

AG VIRGINIS
 PHOTOGRAPHIC LIGHT—CURVE AND ELEMENTS

V. M. BODOKIA

The star 3,1929 Virginis, later designated as AG Virginis¹, was discovered by Guthnick and Prager on plates of the Berlin-Babelsberg Observatory².

The star was observed photographically by Prager³ and visually by Kukarkin⁴ and Dugan⁵. The latter, on the basis of observations made by Prager, Kukarkin and himself, computed the following elements for the star:

$$\text{Min} = 2426418.991 + 0^d.64265 \cdot E$$

Photographic observation material of AG Virginis, secured by 210 observations covering the period from March 5 to July 6, 1930 was obtained at Abastumani on 30 plates in all. Exposures of 7 to 10 minutes were made. Other photographic conditions were exactly similar to those for OO Aquilae⁶.

The photographic brightness of 5 comparison stars was obtained by taking on the same plate the areas AG Virginis and KSA37. The magnitudes of the comparison stars are given in Table I.

TABLE I ცხარე

	m
a) BD + 13°2485	6.60
b) BD + 13°2480	10.07
c) BD + 13°2483	9.48
d) BD + 13°2484	10.14
e) BD + 12°2411	8.69

The photographic brightness of the variable is given in Table II.

TABLE II 3660⁰⁰

J. D. [⊙]	Ph. Mg.	J. D. [⊙]	Ph. Mg.	J. D. [⊙]	Ph. Mg.
	m		m		m
2427859. 387	7.45	2427918. 338	7.72	2427956. 292	7.37
2427867. 285	7.75	347	7.62	297	7.20
296	7.65	356	7.59	303	7.22
314	7.43	363	7.74	308	7.32
326	7.74	371	7.73	314	7.31
328	7.56	381	7.71	319	7.38
2427885. 252	7.53	389	7.51	330	7.30
264	7.78	397	7.55	335	7.10
276	7.58	404	7.60	341	7.14
306	7.39	410	7.46	346	7.18
323	7.58	436	7.59	352	7.49
333	7.14	444	7.58	358	7.22
343	7.40	452	7.75	363	7.12
2427886. 327	7.53	461	7.38	369	7.18
335	7.69	469	7.17	374	7.36
342	7.46	477	7.64	380	7.18
349	7.46	2427946. 328	7.61	2427976. 285	7.69
357	7.54	335	7.53	290	7.48
364	7.74	343	7.29	296	7.50
371	7.80	351	7.46	301	7.70
379	7.80	359	7.38	310	7.47
2427887. 234	7.22	374	7.34	316	7.58
242	7.27	381	7.54	322	7.50
252	7.20	388	7.27	2427977. 274	7.74
260	7.18	396	7.37	279	7.74
267	7.15	404	7.40	285	7.72
274	7.16	2427947. 355	7.47	290	7.75
283	7.30	360	7.40	308	7.44
290	7.52	368	7.33	313	7.63
299	7.50	376	7.41	318	7.66
306	7.46	384	7.30	323	7.57
318	7.73	394	7.32	330	7.80
325	7.33	401	7.14	2427978. 262	7.66
332	7.46	409	7.25	267	7.72
339	7.50	2427948. 267	7.62	272	7.90
346	7.70	360	7.57	292	7.90
354	7.41	381	7.40	297	7.90
362	7.68	389	7.41	304	7.65
369	7.95	2427949. 254	7.26	309	7.94
377	7.57	301	7.34	314	7.81
2427901. 261	7.66	316	7.21	321	7.02
268	7.90	326	7.20	325	8.71
274	7.92	327	7.37	330	8.02
282	7.85	333	7.25	335	7.98
289	7.83	339	7.24	2427979. 262	8.15
296	7.64	348	7.34	267	8.11
304	8.08	355	7.26	272	8.04
311	7.52	360	7.34	276	8.15
318	7.54	365	7.34	279	8.00
326	7.63	371	7.42	2427981. 256	8.40
338	7.60	382	7.50	261	8.32
352	7.76	387	7.58	266	8.27
359	7.70	394	7.68	270	8.22
367	7.69	400	7.79	275	8.23
374	7.61	2427956. 265	7.61	281	8.15
381	7.67	272	7.42	286	8.06
	7.65	278	7.58	291	8.05
		286	7.44	295	7.89

TABLE II 3660⁰⁰

J. D. [⊙]	Ph. Mg.	J. D. [⊙]	Ph. Mg.	J. D. [⊙]	Ph. Mg.
	m		m		m
2427981. 300	7.86	2427983. 274	7.95	2427988. 292	8.27
311	8.00	279	7.69	297	8.20
2427982. 259	7.90	284	7.68	300	8.20
264	7.96	290	7.60	304	8.24
269	7.96	295	7.62	309	8.34
274	7.90	301	7.79	314	8.40
279	7.72	311	7.48	2427989. 269	8.10
287	7.76	317	7.62	274	7.89
291	7.57	323	7.70	283	7.86
296	7.60	2427988. 260	8.00	290	7.91
306	7.62	266	8.03	295	7.84
317	7.34	271	8.00	2427990. 301	8.12
324	7.39	276	8.24	306	7.83
329	7.45	281	8.20	312	7.90
334	7.48	286	8.24	316	7.77
339	7.56			322	7.68

On the basis of Dugan's elements the correction for [the period $\Delta P = -0^d.000010$ was obtained, the new elements being

$$\text{Min} = 2426418.991 + 0^d.642640 \cdot E.$$

Fig. I shows the mean photographic light-curve obtained.

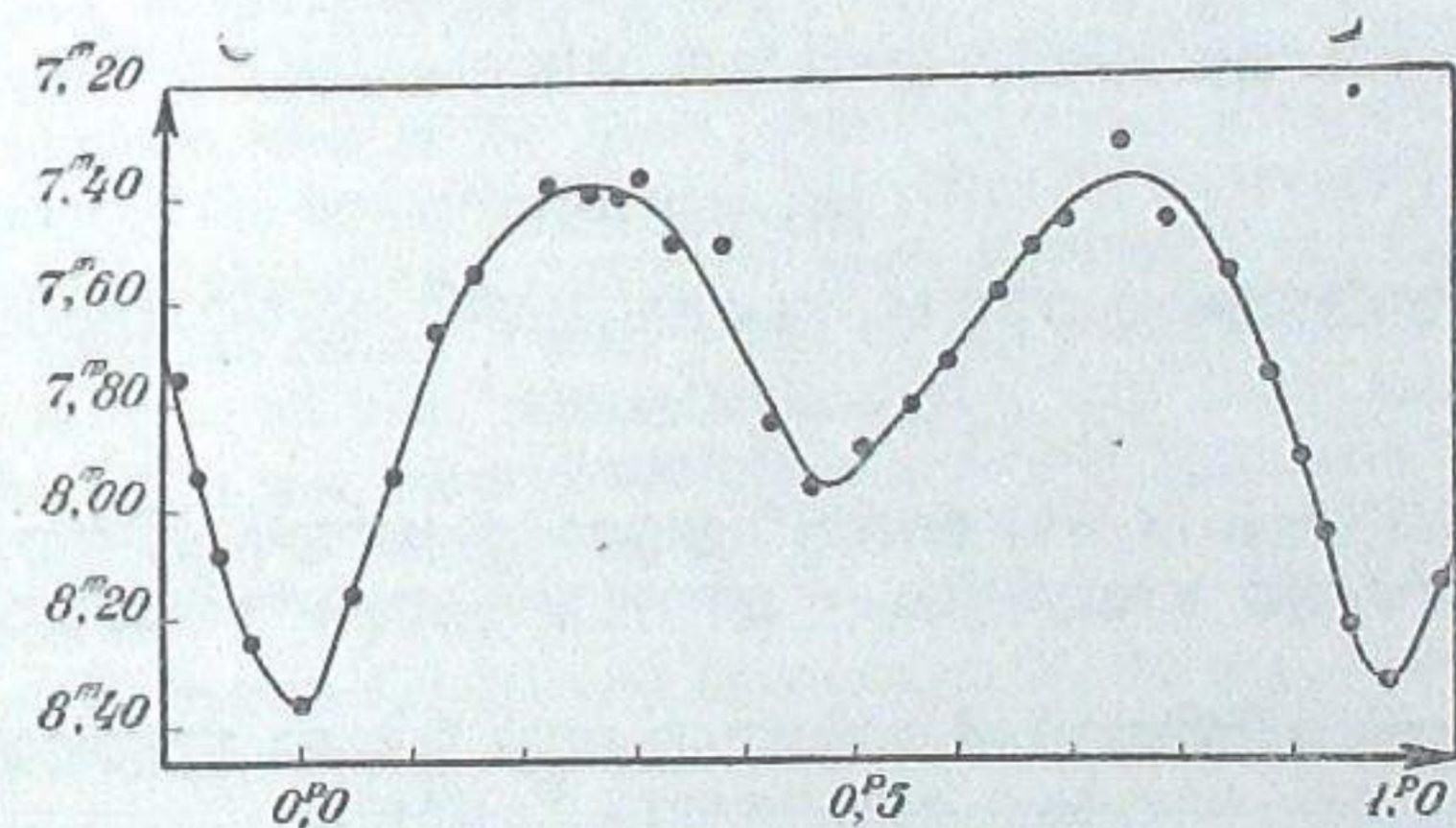


Fig 1 5sb.

The normal points determining this curve are listed in Table III. The phases have been computed by the formula:

$$\text{Phase} = (\text{J. D.} \ominus - 2426418.991) \cdot P^{-1}$$

where $P^{-1} = 1.556081$.

TABLE III ცხრილი

Phase	Ph. Mg.	n	Phase	Ph. Mg.	n	Phase	Ph. Mg.	n
p	m		p	m		p	m	
0.006	8.35	5	0.348	7.50	10	0.709	7.48	10
047	8.14	5	393	7.52	10	705	7.33	10
084	7.94	5	437	7.85	5	796	7.48	10
122	7.66	5	477	7.97	5	854	7.57	10
164	7.56	10	515	7.90	5	896	7.75	10
236	7.40	10	562	7.83	10	922	7.92	5
276	7.41	10	601	7.76	10	935	8.05	5
298	7.42	10	646	7.62	10	963	8.23	5
320	7.38	10	680	7.54	10			

Examination of the curve reveals that the minima are disposed quite symmetrically but that their depths greatly differ:

$$\text{Min}_I = 8^m.35 \quad \text{Min}_{II} = 7^m.97.$$

The maxima also range symmetrically and are equal:

$$\text{Max} = 7^m.40.$$

This seems to indicate that this star is probably of the short period β Lyrae type.

The author is indebted to L. A. Sukharev and V. V. Vikhrov for their assistance in gathering the photographic material and to E. Dolidse who made the microphotometric measurements.

November, 1935.

Literature: ლიტერატურა:

1. A. N. 237, p. 169, 1929.
2. B. Z. 13, 1929.
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6. Bull. Abast. Obs., 1, 1937.

AG VIRGINIS

ფოტოგრაფიული სიკაშკაშის მრუდი და ელემენტები

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(რეზუმე)

AG Virginis-ის ფოტოგრაფიული დაკვირვება სწარმოებდა 1935 წლის 5 მარტიდან 6 ივლისამდე. ამ დროის განმავლობაში მიღებული იყო 210 გამონახაზი.

მასალის დამუშავებამ ამ ვარსკვლავისათვის შემდეგი ელემენტები მოგვცა:

$$\text{Min} = 2426418.991 + 0^d642640 \cdot E$$

ფოტოგრაფიული სიკაშკაშის საშუალო მრუდის (ნახ. 1) განხილვა ცხად-პკოფს, რომ მინიმუმები სიმეტრულად არიან განლაგებულნი, მაგრამ მათი სიღრმე სხვადასხვაა ($\text{Min}_I = 8^m.35$; $\text{Min}_{II} = 7^m.97$). მაქსიმუმებიც ასევე სიმეტრული არიან და ამავე დროს ტოლნი.

ეს გარემოება გვაფიქრებინებს, რომ ვარსკვლავი AG Virginis მოკლე პერიოდის β Lyrae-ს ტიპის ცვალებადია.

ნოემბერი, 1935.

ZZ PERSEI

PHOTOGRAPHIC LIGHT-CURVE AND ELEMENTS

V. M. BODOKIA

The star ZZ Persei was discovered in 1922¹. It has been observed by Nakamura² and Martinov³ and was supposed to belong to the RR Lyrae type stars. On the suggestion of B. V. Kukarkin, who had ground to believe that ZZ Persei was of the W Ursae Majoris type, we undertook the observation of this star.

In the beginning of 1935 about 120 photographic images of ZZ Persei were obtained on Ilford Monarch plates (emulsion 6428 A). Considering the faintness of this star and the necessity of using a special light filter to avoid the orthochromatic effect of the above plates, exposures of 20 and 25 minutes were made. This, however, did not yield plates good enough for accurate measurements by photoelectric microphotometer. Moreover, long exposures like these may affect the results of observations of such a short period star as ZZ Persei. Owing to all these circumstances, and a very small range of light variation besides, it was impossible to obtain a definite light-curve on the basis of this material. The reduction of this material in 1935 merely showed that the star is of the W Ursae Majoris and not of the RR Lyrae type, as indicated in Prager's Katalog und Ephemeriden V. S., 1935.

In November 1935 photographic observations of ZZ Persei were resumed, our aim being this time to draw a definite light-curve and to determine the elements of the star. By December 22, 1935, 300 images (Fulgur-plates, emulsion 60187) were taken, 284 of which were used for measurements. For the Fulgur plates 5 minute exposures proved to be quite sufficient.

Photographic magnitudes of five comparison stars were derived from two plates on which ZZ Persei and KSA26 regions were photographed in the following order: ZZ Persei—KSA26—ZZ Persei. Table I gives the magnitudes of comparison stars as obtained by us and their probable errors.