2009) for young magnetic stars based on the criteria of objects having outlying SrCrEu-type anomalies banded with early spectral classes, and selected two poorly studied stars: HD 50341 and HD 63347. Later we added HD 201174, previously known from observations to be A0 SrCrEu magnetic star.

The current study is based on spectropolarimetric observations carried out with the 6-m telescope at the Special Astrophysical Observatory. Raw data was reduced with the use of ESO-MIDAS system.

2. Physical parameters and magnetic field

We have attempted to estimate basic physical parameters from the H_β spectral region using the SME code (Piskunov & Valenti, 2017) assuming the stars to be non-magnetic. If present, we also used Geneva or Strömgren photometric data to estimate $T_{\rm eff}$ and $\log g$.

Stellar physical parameters obtained from different sources are reviewed in Table 1. According to the listed values of the effective temperature and luminosity, the stars lay near ZAMS on a theoretical HR diagram.

Magnetic properties of the stars were obtained from time series of the effective magnetic field (B_l) measurements. For HD 50341 and HD 63347, we have found the presence of the magnetic field for the first time. Also, we found rotational periods derived from magnetic measurements to be in perfect agreement

Table 1. Derived physical parameters and rotational characteristics of sample stars.

	HD 50341	HD 63347	HD 201174
$T_{\rm eff}$ (phot), K	10 870	–	9 690
$\log g$ (phot)	4.3	–	3.8
$T_{\rm eff}$ (spec), K	10 800	11 600	9 600
$\log g$ (spec)	4.0	4.5	4.0
$v_{\rm e} \sin i$, km s^{-1}	50	43	< 20
$\log L/{\rm L}_{\odot}$	1.67	1.66	1.45
$P_{\rm rot}$, days	2.5094	1.7495	2.4300

with those mentioned in the literature. Rotational period of HD 201174 was derived, to our knowledge, for the first time.

The best-fit model for longitudinal field phase curves of HD 63347 and HD 201174 is a two harmonic extension of periodic functions (see Fig. 1). HD 50341 has the weakest field in the sample, which does not allow to draw any conclusions about its topology.

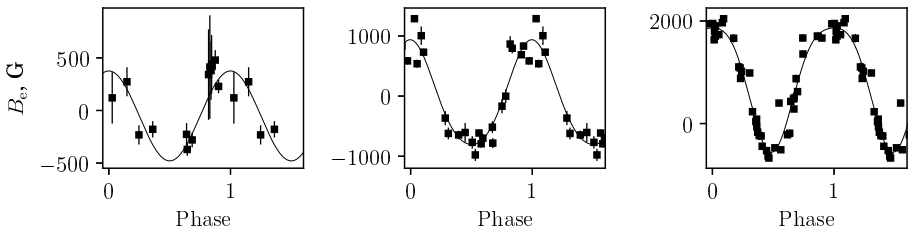

Figure 1. From left to right: phase curves of the longitudinal field of HD 50341, HD 63347, and HD 201174.

Acknowledgements. This work is supported by the Russian Science Foundation, grant No.14-50-00043.

References

Piskunov, N. & Valenti, J. A. 2017, *Astron. Astrophys.*, **597**, A16

Renson, P. & Manfroid, J. 2009, *Astron. Astrophys.*, **498**, 961