PHOTOGRAPHIC STUDY OF ECLIPSING BINARIES IY Aur, RX Ari, DG Per, ZZ Cnc

K.A. Antoniuk
Department of Astronomy, Odessa State University
T.G.Shevchenko Park, Odessa 270014 Ukraine

ABSTRACT. Photometric elements for four stars, brightness of the comparison stars and moments of 67 weakenings are determined.

Key words: Stars - binary - eclipsing: Individual: IY Aur, RX Ari, DG Per, ZZ Cnc

The investigated stars were measured on the photographic plates of the Sky Patrol of the Astronomical Observatory of the Odessa State University. The brightness of the comparison stars was determined by linking to the standards in the Pleiades (for RX Ari), Champ 13 (IY Aur), h Per (DG Per) and NGC 2323 (ZZ Cnc). The brightness of the standard stars was published by Kazanasmas et al. (1979). The finding charts are shown in Fig.2. The brightness of the comparison stars is listed in Table 1. For the periodogram analysis, we have used the method described by Lafler and Kinman (1965) and realized among other algorithms in the set of computer programs by Andronov (1994). The phase curves are shown in Fig. 1.

RX Ari. The total duration of the eclipse is $D = 14$ (per cent of the orbital period), the duration of the total eclipse $d = 3$. The mean range is $8\overset{\mathrm{m}}{.}80 - 9\overset{\mathrm{m}}{.}05$ The depth of secondary minimum is nearly 1/3 of the depth of the primary eclipse, i.e. Min.II=$8\overset{\mathrm{m}}{.}85$.

IY Aur. Brightness at maximum is $9\overset{\mathrm{m}}{.}48$, Min.I=$9\overset{\mathrm{m}}{.}69$, Min.II=$9\overset{\mathrm{m}}{.}55$.

ZZ Cnc. No period variations are detected. The secondary minimum is doubt, the range is $8\overset{\mathrm{m}}{.}2 - 8\overset{\mathrm{m}}{.}4$. Our period is two times larger than that published in the GCVS.

DG Per. The range $13\overset{\mathrm{m}}{.}2 - 13\overset{\mathrm{m}}{.}7$, the depth of the secondary minimum is $\leq 0\overset{\mathrm{m}}{.}06$.

Acknowledgement. The author is thankful to I.L.Andronov for helpful discussions.

The photometric elements

Star	n	P	T_0
RX Ari	114 pv	1.02962 ± 0.00027	45735.076 ± 0.003
IY Aur	168 pv	2.79341 ± 0.00099	44943.293 ± 0.001
ZZ Cnc	174 pv	25.4908 ± 0.0043	45566.671 ± 0.003
DG Per	206 pg	56.7527 ± 0.0019	46254,184 ± 0.002

Moments of weakenings (HJD 24.....) and corresponding brightness

RX Ari		IY Aur		DG Per	
42418.2729	9.05	43518.4214	9.61	41596.4815	13.62
42982.5024	8.92	44253.3587	9.61	41598.4424	13.65
43401.5257	8.83	44996.2742	9.68	44490.5234	13.63
43403.5484	8.81	44996.3020	9.67	45231.5122	13.20
45588.5588	8.80	44996.3319	9.69	46079.2076	13.25
45589.5593	8.86	45264.6004	9.55	46081.2194	13.68
45592.5630	8.87	45641.5124	9.68	46306.5586	13.61
45593.5495	8.83	45641.5385	9.68	46762.3686	13.68
45621.4762	8.86	46359.5490	9.68	47044.5580	13.70
45622.4680	9.04	46359.5757	9.53	48178.4548	13.20
46003.4157	9.04	46387.4816	9.65	48179.4495	13.66
47176.2137	8.81	46387.5055	9.52	48181.4323	13.68
47879.3038	8.79	46795.4197	9.47	48182.4437	13.18
48162.5368	9.05	47155.4005	9.56	48918.4356	13.68
48163.5539	9.05	47828.5986	9.57	ZZ Cnc	
48541.4747	8.88	47834.5348	9.61	40622.4055	8.13
IY Aur		42423.3562	9.56	41768.3189	8.21
40968.3095	9.55	42454.3020	9.69	41769.2974	8.19
40976.2988	9.50	43166.3257	9.55	42507.3036	8.13
41652.4772	9.68	47834.5612	9.46	45642.6123	8.09
41708.3666	9.66	47915.3669	9.68	47860.5413	8.19
41708.3957	9.68	48180.5702	9.53	47860.5659	8.29
41719.5649	9.68	48183.5609	9.68	47860.5904	8.30

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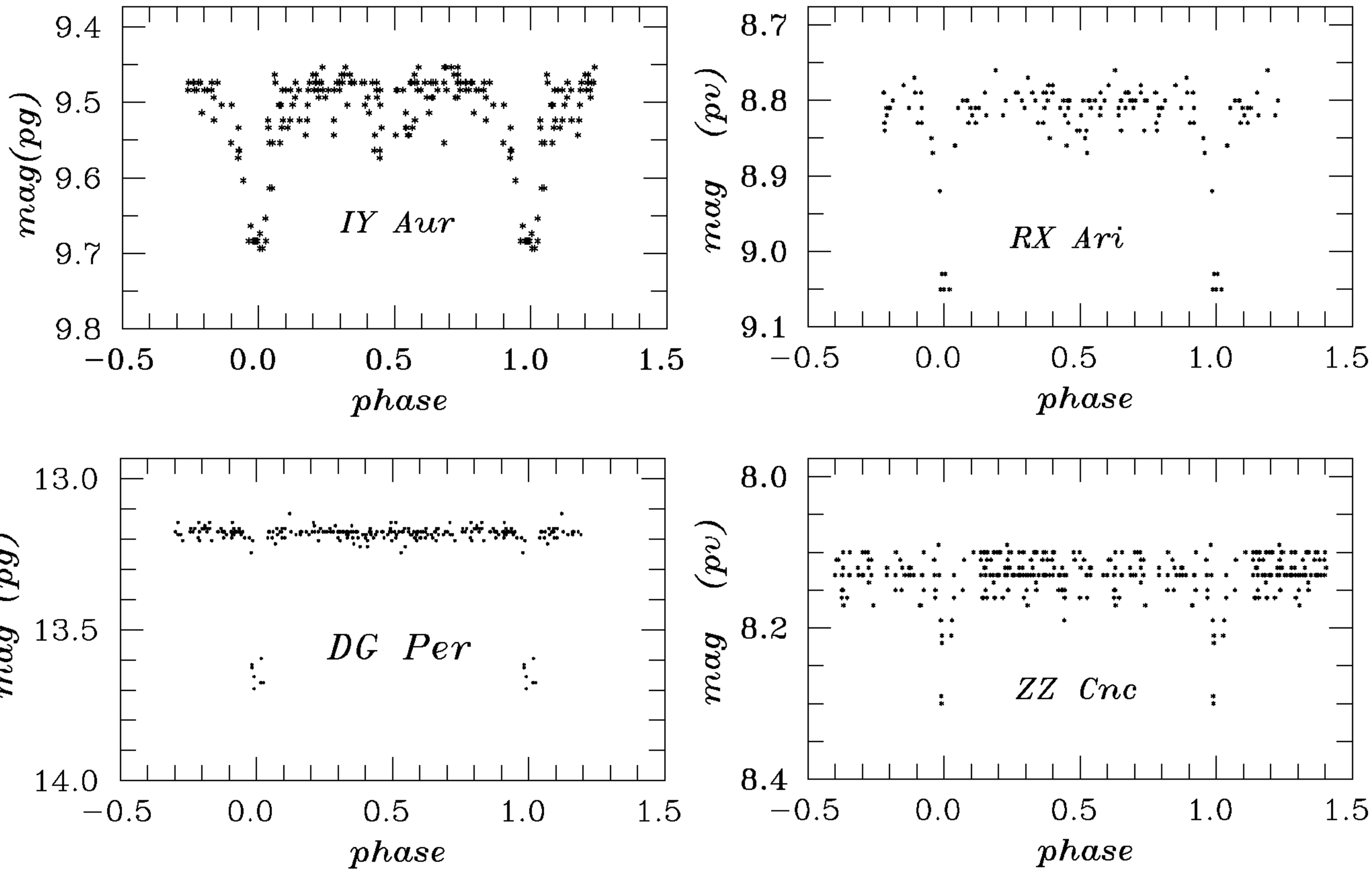

Figure 1. Phase light curves for the stars studied.

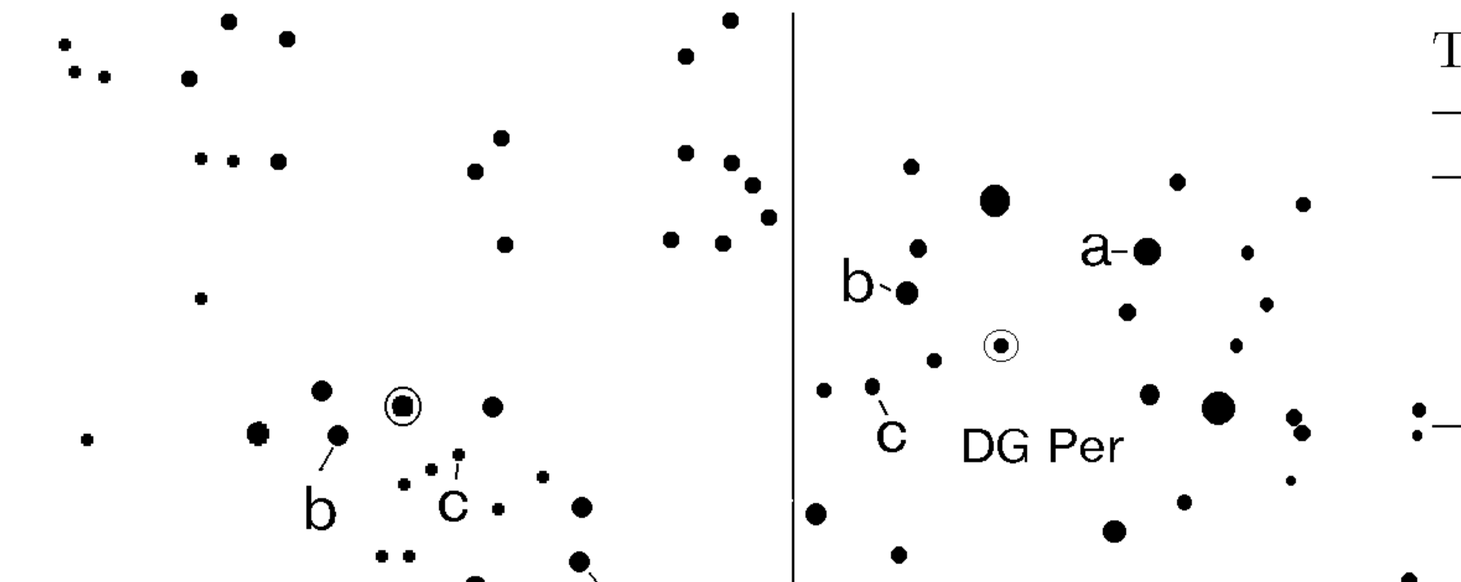

Figure 2. Finding charts for the investigated stars.

Table 1. Magnitudes of the comparison stars

Star		a	b	c	d
IY Aur	pv	9.38	9.66	9.72	-
RX Ari	pv	8.09	8.73	8.95	9.22
DG Per	pg	13.02	13.39	13.76	-
ZZ Cnc	pv	7.74	8.04	8.28	-