PHOTOMETRIC CLASSIFICATION OF THE MARGONI & STAGNI SUSPECTED VARIABLES V 58, V 91

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ABSTRACT. V 58 was found to be an eclipsing variable with $P = 0.46771^d(82)$, $T_{Min} = 2446421.795(5)$ and eclipse duration $d \approx 0.2P$. V 91 is a RRab type star with $P = 0.3493^d(11)$, $T_0 = 2446421.402(5)$, Max=13.32^m, Min=14.21^m, and an asymmetry $f = 0.26(2)$. Finding charts with photographic magnitudes of comparison stars are presented.

Key words: Stars: Eclipsing, Pulsating.

The objects discovered by Margoni & Stagni (1984) were observed photographically by using a 2–camera astrograph of the Abastumani Astrophysical Observatory in 1988 mainly by G.N.K. and I.V.Kharchenko. The blue–sensitive plates ORWO ZU–21 were used with a typical exposure time 25 min.

Previous one–time UBVRI observations showed that B–V colors are equal to 0.45^m for V 58 and 0.76^m for V 91 (Andronov et al. 1993), corresponding (according to the calibration of Johnson (1966)) to spectral classes ≈F5 and ≈G8, respectively. However, U–B colors for both stars occasionally correspond to earlier spectral types.

Brightness of the comparison stars was measured by A.V.Ch. by linking to the standard NGC 7063. These values are a=9.94(5), b=11.90(6), c=12.20(9), d=12.59(2) for V 58 and a=12.74(8), b=13.49(11), c=14.02(14) for V 91. Internal r.m.s. error in parentheses is expressed in units 0.01^m. However, the systematic difference is much larger. The only comparison star measured photoelectrically is very red object "c"="3" for V 58, for which the photographic estimate is more close to U (14.21) than to B (12.94). Time series analysis of the observations by A.V.Ch. was made by I.L.A.

V 58

Our light curves obtained during individual nights showed well pronounced eclipses. Moments of "weak" brightness near minima are listed in Table 1. A program "PERMIN" (algorithm described by Andronov 1991) allowed to obtain a best fit ephemeris listed in the Abstract. This value of the period is in agreement with Margoni's et al. (1989) suggestion that it is shorter than 1^d.

Table 1. Fadings of V 58

HJD 2446..	E	O-C
419.4615	–5	0.005
420.3956	–3	0.004
421.3156	–1	–0.012
426.4745	10	0.003

The phase light curve is shown at Fig.2. The smoothing line was obtained by using the method of "Running Parabolae" (Andronov 1990). with a filter half–width $\Delta t = 0.2P$ outside primary eclipse and $0.08P$ inside it. One may note no secondary minimum. The one–hump wave outside eclipse may be explained as a reflection effect. However, the orbital period twice the observed may also not be ruled out corresponding to an EB or EW–type binary with nearly equal minima. However, the amplitudes in EW stars are much smaller than the observed value 1.2^m.

V 91

Individual light curves are characteristic for RR Lyr – type stars. Two sure maxima were registered at HJD 2446421.4061 (13.41^m) and 422.4443 (13.25^m). Difference in brightness at maxima seems to be real and may possibly be explained by the Blazhko effect. We had made a 1–harmonic period search by using the method of the least squares, which allowed to obtain a preliminary period value $P = 0.3478 \pm 0.0014^d$. However, the phase curve (Fig.2) showed significant asymmetry f, and we computed best fit period values for m – harmonic approximation (Andronov 1994). Estimates of f varied from 0.26 ± 0.02 ($m = 3$) to 0.33 – 0.36 for other $1 < m < 8$. The fit for $m = 3$ corresponds to statistically significant number of harmonics. Brightness at the mean extrema is 13.32(5) and 14.21(6). One may note that a "hump" at the descending branch is not real. It apparently occurred due to a phase shift of the lower maximum (421) in respect to higher (422) one. Other parameters are listed in the Abstract. For comparison, we describe the 2–harmonic fit. It shows no hump (Fig. 2), it corresponds to a period $P = .3496 \pm .0016^d$, epoch $T_{Max} = 2446421.419 \pm .007$ which are the same within the error estimates as the values for other fits. However, the asymmetry $f = 0.36 \pm .02$ is underestimated.

Results on study of these objects on the astrograph plates of the Sternberg State Astronomical Institute will be presented elsewhere.

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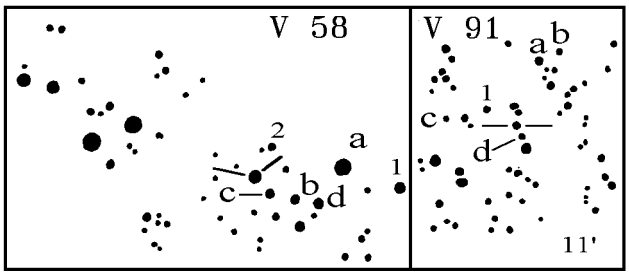

Figure 1. Comparison stars. The magnitudes are (Andronov et al. 1993): U=11.53, B=11.40, V=11.05, R=10.77, I=10.52 (V 58, N 1); U=12.93, B=12.69, V=12.05, R=11.54, I=11.11 (V 58, N 2); U=14.21, B=12.64, V=11.66, R=10.72, I=11.00 (V 58, N 3); U=12.92, B=12.31, V=11.40, R=10.69, I=10.11 (V 91, N 1).

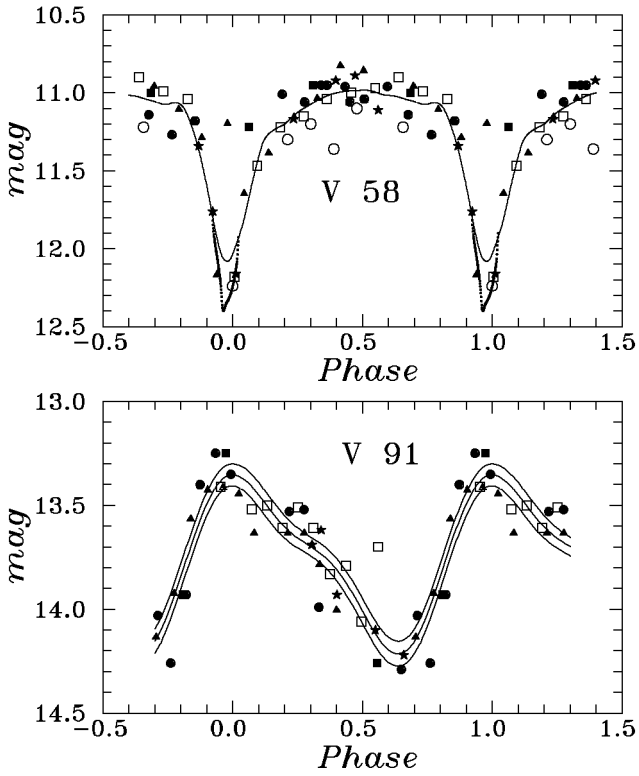

Figure 2. Light curves. The observations obtained at different dates are marked by symbols: ⋆ – JD 2446419, – 420, △ – 421, • – 422, ■, o – 426. Solid line is a fit obtained for V 58 by the method of "running parabolae" (Andronov 1995) with $\Delta t = 0.2P$. Small points from phase –0.078 to 0.022 correspond to $\Delta t = 0.08P$ better fitting the minimum. One bright point at mid–eclipse was not used. For V 91 the lines correspond to 2–harmonic fit $m(\varphi)$ and to $m(\varphi) \pm \sigma(\varphi)$.