

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 5637

Konkoly Observatory
Budapest
21 July 2005

HU ISSN 0374 – 0676

ELEMENTS FOR 7 ECLIPSING BINARIES IN OPHIUCHUS

HÄUSSLER, K.¹; BERTHOLD, T.^{1,2}; KROLL, P.²

¹ Bruno-H.-Bürgel-Sternwarte, Töpelstr. 46, D-04746 Hartha, Germany

² Sternwarte Sonneberg, Sternwartestr. 32, D-96515 Sonneberg, Germany

email: sternwartehartha@lycos.de, tb@4pisysteme.de, pk@4pisysteme.de

The discovery of the variability of these stars has been reported by Hoffmeister (1949, 1965, 1967, 1968). Except for V987 Oph and V2056 Oph, no further observations or ephemeris were published until today. Photographic plates of a field centered around 67 Oph, taken with the Sonneberg Observatory 40cm Astrograph during three intervals spread over the years from 1938-1994, were used to check the behaviour of these objects (see Table 1).

The given elements were obtained by means of least-squares solutions. Photographic amplitudes were derived with respect to magnitudes of the comparison stars given in Table 2. Individual data are available upon request.

Remarks:

V987 Oph

Period varies; ephemeris valid for J.D. 2429100-2442000 and J.D. 2442000-2449500 resp. First elements were found by Gavrjushov; his published times of minimum as well as those found by Götz were included in our analysis.

V1080 Oph

Period probably varies. Further investigation needed.

V2056 Oph

The period value derived and published in the GCVS by Tsessevich, has been found to be doubled.

This research made use of the SIMBAD data base, operated by the CDS at Strasbourg, France.

References:

- Gavrjushov, S. A., 1982, *Perem. Zvezdy Priloz.* **4.** 241
Götz, W., et al., 1957, *Veröff. Sternw. Sonneberg* **4.** 123
Hoffmeister, C., 1949, *Erg. Astron. Nachr.* **12.** 1
Hoffmeister, C., 1966, *Astron. Nachr.* **289.** 139
Hoffmeister, C., 1967, *Astron. Nachr.* **290.** 43
Hoffmeister, C., 1968, *Astron. Nachr.* **290.** 277

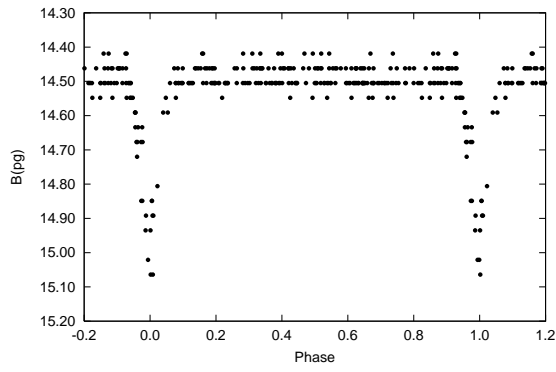


Figure 1. Composite light curve of V987 Oph

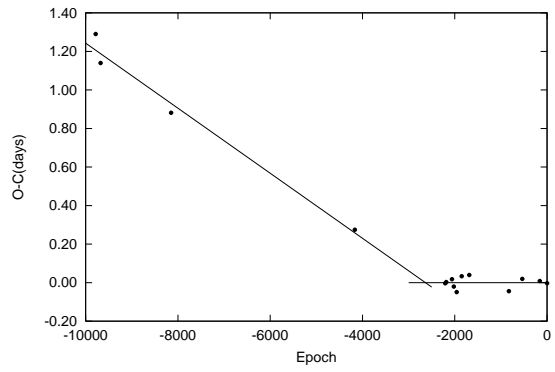


Figure 2. (O-C) diagram for V987 Oph

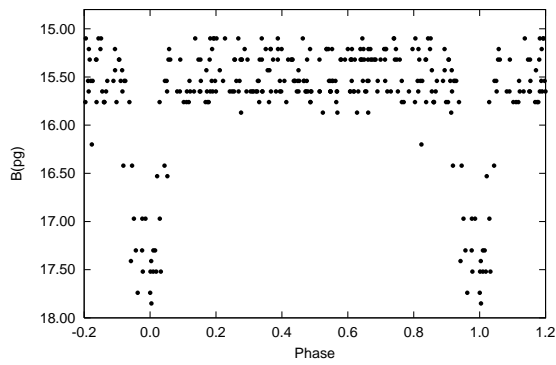


Figure 3. Light curve of V1080 Oph

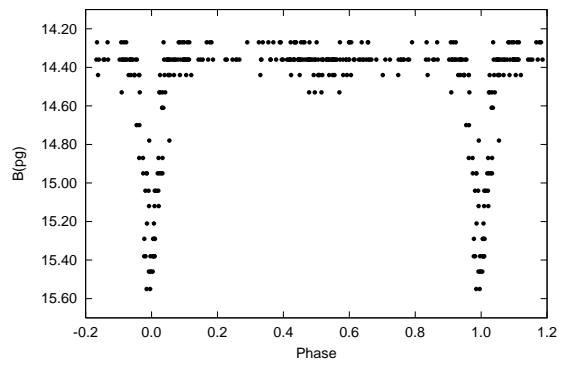


Figure 4. Light curve of V2037 Oph

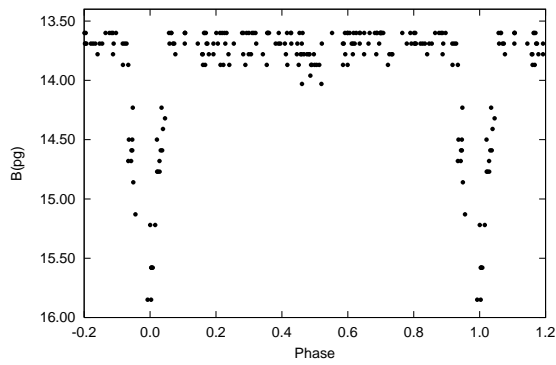


Figure 5. Light curve of V2056 Oph

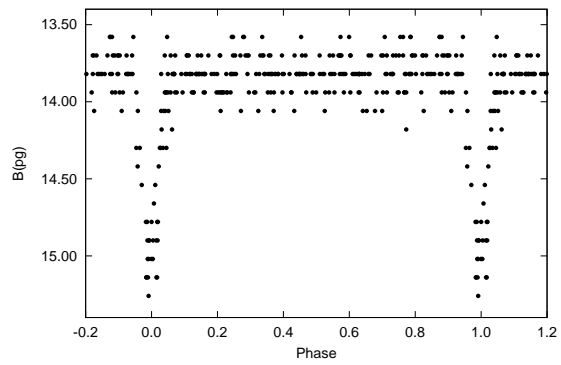


Figure 6. Light curve of NSV 9905

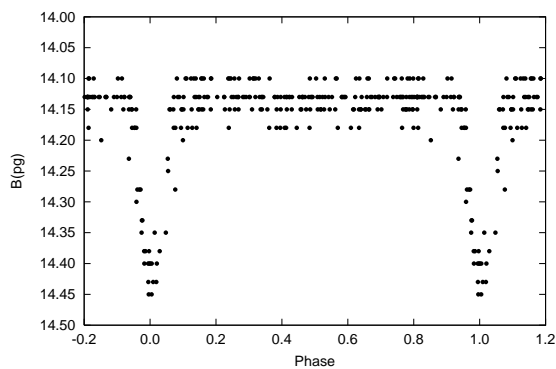


Figure 7. Light curve of NSV 9995

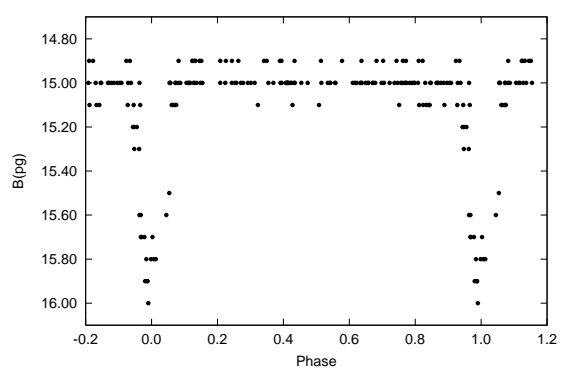


Figure 8. Light curve of NSV 10072

Table 1. Summary of this paper

Star	Type	Epoch 2400000+	Period (day)	Max.	Min.I	Min. II	D	No. of Plates
V987 Oph (1)	EA	29788.560 ±39	2.202681 ±17	14 ^m 45	15 ^m 05		0 ^p 15	125
V987 Oph (2)		47736.450 ±18	2.202850 ±11					131
V1080 Oph	E	48862.362 ±64	4.873579 ±26	15 ^m 4	17 ^m 8		0 ^p 12	252
V2037 Oph	EA	47591.725 ±8	2.0051041 ±15	14 ^m 3	15 ^m 5		0 ^p 12	267
V2056 Oph	EA	47368.456 ±16	4.2549086 ±80	13 ^m 7	15 ^m 9	13 ^m 9	0 ^p 13	179
NSV 9905	EA	49215.433 ±11	1.7105330 ±12	13 ^m 7	15 ^m 2		0 ^p 10	295
NSV 9995	EA	47380.420 ±7	1.2061988 ±9	14 ^m 15	14 ^m 45		0 ^p 15	264
NSV 10072	EA	48839.388 ±15	1.4057497 ±23	15 ^m 0	15 ^m 9		0 ^p 13	155

Table 2. Comparison stars and cross references

V987 Oph S 4216 USNO 0900-12115145			V1080 Oph S 9267 USNO 0900-11003998	
Comp. No.	GSC	m*	USNO	m*
1	0900-12117555	14 ^m 2	0900-11008666	15 ^m 4
2	0900-12113655	14 ^m 8	0900-11004175	15 ^m 9
3	0900-12109715	15 ^m 0	0900-10998821	16 ^m 2
4	0900-12112607	15 ^m 1	0900-11009519	17 ^m 1
V2037 Oph S 10361 USNO 0900-11940451			V2056 Oph S 4172 USNO 0825-10985914	
Comp. No.	USNO	m*	USNO	m*
1	0900-11939540	13 ^m 9	0825-10985246	13 ^m 9
2	0900-11934509	14 ^m 9	0825-10987644	14 ^m 5
3	0900-11941412	15 ^m 2	0825-10984805	15 ^m 2
4	0900-11923365	15 ^m 5	0825-10982872	16 ^m 1
NSV 9905 S 9847 USNO 0900-11052470			NSV 9995 S 9280 USNO 0900-11264720	
Comp. No.	USNO	m*	USNO	m*
1	0900-11050194	13 ^m 1	0900-11265139	14 ^m 2
2	0900-11047354	13 ^m 8	0900-11277123	14 ^m 5
3	0900-11054226	15 ^m 2		
NSV 10072 S 10358 USNO 0975-10288226				
Comp. No.	USNO	m*		
1	0975-10285318	14 ^m 7		
2	0975-10284764	15 ^m 2		
3	0975-10291701	15 ^m 9		

* Magnitudes refer to the B values of the USNO–A2.0 catalogue

Table 3. Heliocentric times of newly found minima and $O - C$ values according to the elements derived in this paper

Star	JD (min.*)	Epoch	$O - C$	Star	JD (min.*)	Epoch	$O - C$
V987 Oph (2)	38557.449	-4167	0.274	NSV 9905	25707.563	-13743	-0.015
	44022.485	-1686	0.040		25743.528	-13722	0.028
	45912.446	-828	-0.044		25880.321	-13642	-0.021
	46553.539	-537	0.019		26073.605	-13529	-0.028
	47388.408	-158	0.008		29785.495	-11359	0.006
	47736.447	0	-0.003		29845.389	-11324	0.031
	V1080 Oph	25498.354	-4794		-0.069	35197.588	-8195
29816.433		-3908	0.019	36675.563	-7331	0.047	
29845.473		-3902	-0.183	39263.536	-5818	-0.016	
36673.565		-2501	0.025	45486.458	-2180	-0.013	
38530.529		-2120	0.155	46290.421	-1710	-0.001	
38910.520		-2042	0.007	46507.630	-1583	-0.030	
39597.572		-1901	-0.116	47744.399	-860	0.024	
39651.484		-1890	0.187	48801.513	-242	0.028	
39685.503		-1883	0.091	49215.413	0	-0.020	
40382.460		-1740	0.126	NSV 9995	29790.429	-14583	0.006
46976.423		-387	0.136		29843.474	-14539	-0.022
47736.457		-231	-0.108		38530.533	-7337	-0.007
48862.378		0	0.016		38910.515	-7022	0.023
V2037 Oph		49154.493	60	-0.284	39618.528	-6435	-0.003
	29786.410	-8880	0.010	39682.484	-6382	0.024	
	29808.450	-8869	-0.006	39711.401	-6358	-0.007	
	29812.458	-8867	-0.009	40419.450	-5771	0.003	
	29816.461	-8865	-0.016	43303.469	-3380	0.001	
	38883.550	-4343	-0.008	44069.410	-2745	0.005	
	40417.483	-3578	0.021	44484.340	-2401	0.003	
	40419.482	-3577	0.015	46608.449	-640	-0.004	
	40798.439	-3388	0.007	47380.399	0	-0.021	
	41179.418	-3198	0.016	NSV 10072	29812.530	-13535	-0.036
	45905.451	-841	0.019		29843.474	-13513	-0.018
	45913.470	-837	0.017		38553.515	-7317	-0.002
	46288.406	-650	-0.001		39270.525	-6807	0.075
	46290.421	-649	0.009	39620.544	-6558	0.063	
46298.403	-645	-0.030	44484.348	-3098	-0.027		
47591.680	0	-0.045	46272.507	-1826	0.018		
V2056 Oph	29808.450	-4127	0.001	46289.368	-1814	0.010	
	46266.403	-259	-0.032	46296.356	-1809	-0.031	
	46649.390	-169	0.013	46508.637	-1658	-0.018	
NSV 9905	47368.474	0	0.018	46608.449	-1587	-0.014	
	25442.427	-13898	-0.019	46646.396	-1560	-0.023	
	25502.340	-13863	0.025	48839.392	0	0.004	

* Mid-exposure times of plates with brightest observations