Magnetic Stars, 2011, pp. 470 – 472

HD 182255 — a Candidate Magnetic Variable He–w Star

Glagolevskij Yu. V.[1], **Chountonov G. A.**[1], **Shavrina A. V.**[2]

[1] Special Astrophysical Observatory, Nizhny Arkhyz, Russia
[2] Main Astronomical Observatory of the National Academy of Sciences of Ukraine

Within the program of spectroscopic research of different types of stars on the 6–m BTA telescope (Glagolevskij et al., 2010), the roAp star HD 182255 was investigated. The resolution was 15000 on the Main Stellar Spectrograph (MSS), $S/N \geq 1000$.

Preliminary results:

1. The star demonstrates spectral variability linked with its rotation, as well as a fast variability. It follows, in particular, from Fig. 1a, where points show the central intensity of line in 2008 – 2009, and asterisks — the ELODIE Archive (EA) spectra in 2002 – 2003 smoothed to the resolution of the MSS.

2. The central intensity of lines He 4026 Å behaves similarly (Fig. 1b). The estimation of the abundance of He shows that along with general underabundance over the surface, it is intensified in the phase $\Phi = 0$. It denotes as well that the star belongs to the He–weak type of stars.

3. The behaviour of the semi–sum of full Si II 4128, 4130 AA line intensities is opposite to the helium, where helium is strengthened and silicon is weakened.

4. As silicon (Vauclair et al., 1979, 1991) accumulates in the areas between magnetic poles, where the magnetic lines are aligned horizontally ($\Phi = 0.5$), it is possible to assume that the star has a magnetic field with the magnetic pole passing through the central meridian in $\Phi = 0$.

5. The fact that helium abundance is increased in the magnetic pole, as compared to other regions, can be an indication of the presence of wind in the poles (Vauclair et al., 1979, 1991).

6. The structure of the atmosphere changes with time. Figure 2a demonstrates the distribution of temperature in the atmosphere in the phase $\Phi = 0.07$ and Fig. 2b — in the phase $\Phi = 0.53$ of the rotation period, obtained from the hydrogen line profiles in 2008 – 2009. Different structures of the atmosphere in different phases is well seen.

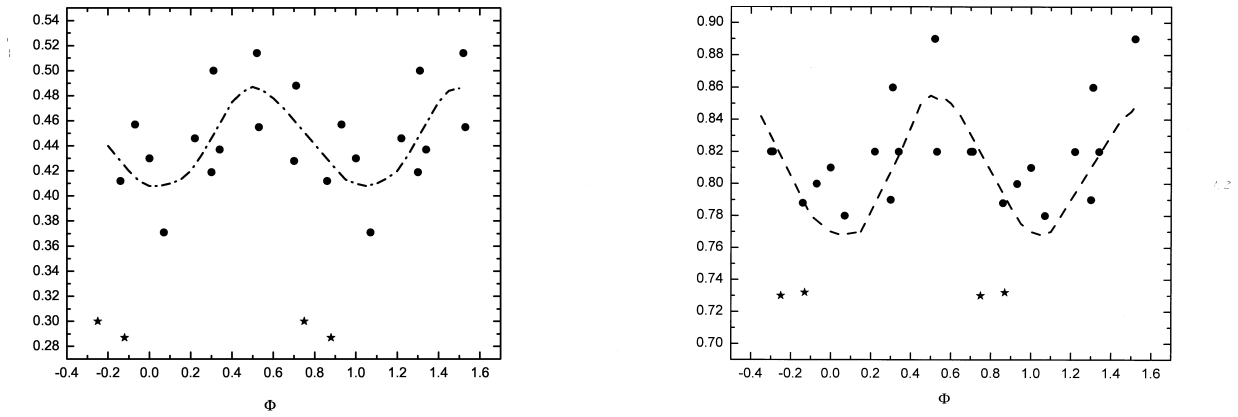
7. The stratification of helium in Fig. 3a, obtained from the He I 4026 Å line profile in two phases $\Phi = 0.07$ (dashed line), 0.53 (solid line). Solar abundance of He is represented with the horizontal line.

8. The Si stratification on Fig. 3b, obtained from the Si II 4128, 4130 Å line profiles in two phases $\Phi = 0.07$ and 0.53. Solar abundance of Si is marked with the horizontal line.

9. Based on the stellar parameters we can conclude that HD 182255 is probably a young star, which has just arrived on the Main sequence.

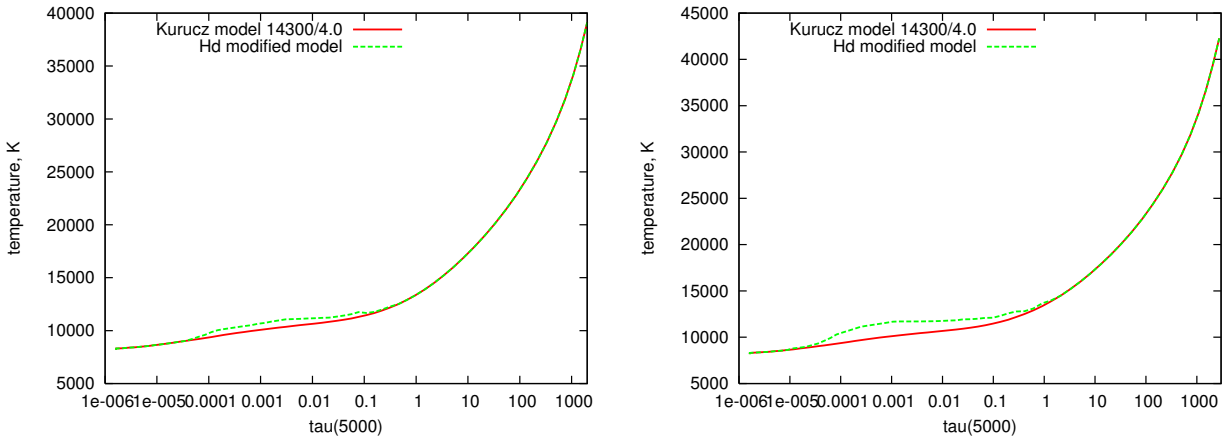
10. Our observations allow to specify the period and the resulted JD time dependence is constructed with the following ephemeris (the maximal intensity of He lines are in the phase $\Phi = 0$: JD $2450650.4720 + 1.2624940E \pm 0.0000005$ d

11. Our results have a preliminary character.



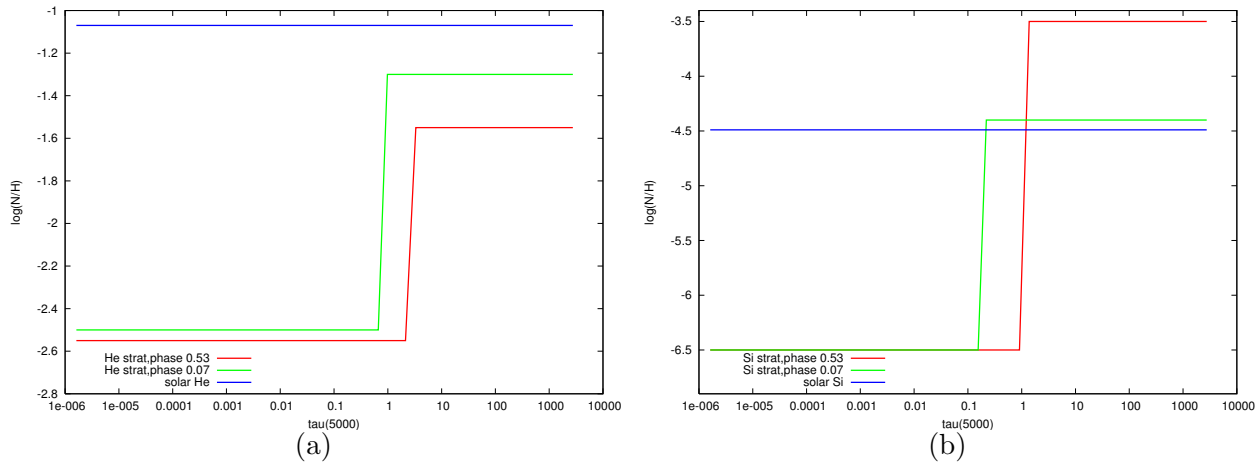
(a) (b)

Figure 1: The points show the central intensity of the H_δ (a) and He I 4026 Å (b) lines in 2008 – 2009, and asterisks — the same in 2002 – 2003 (EA spectra)



(a) (b)

Figure 2: The $T - P$ dependence for the phase $\Phi = 0.07$ (a) and for the phase $\Phi = 0.53$ (b) in 2008 – 2009 obtained with the H_δ profile.



(a) (b)

Figure 3: The He (a) and Si (b) stratifications, obtained from the He I 4026 Å and Si II 4128, 4130 Å line profiles in two phases $\Phi = 0.07$ and 0.53. Solar abundances of He and Si are marked with horizontal lines.

References

Glagolevskij Yu. V., Shavrina A. V., Chountonov G. A., 2010, Astrophys. Bull., in press
Vauclair S., Dolez N., Gough D. O., 1991, A&A, 252, 618
Vauclair S., Hardorp J., Peterson D. M., 1979, ApJ, 227, 526