Astronomical Journal of Azerbaijan, 2020, Vol. 15, No. 2

SUMMARY LIGHT CURVE ANALYSIS OF THE T TAURI TYPE STAR AS205

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Phase light curves have been build based on photometric materials, obtained in 10 colors for different (B0-F0) magnetic CP stars. The light curves observed in the form of a double wave for most stars. The changes in the light curves occur in counter-phase, in different bands for some of the investigated late CP stars (A2-F0) of the SrCrEu type. It is shown, that the brightness variability in antiphase is explained by the energy blocking in the region $\lambda\lambda$5000 - 5500 ÅÅ(in range of depression λ5200Å), created mainly by rare earth elements, the excesses are reaching in the atmosphere of these stars 4.0 - 6.0 dex.

Keywords: magnetic stars– photometric variability.

1. INTRODUCTION

In the report presents the results of the analysis of the total light curve of the T Tauri type star EM* AS 205 ($\alpha 2000 = 16^h 11^m 31.343^s$, $\delta 2000 = -18^\circ$ 38'26.00") obtained from 7 years of ROTOR observations. For a total 355 nights of observations in the UBVRI bands, one estimate was obtained in each filter per night. There are significant seasonal changes in the brightness of the star with a stable average value of brightness for the year. The amplitude of seasonal changes in different bands is 2-3 mag in V-band.

In the Fig.1 we have presented a master light curve in V-band for time interval JD 2446955-2449235 performed for 7 years (1987-1993). As can be seen, the average annual brightness value remains almost unchanged, while significant variations in brightness are observed during the year. For example, in the V-band, the brightness is change from a maximum to a minimum of about 2-3 magnitudes. In Fig1. Color diagrams V versus U-B, B-V and V-R is presented. The color di-

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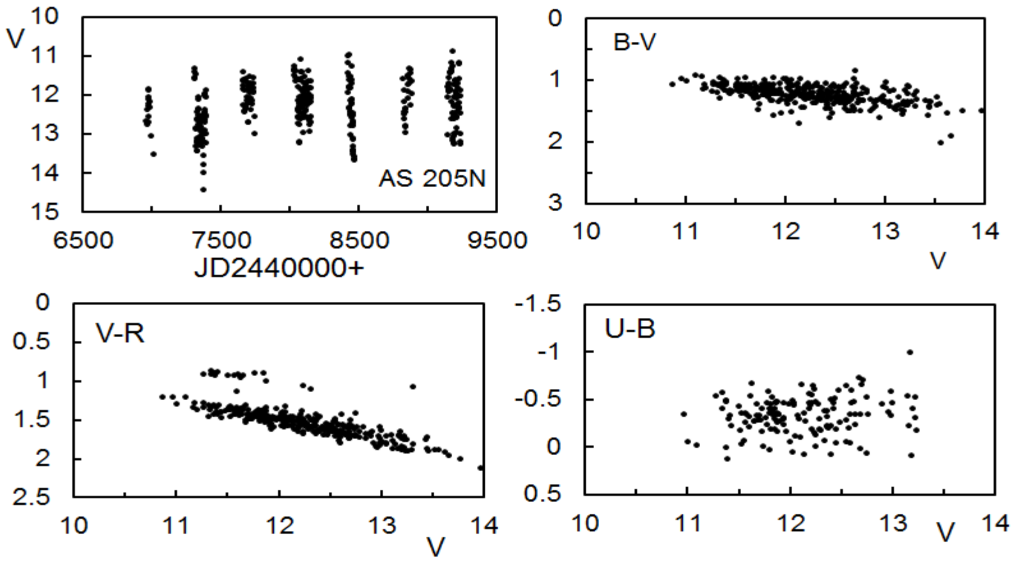

Fig. 1. Master light curve in V-band of AS 205N for 7 years (top left panel) and color diagrams U-B, B-V and V-R versus V-magnitude.

agrams B-V and V-R are demonstrated linear change versus V-band brightness, so it can be explained as cool spot mechanism on the stellar surface. The color diagram V U-B is demonstrated a flare-like activity in U band.

In the Table 1 the average values of seasonal brightness and the standard deviation from the mean value of the brightness are presented. In all bands for seasonal variability we are obtained $\sigma > 0.4$ mag.

Table 1. Mean annual brightness and its rms of the star in UBVR- bands.

Season	V	Rms	B	rms	R	rms	U	rms
1	12.462	0.431	13.544	0.516	10.962	0.350	13.190	0.438
2	12.724	0.596	14.032	0.665	11.223	0.769	13.512	0.543
3	12.003	0.343	13.211	0.410	10.616	0.322	12.811	0.403
4	12.079	0.463	13.242	0.533	10.628	0.308	12.868	0.584
5	12.403	0.744	13.651	0.906	11.364	1.092	12.628	0.734
6	12.030	0.493	13.255	0.559	11.036	1.081	12.795	0.416
7	12.122	0.605	13.371	0.694	10.636	0.564	13.153	0.606

By using the period searching software Perio04 which are working on the statistical Fourier analysis we have carried out V-brightness analysis for each season data's. From the selected 7 massive of points that relate to individual years, we found 3 frequently repeated most probable periods, $P_1 = 6.51 \pm 0.6, P_2 = 14.6 \pm 1.03 and P_3 = 24.71 \pm 0.9$ days. The obtained periods P_1 and P_3 are confirmed the periods, which were obtained in the work of Artemenko et al. (2010).

In Fig.2 it is shown a phase diagram for group of points in massive 7, which was obtained in one year. The phases were calculated for both periods P_1 and P_3. In the Fig.2 it was shown a phase diagram for the period P3, which can be explained eclipsing process by a secondary component with a dip at 2 mag in V band. On this data we have estimated a luminosity of the secondary component of the system. If for AS 205N $L = 3.98L\odot$ (Artemenko et al. 2012) then for the secondary component we can get L=0.6 $L\odot$, which is corresponding to the brown dwarf's luminosity.

Since the magnitude of the changes in brightness is large enough, such variations in the brightness of the star cannot be explained by the spotty structure of the surface. It is assumed that periods longer than 6 days may be related by duality or multiplicity of the system.

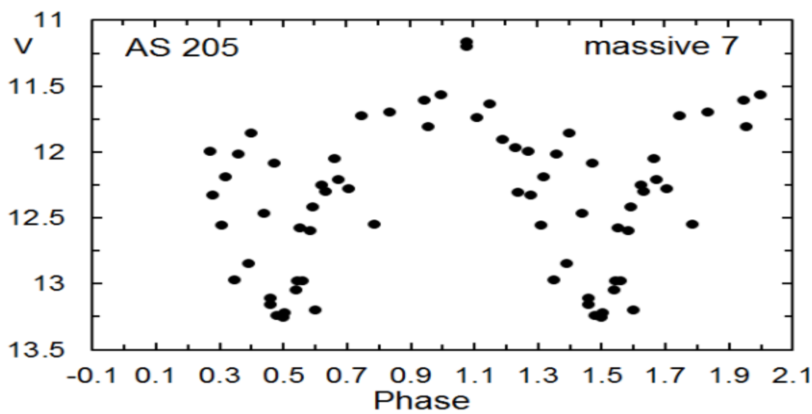

Fig. 2. Phase diagram for the period P3 calculated in model with the eclipsing elements Min I = JD 2447379.36 +24.71E

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