NSV 11802 – A NEW ALGOL-TYPE ECLIPSING BINARY

According to the New Catalogue of Suspected Variables Stars (Kholopov et al., 1982), NSV 11802 (HD 179376) is a star suspected to be an eclipsing binary. We have chosen and included the star to the list of stars observed within the framework of general program of astrophysical final works execution by students of high schools of Israel at the astrophysical observatory of Jordan Valley Academic College.

NSV 11802 was observed with a 16" Meade LX200 telescope and ST-6 CCD photometer. The expositions were done 2-3 times every night during June-August 1995. The field of view of the CCD camera with focal reducer f/6.3 is about $8' \times 6\!.\!5$, so we are able to obtain an image of NSV 11802, comparison stars and cepheid V 1344 Aql simultaneously in the same field (Figure 1).

For image processing we have used the Mira Professional 3.1 software and aperture photometry method. The observational results as instrumental magnitude differences between NSV 11802 and comparison star C1 are shown in Table 1. Standard deviation of a single measurement is about 0.010 - 0.015 mag.
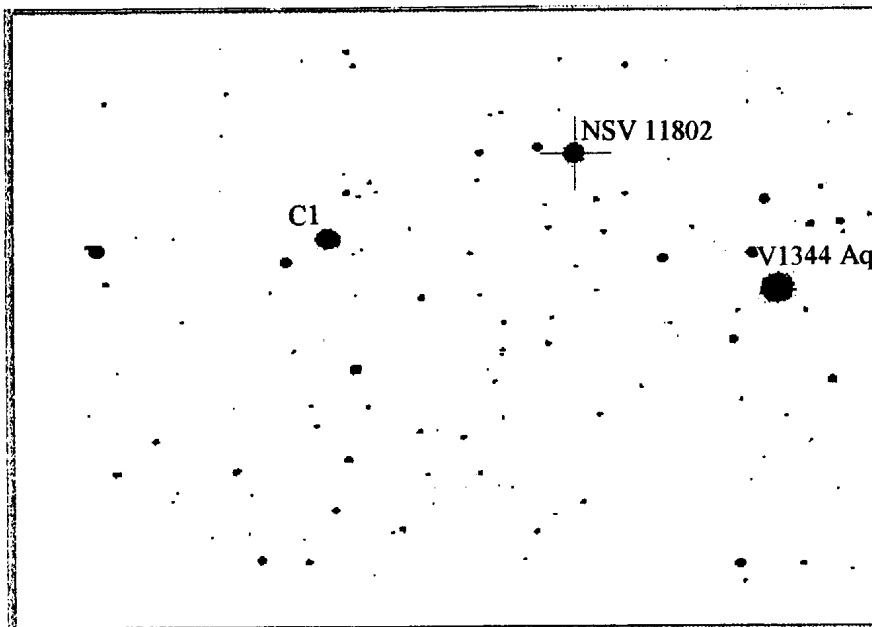

Figure 1. Field of NSV 11802 drawn using an ST-6 CCD-picture. North is at the top.

Table 1. Differences of instrumental magnitudes: NSV 11802 − comparison star.

JD hel +2,449,000	ΔB	ΔV	ΔR
896.457	−0.098	0.366	0.696
897.430	−0.094	0.339	0.656
901.408		0.311	0.620
904.360	−0.122	0.300	0.613
905.353	−0.116	0.317	0.628
908.500	−0.133	0.304	0.6?2
909.422	−0.092	0.323	0.622
910.394	−0.095	0.336	0.648
911.355	−0.149	0.299	0.609
912.350	−0.099	0.328	0.645
915.410	−0.124	0.302	0.618
916.348	−0.014	0.448	0.778
917.346	−0.116	0.311	0.628
919.496	−0.098	0.298	0.616
922.341	−0.113	0.310	0.639
923.340	−0.062	0.402	0.701
924.321	−0.141	0.296	0.620
925.326	−0.123	0.301	0.638
926.323	0.297	0.688	0.998
929.320	−0.041	0.384	0.717
930.323	−0.001	0.319	0.629
932.308	−0.107	0.323	0.655
933.339	0.121	0.530	0.863
937.303	−0.133	0.291	0.621
938.314	−0.098	0.299	0.620
940.306	−0.099	0.324	0.633
943.316	−0.070	0.359	0.704
944.286	−0.138	0.279	0.618
945.275	−0.126	0.310	0.622
946.290	0.273	0.692	0.997
947.288	−0.091	0.282	0.628

The data were examined for periodicity with a standard phase-dispersion minimization program, and we found the greatest reduction of the residuals at a period of 6.567 ± 0.050 days. There is also another possible period equal to about 2.86 days. For the second period the sum of residual squares is a little more than that for the first period. As it seems to us, the first period (6.567 days) is more suitable. It is possible that these periods are commensurable. The elements of main eclipse are:

JD hel (Primary Min.) = 2,449,926.427 + 6.567 × E

The light curves phased with these elements are shown in Figure 2. As it is seen from the light curves, NSV 11802 is really an Algol-type eclipsing binary system. The depth of the primary minimum is approximately the same in all three spectral bands.
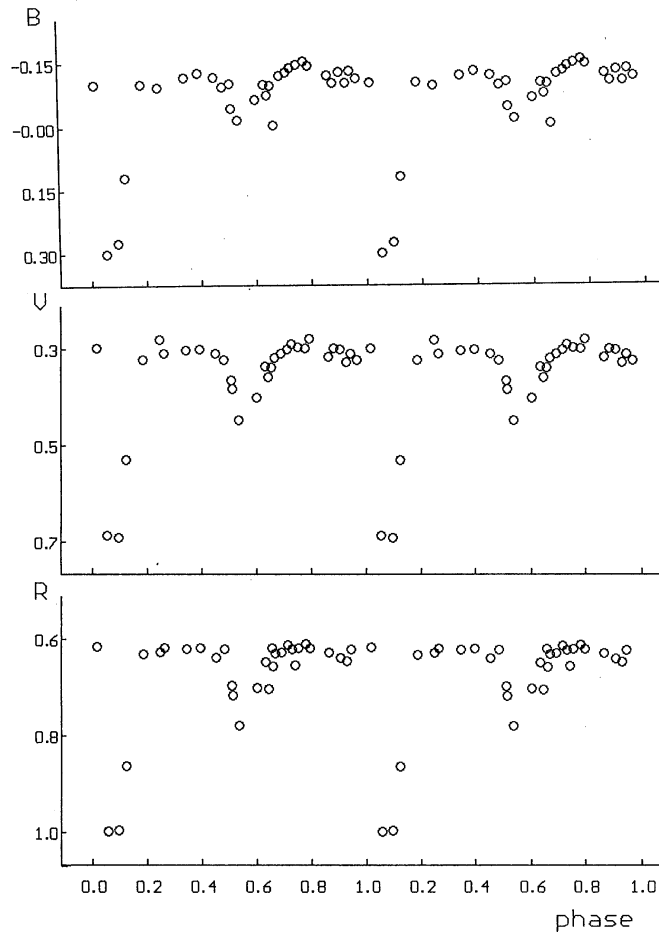
Figure 2. Light curves of NSV 11802 phased with the period of 6.567 days.

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Reference:
Kholopov, P.N. (ed.): 1982, New Catalogue of Suspected Variable Stars. Nauka, Moscow