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TWO - COLOUR OBSERVATIONS OF BP PEGASI

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A b s t r a c t .- Two - colour observations of BP Pegasi show that the star is a dwarf cepheid with a period of $0^d.109$.

BP Pegasi was discovered to be variable by Shapley and Hughes/1934/. They found W Ursae Majoris - type variations with a period of $0^d.246$. According to Jacchia /1941/ Kukarkin classified the star as a cluster - type variable with a period of $0^d.10944$ and light amplitude $0^m.34$. Jacchia himself after rediscussion of Miss Hughes original observations decided that the star is certainly a W UMa - type and gave the elements

$$\text{Helioc. min.} = \text{JD } 2424850.742 + 0^d.2190862.E$$

Photometric two-colour observations of BP Pegasi were obtained with the 65 cm refractor of the Belgrade Observatory. The signal from a 1P21 photomultiplier was fed into a DC amplifier and recorded on a Brown strip - chart potentiometer. The filters used were Schott 2 mm GG 14 /yellow/ and 1 mm BG 12 + 2 mm GG 13 /blue/. BP Peg and the comparison star /cf. Fig. 1/ were observed alternately. Magnitude differences in two colours in the sense of : variable minus comparison are given in Table 1 and are displayed in Figure 2.

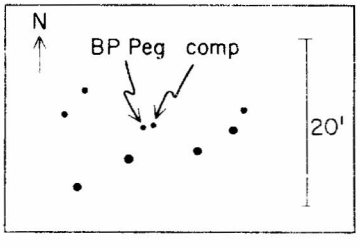

Fig. 1.

Identification chart for BP Pegasi and the comparison star.

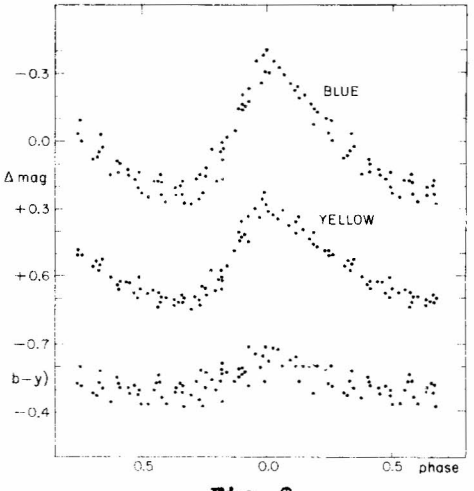

Fig. 2.

Blue and yellow light-curves and blue minus yellow colour-curve for BP Pegasi.

The elements: Helioc. max. = JD 2438620.472 + $0^{d}.1095431.E$ were used to compute the heliocentric phases in Figure 2.

T A B L E 1

Two-colour observations of BP Pegasi

JD hel 2438000+	y	b	JD hel 2438000+	y	b
620.3260	+0.72	+0.24	636.4347	+0.70	+0.17
.3384	+0.58	+0.04	.4432	+0.67	+0.18
.3982	+0.54	+0.07	.4516	+0.49	-0.04
.4073	+0.64	+0.09	.4576	+0.34	-0.17
.4167	+0.70	+0.21	.4644	+0.23	-0.30
.4260	+0.70	+0.24	.4727	+0.31	-0.29
.4351	+0.69	+0.18	.4792	+0.34	-0.19
.4449	+0.66	+0.16	.4859	+0.41	-0.07
.4548	+0.56	-0.01	.4924	+0.49	-0.03
.4641	+0.45	-0.23	.4992	+0.56	+0.08
.4731	+0.32	-0.30	.5071	+0.61	+0.15
.4820	+0.38	-0.25	.5151	+0.63	+0.15
.4911	+0.44	-0.16	.5229	+0.68	+0.25
.5006	+0.51	0.00	.5310	+0.70	+0.27
.5101	+0.53	+0.03	.5392	+0.70	+0.28
.5213	+0.63	+0.13	.5472	+0.65	+0.23
.5324	+0.67	+0.18	.5556	+0.61	+0.17
.5420	+0.71	+0.21	636.5638	+0.36	-0.20
.5524	+0.71	+0.26	638.3081	+0.62	+0.04
.5622	+0.66	+0.09	.3162	+0.44	-0.15
.5715	+0.42	-0.15	.3273	+0.28	-0.40
620.5800	+0.26	-0.38	.3438	+0.40	-0.20
636.2986	+0.68	+0.17	.3537	+0.49	-0.10
.3086	+0.74	+0.18	.3650	+0.55	-0.03
.3185	+0.72	+0.20	.3729	+0.66	+0.14
.3270	+0.73	+0.15	.3827	+0.66	+0.23
.3360	+0.58	+0.05	.3907	+0.72	+0.19
.3449	+0.43	-0.16	.3973	+0.73	+0.24
.3528	+0.34	-0.25	.4041	+0.75	+0.28
.3608	+0.35	-0.32	.4108	+0.69	+0.12
.3692	+0.36	-0.24	.4177	+0.62	+0.01
.3765	+0.46	-0.14	.4252	+0.41	-0.14
.3840	+0.51	-0.09	.4322	+0.30	-0.35
.3925	+0.58	+0.05	.4402	+0.33	-0.35
.4012	+0.63	+0.10	.4498	+0.41	-0.23
.4097	+0.61	+0.14	638.4592	+0.47	-0.13
636.4186	+0.68	+0.15			

The period is one half of that given by Jacchia. The asymetry of the light - curve and large amplitude of the colour - curve leave no doubt that BP Pegasi is not a W UMa-type variable. The resemblance to such stars as DY Her or EH Lib is very close and BP Peg should be classified as an ultra short-period pulsating stars.

It is a pleasure to express my sincere gratitude to the staff of the Belgrade Observatory and particularly to Dr V. Oskanjan for affording me the opportunity of using the 65 cm refractor, and also for their help during my stay in Belgrade. The present investigation was made possible by a grant from the Yugoslav Federal Council for Scientific Research.

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PHOTOMETRIC OBSERVATIONS OF DELTA DELPHINI

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A b s t r a c t .- Photoelectric observations of Delta Delphini in yellow light are presented. The improved period of $0^d.1567920$ is obtained. It is shown that radial velocity minimum coincides with maximum brightness.

The variability in the light of Delta Delphini was discovered by Eggen /1956/. He derived the period of $0^d.13505$. Struve et al. /1957/ have found radial velocity variations with a period of $0^d.13447$. On the basis of Perry's /1957/ lightcurve Struve came to the conclusion that maximum brightness occurs approximately halfway on the ascending branch of the mean velocitycurve. Wehlau and Leung /1964/ obtained the period of $0^d.15680$ on the basis of their extensive photometry.

In this note some new observations of Delta Delphini are presented. These Observations were made in July, 1964 using a 1P21 photomultiplier attached to the 65 cm refractor of the Belgrade Observatory. The filter employed was the Schott 2 mm GG 14. The Observations were left on the instrumental colour system and are given in Table 1. Zeta Delphini was chosen as the comparison star. The magnitude differences are given in the sense of Delta Delphini minus Zeta Delphini.

T A B L E 1

Observations of Delta Delphini in yellow light

JD hel 2438598+	mag	JD hel 2438605+	mag
0.3680	-0.243	0.3360	-0.225
.3745	.233	.3424	.221
.3805	.231	.3488	.223
.3867	.251	.3547	.218
.3932	.249	.3602	.214
.3994	.269	.3664	.216
.4062	.272	.3726	.226
.4121	.272	.3758	.229
.4189	.280	.3824	.216
.4298	.267	.3851	.229
.4359	.258	.3914	.224
.4418	.239	.3967	.219
.4450	.225	.4029	.229
.4615	.217	.4093	.228
.4653	.198	.4156	.227
.4719	.202	.4213	.231
.4755	.216	.4281	.233
.4862	.208	.4373	.265
.4937	.205	.4451	.265
.5016	.216	.4523	.272
.5226	.243	.4618	.265
.5303	.245	.4687	.266
.5383	.274	.4765	.243
.5415	.273	.4832	.234
.5502	.265	.4898	.231
.5587	.265	.4963	.220
.5662	.258	.5026	.214
.5748	.240	.5086	.201
0.5846	-0.261	.5148	.215
		.5210	.220
		.5272	.222
		0.5331	-0.211

With the period given by Wehlau and Leung /1964/ the normal light maxima were obtained from the observations made by different authors. These maxima are given in Table 2. It was found that the elements that give the best fit to all the normal maxima are

Hel. max. = JD 2435613.861 + $0^d.1567920.E$

T A B L E 2

Normal light maxima of Delta Delphini

Observed max. JD hel	O-C	Epoch	Observer
2435613.859	-0^{d}.002	0 - 268	Eggen
5758.738	+0.001	924 - 950	Perry
7849.871	-0.001	14216 - 14300	Wehlau and Leung
7873.694	-0.010	14356 - 14452	"
7891.730	-0.005	14496 - 14574	"
7914.625	-0.002	14617 - 14725	"
2438598.403	+0.006	19035 - 19080	Paczyński

The O-C deviations from these elements are also given in Table 2. The observations given in Table 1 are displayed in Figure 1. The elements

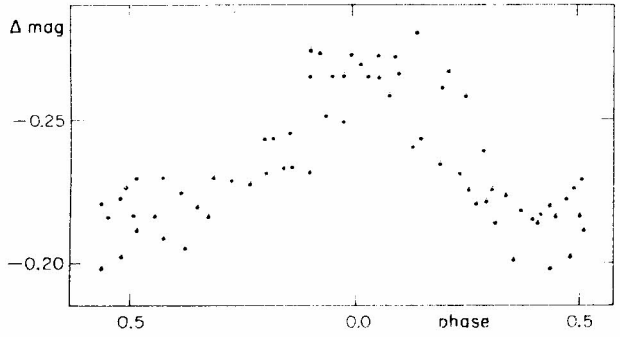

Fig. 1.

Yellow light curve of Delta Delphini in 1964

given above were used to compute the heliocentric phases. The same elements were used to compute the phases for the photometric observations made by Perry /1957/ and for the radial velocity observations published by Struve et al. /1957/. The light and radial velocity curves obtained in such a way are shown in Figure 2. Both photometric and spectroscopic observations displayed in Fig. 2 were made in

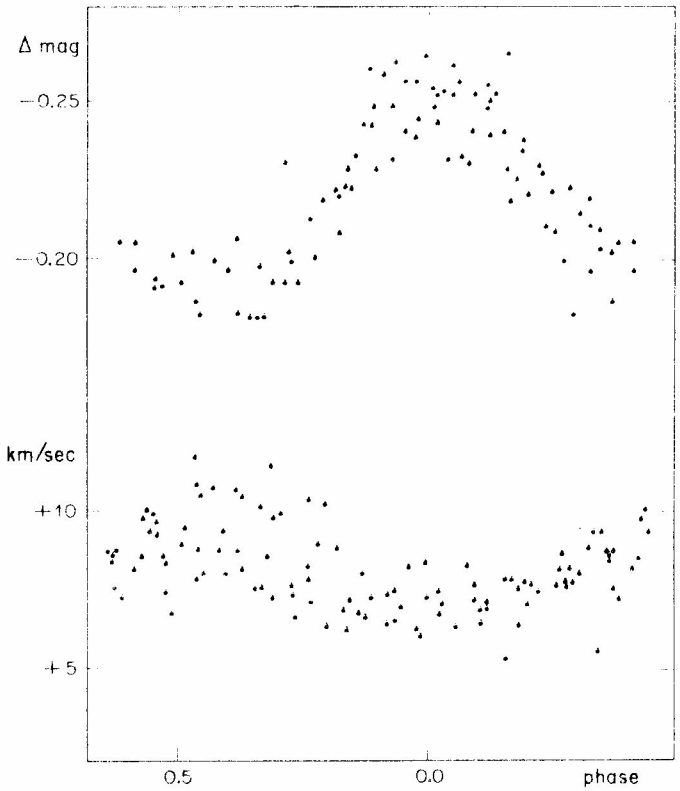

Fig. 2.

Yellow light curve /Perry, 1957/ and radial velocity curve /Struve et al., 1957/ of Delta Delphini

the same season. It is clear that with the new period maximum brightness approximately coincides with minimum

radial velocity. Therefore, the phase relation for Delta Delphini is the same as that found by Paddock and Struve /1954/ for Delta Scuti and by Wilson and Walker /1956/ for CC Andromedae.

It is possible to fit the normal maxima in Table 2 with a period of $0^d.1568264$, but O-C deviations are then 2.5 times larger than those obtained from a period of $0^d.1567920$. In any case the phase relation between the light and radial velocity variations remains unchanged.

It is a pleasure to express my sincere gratitude to the staff of the Belgrade Observatory and particularly to Dr V. Oskanjan for affording me the opportunity of using the 65 cm refractor, and also for their hospitality and help during my stay in Belgrade. The present investigation was made possible by a grant from the Yugoslav Federal Council for Scientific Research.

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Fin du Volume

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