

A photometric study of the eclipsing binary system V359 Herculis

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We performed timing of eclipses of the binary system V359 Her and found evidence in favor of the existence of light-time effect in the system. It can indicate the presence of a third body with the lower limit of mass $\approx 0.5M_{\odot}$, its orbital period being about 24 yr. We also estimated the rate of mass transfer between the components as $0.5 \times 10^{-8} - 1.5 \times 10^{-7} M_{\odot}/\text{yr}$. For this purpose, we used times of minima from literature, from our observations, and from light curves obtained by the TESS satellite.

We study the eclipsing binary V359 Her using times of its brightness minima.

Our own observations of the system were performed in 2003–2007 at the Crimean Station of Moscow State University using a Zeiss-600 telescope with a photomultiplier tube, in the V filter. The comparison star was TYC 3071-919-1, the check star was TYC 3071-656-1. Data processing was made using MERLIN code by V. G. Kornilov (there is no published description of this program). Subsequent observations were conducted using the same telescope and CCD matrices. For a part of observations in 2007 in the V filter, we used an Apogee CCD; in 2021, in the V , R filters, we used a FLI CCD. For data reductions, we applied the MAXIM DL3 and MAXIM DL5 codes; TYC 3071-656-1 served as the comparison star and TYC 2602-684-1, as the check star.

As the first approximation for calculations of times of minima, we use the following linear ephemeris:

$$\text{Min I} = T_0 + P_0 \times E, \quad (1)$$

where Min I is the calculated time of the primary minimum, $T_0 = \text{HJD } 2457131.3885$ is the initial epoch, $P_0 = 1^{\text{d}}7557708$ is the orbital period, E is the number of orbital cycles after the initial epoch. For our calculations, we used only primary minima. They are taken from the literature¹ and derived from our observations and from light curves obtained by the TESS satellite². Secondary minima of the system are very shallow, their depth is ≤ 0.1 mag, and they are not symmetric. In the TESS light curves, the shape of the secondary minimum seems to slightly change during two years (2020–2022). This can indicate an active mass transfer in the system.

The spectral types, mass ratio, semi-major axis, masses and radii of stars in V359 Her are poorly known. Appropriate data can be found in the catalogues: Brancewicz &

¹B.R.N.O. database, <http://var2.astro.cz/ocgate/?lang=en>.

²Files from MAST archive: `tess2020133194932-s0025-0000000072839144-0182-s.lc.fits` and `tess2022112184951-s0051-0000000072839144-0223-s.lc.fits`.

Dworak (1980), Svechnikov & Kuznetsova (1990), Svechnikov & Perevozkina (1999). According to Svechnikov & Kuznetsova (1990), the mass ratio is $M_2/M_1 = 0.32$, the semi-major axis is $a = 7.6R_\odot$, radii of stars are $R_1 = 1.6R_\odot$, $R_2 = 2.1R_\odot$, spectral types of the components are F0V+G9IV. Most likely, these values were obtained using theoretical considerations, the catalogues do not contain references to other papers for this particular binary system. Brancewicz & Dworak (1980) give somewhat different values, the most different of them is the mass ratio (0.86). In our study, we use system parameters from Svechnikov & Kuznetsova (1990); times of minima were computed using the code by Kozyreva & Zakharov (2001). Minima in the light curves are symmetric with respect to the phase 0.

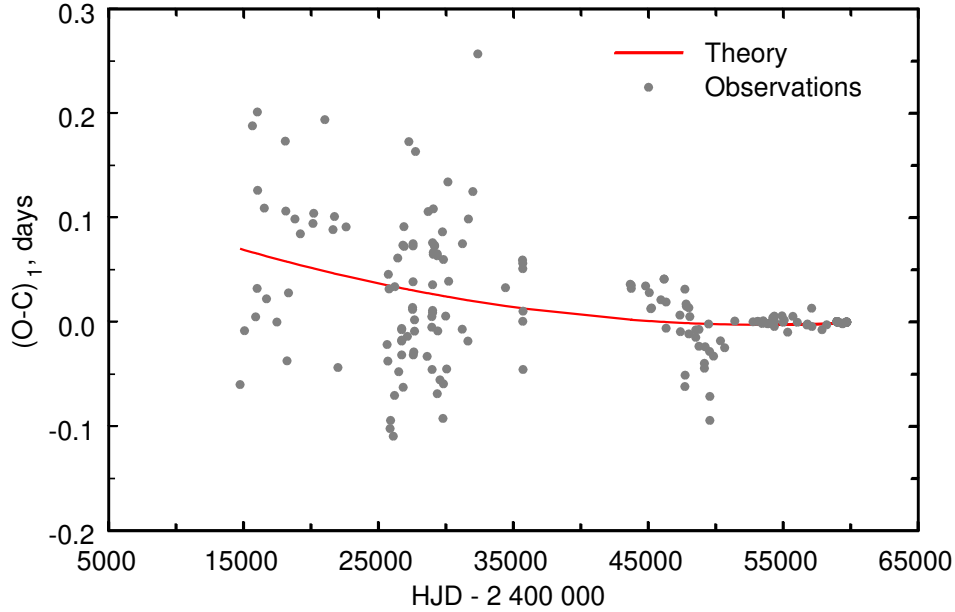


Figure 1.

$(O-C)_1$ diagram for V359 Her. O is the observed minimum of the light curve, C is the minimum calculated using eq. (1). “Theory” is the quadratic fit (secular period change), eq. 2.

Figure 1 shows the $(O-C)_1$ diagram for observed times of minima (O) and calculated times of minima (C, eq. 1). Using iterations, we fitted it with a parabolic function that reflects the secular change of the orbital period:

$$\text{Min I} = (T_0 + \delta T_0) + (P_0 + \delta P_0) \times E + \frac{\beta}{2} \times E^2, \quad (2)$$

where $\delta T_0 = -0.00205 \pm 0.0015$ d, $\delta P_0 = 6.02 \times 10^{-7} \pm 3 \times 10^{-7}$ d, $\beta = (3.0 \pm 1.6) \times 10^{-10}$ d/period $\approx (6.2 \pm 3.1) \times 10^{-8}$ d/year.

The secondary star is leaving the main sequence and almost fills its Roche lobe. The system is old, the circularization of the orbit has been finished. Using Paczynski–Huang equation (Paczynski, 1966; Huang, 1966) and the derivative of the orbital period of V359 Her (see above), the calculated mass transfer rate is found to be $\approx 0.5 \times 10^{-8} M_\odot/\text{yr}$ for system parameters from Svechnikov & Kuznetsova (1990) and $\approx 1.3 \times 10^{-7} M_\odot/\text{yr}$ for system parameters from Brancewicz & Dworak (1980). More complicated approaches and equations (e.g., such as those suggested by Medvedeva, 2013) are not useful due to high uncertainties of estimates of the system parameters.

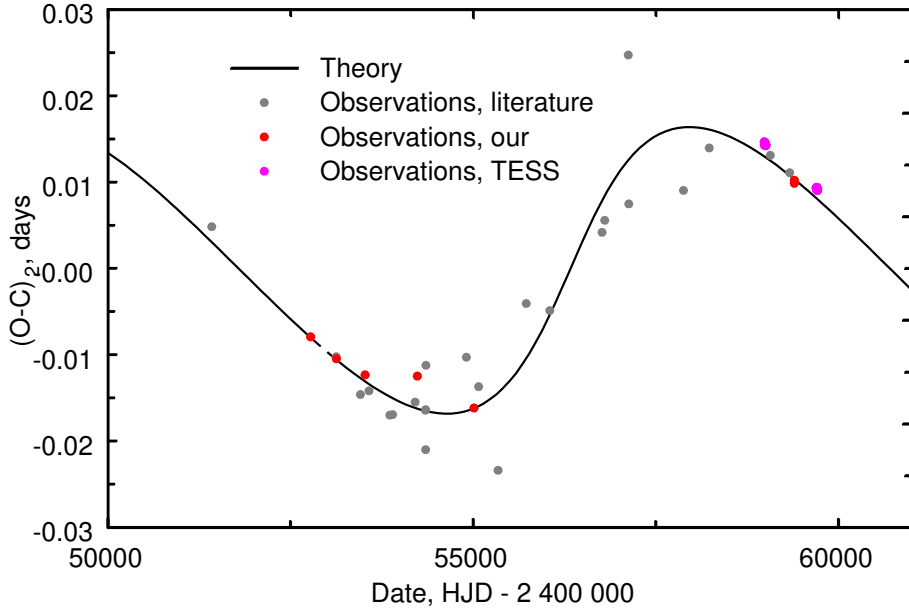


Figure 2.

$(O-C)_2$ diagram for V359 Her. O is the observed minimum of the light curve, C is the time of minimum calculated using eq. 2. “Theory” is the light equation, eq. 3.

Residuals for minima obtained after 1995 (with relatively low errors) show a possible presence of a light-time effect (light equation) due to the gravitational influence of a putative third body. Figure 2 shows the $(O-C)_2$ diagram for observed times of minima (O) and calculated values (C, eq. 2). They can be fitted with the equation:

$$(O-C)_2 = A_1 \sqrt{1 - e_3^2} \sin E' \cos \omega + \cos E' \sin \omega, \quad (3)$$

where $A_1 = 0^d018 \pm 0^d0010$ is the amplitude of the light equation, $e_3 = 0.40 \pm 0.10$ is the eccentricity of the orbit of the third body, $P_3 = 8915 \pm 150$ d is its orbital period, $\omega = 2^\circ \pm 3^\circ$ is its longitude of the ascending node. The epoch of the periastron passage by the third body is $T_p = 2444090 \pm 150$ d, E' is the eccentric anomaly. The lower limit of the mass of the third body is $\approx 0.5M_\odot$ assuming parameters of the central binary from Svechnikov & Kuznetsova (1990).

Figure 3 shows the light equation curve for the whole set of observational data. It can be clearly seen that old data are not apt for the search for the influence of the third body due to the high scatter of observational points. Modern ground-determined and space-determined times of minima made such study possible.

Times of minima obtained from our observations and from TESS light curves can be found in Table 1. Table 2 lists our observations.

Acknowledgments

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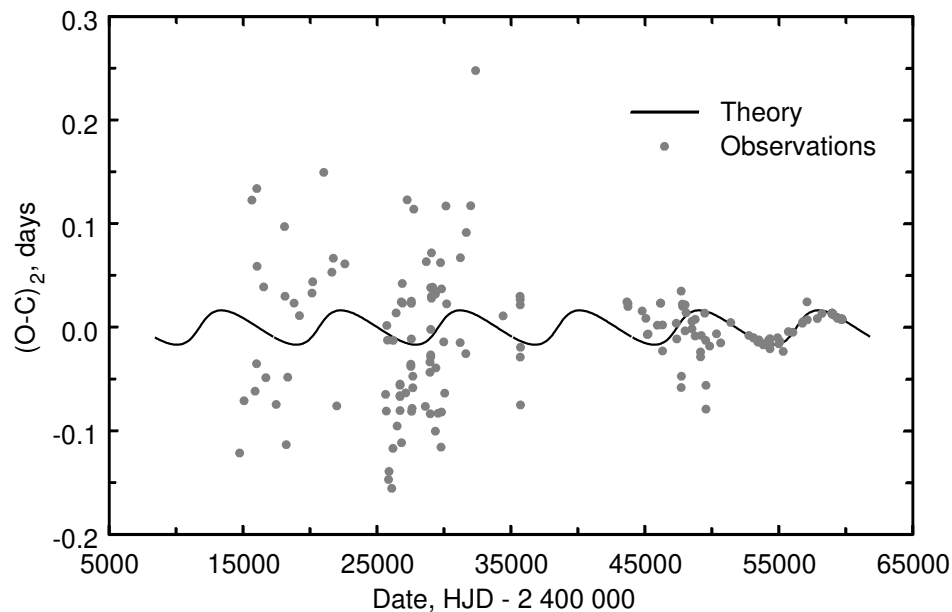


Figure 3.

Same as Fig. 2, for all available observations.

References:

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Table 1: Times of primary minima (Min I) of V359 Her obtained in the present study and derived from TESS light curves

HJD-2400000	$(O - C)_1$	$(O - C)_2$	Reference
52775.3105	0.0002	-0.0079	This study, <i>V</i>
53126.4621	0.0003	-0.0105	This study, <i>V</i>
53521.5087	0.0012	-0.0123	This study, <i>V</i>
54234.3515	0.0040	-0.0125	This study, <i>V</i>
55010.39850	-0.0005	-0.0162	This study, <i>V</i>
58983.73870	0.00043	0.01467	TESS
58985.49410	0.00006	0.01434	TESS
58987.24990	0.00010	0.01431	TESS
58989.00570	0.00014	0.01439	TESS
58990.76160	0.00028	0.01449	TESS
58992.51740	0.00032	0.01458	TESS
58994.27320	0.00036	0.01462	TESS
58997.78450	0.00014	0.01435	TESS
58999.54030	0.00017	0.01434	TESS
59001.29590	0.00001	0.01422	TESS
59003.05180	0.00015	0.01435	TESS
59004.80760	0.00019	0.01433	TESS
59006.56330	0.00013	0.01427	TESS
59008.31920	0.00027	0.01436	TESS
59396.3400	-0.00184	0.0099	This study, <i>V</i>
59396.3403	-0.00154	0.0102	This study, <i>R</i>
59694.82050	-0.00016	0.00936	TESS
59696.57620	-0.00022	0.00927	TESS
59698.33210	-0.00007	0.00935	TESS
59700.08780	-0.00013	0.00936	TESS
59701.84350	-0.00019	0.00920	TESS
59703.59910	-0.00035	0.00911	TESS
59707.11100	0.00004	0.00942	TESS
59708.86670	-0.00002	0.00935	TESS
59710.62240	-0.00007	0.00926	TESS
59712.37790	-0.00033	0.00905	TESS
59714.13370	-0.00029	0.00909	TESS
59715.88960	-0.00015	0.00915	TESS

Table 2: Ground-based photometric observations of V359 Her obtained in the present study. Δm is the differential magnitude of V359 Her with respect to the comparison star (TYC 3071-919-1, TYC 3071-656-1) in the V and R filters.

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
TYC 3071-919-1, V					
52775.37692	0.33000	52797.35028	-0.03100	52797.42677	-0.06300
52775.39067	0.28300	52797.35291	-0.01600	52797.42717	-0.07100
52775.39400	0.25600	52797.35493	-0.02800	52797.42896	-0.06200
52775.39794	0.24300	52797.35791	-0.02400	52797.42945	-0.06500
52775.40615	0.19000	52797.35834	-0.02500	52797.42993	-0.05900
52775.41025	0.16500	52797.35882	-0.02000	52797.43402	-0.06300
52775.41466	0.13400	52797.36321	-0.02900	52797.43446	-0.06500
52775.41741	0.12700	52797.36739	-0.03000	52797.43695	-0.06800
52775.42032	0.11100	52797.37022	-0.04600	52797.43735	-0.07700
52775.42507	0.10600	52797.37328	-0.03800	52797.44012	-0.07200
52775.42907	0.09900	52797.37371	-0.03500	52797.44061	-0.07900
52775.43374	0.10700	52797.37629	-0.01800	52797.44108	-0.07200
52775.43841	0.04800	52797.37667	-0.03200	52797.44461	-0.06300
52775.44422	0.02800	52797.37954	-0.04700	52797.44499	-0.06600
52775.44789	0.02600	52797.37991	-0.04100	52797.44717	-0.07600
52775.45215	0.01400	52797.38170	-0.05000	52797.44756	-0.08100
52775.45735	0.00900	52797.38219	-0.05100	52797.45032	-0.06200
52775.46212	-0.00300	52797.38266	-0.04900	52797.45070	-0.06600
52775.48527	-0.05100	52797.38640	-0.05500	52797.45314	-0.06400
52775.49215	-0.06300	52797.38680	-0.03400	52797.45351	-0.06900
52775.49671	-0.06800	52797.38733	-0.02900	52797.45570	-0.06800
52775.50200	-0.06000	52797.38991	-0.03800	52797.45610	-0.06200
52775.50548	-0.05000	52797.39033	-0.01500	52797.46239	-0.06200
52775.51330	-0.04900	52797.39240	-0.06100	52797.46861	-0.07000
52775.51810	-0.08400	52797.39585	-0.04800	52797.47180	-0.07000
52775.52171	-0.06600	52797.39597	-0.04300	52797.47221	-0.06900
52775.52496	-0.09100	52797.39956	-0.05000	52797.47276	-0.07400
52782.44183	0.20900	52797.40124	-0.05900	52797.47795	-0.06500
52782.44545	0.10700	52797.40153	-0.06100	52800.33517	-0.10100
52797.31057	0.02700	52797.40202	-0.06700	52800.36205	-0.09400
52797.31348	0.03600	52797.40243	-0.06100	52800.45385	-0.09300
52797.31623	-0.00800	52797.40662	-0.05700	52800.45471	-0.09600
52797.31673	-0.00600	52797.40702	-0.05300	52800.45545	-0.09900
52797.31993	-0.02400	52797.40927	-0.06300	52800.45824	-0.10000
52797.32234	-0.02900	52797.40964	-0.06600	52801.34207	-0.08000
52797.32448	-0.03500	52797.41343	-0.05400	52801.34483	-0.09100
52797.32491	-0.03000	52797.41389	-0.05500	52801.34713	-0.08100
52797.32809	-0.01800	52797.41668	-0.05900	52801.34979	-0.06700
52797.33100	-0.02800	52797.41866	-0.05800	52801.35340	-0.07300
52797.33148	-0.02700	52797.41902	-0.05400	52801.35720	-0.08100
52797.33197	-0.02500	52797.41939	-0.05300	52801.36758	-0.07600
52797.33618	-0.02400	52797.41975	-0.06100		
52797.33992	-0.03200	52797.42011	-0.05800		

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
53126.36590	0.12700	53126.43620	0.43300	53126.49730	0.46300
53126.36720	0.14700	53126.43750	0.49300	53126.49850	0.42400
53126.36850	0.14700	53126.43880	0.49700	53126.49980	0.46700
53126.36970	0.15600	53126.44010	0.53400	53126.50110	0.43800
53126.37100	0.18600	53126.44130	0.51400	53126.50230	0.42700
53126.37230	0.14600	53126.44260	0.49200	53126.50360	0.43500
53126.37850	0.19300	53126.44390	0.47000	53126.50490	0.41900
53126.37980	0.21300	53126.44510	0.51700	53126.50620	0.42200
53126.38100	0.17500	53126.44640	0.50200	53126.50740	0.42800
53126.38230	0.19800	53126.44770	0.51100	53126.50870	0.43100
53126.38360	0.21100	53126.44890	0.50200	53126.51000	0.40800
53126.38480	0.20400	53126.45020	0.52700	53126.51130	0.41400
53126.38610	0.21700	53126.45150	0.52400	53126.51250	0.39100
53126.38740	0.26500	53126.45280	0.52100	53126.51380	0.40600
53126.38870	0.24900	53126.45400	0.52400	53126.51510	0.35000
53126.38990	0.25800	53126.45530	0.54600	53126.51630	0.40000
53126.39120	0.27600	53126.45660	0.50600	53126.51760	0.36600
53126.39250	0.26800	53126.45780	0.51500	53126.51890	0.38300
53126.39370	0.29500	53126.45910	0.52500	53126.52020	0.36700
53126.39500	0.25500	53126.46040	0.53400	53126.52140	0.35000
53126.40010	0.29800	53126.46170	0.53700	53126.52270	0.33400
53126.40140	0.34300	53126.46290	0.48700	53126.52400	0.34300
53126.40260	0.31200	53126.46420	0.52400	53126.52520	0.34500
53126.40390	0.32500	53126.46550	0.54100	53126.53010	0.30000
53126.40520	0.33000	53126.46800	0.53100	53126.53140	0.32100
53126.40800	0.40200	53126.46930	0.49900	53126.53260	0.31700
53126.40930	0.37400	53126.47060	0.48500	53126.53390	0.30400
53126.41060	0.35900	53126.47180	0.51100	53126.53520	0.28000
53126.41180	0.44300	53126.47310	0.51000	53126.53640	0.26000
53126.41310	0.42500	53126.47440	0.52100	53126.53770	0.26900
53126.41440	0.39700	53126.47560	0.52100	53126.53900	0.29800
53126.41570	0.39300	53126.47820	0.53000	53126.54030	0.25500
53126.41690	0.40400	53126.47950	0.51800	53126.54150	0.28200
53126.41820	0.37000	53126.48070	0.49000	53126.54280	0.23500
53126.41950	0.39000	53126.48200	0.55700	53126.54410	0.26300
53126.42070	0.42000	53126.48330	0.50800	53126.54530	0.21700
53126.42200	0.45200	53126.48450	0.53500	53126.54660	0.25400
53126.42330	0.43000	53126.48580	0.51300	53126.54790	0.24600
53126.42460	0.40900	53126.48710	0.47600	53126.54920	0.22900
53126.42590	0.44000	53126.48840	0.49900	53126.55040	0.20400
53126.42710	0.44100	53126.48960	0.49500	53126.55170	0.20900
53126.42840	0.47300	53126.49090	0.48900	53126.55300	0.19900
53126.42970	0.45700	53126.49220	0.47200	53126.55420	0.19800
53126.43090	0.48500	53126.49340	0.46300	53126.55550	0.16400
53126.43370	0.46000	53126.49470	0.47200	53126.55680	0.17800
53126.43500	0.49900	53126.49600	0.48100	53126.55810	0.19900

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
53127.29670	-0.00700	53509.33734	0.08200	53516.43219	-0.07900
53127.31220	-0.00400	53509.34048	0.06400	53516.43598	-0.08100
53127.32520	0.00600	53509.34342	0.05000	53516.43923	-0.07200
53127.33790	-0.00200	53509.34774	0.03000	53516.44399	-0.07500
53127.35060	-0.00500	53509.35996	0.00200	53516.44592	-0.07900
53127.36330	0.00000	53509.36408	-0.00100	53516.44790	-0.07700
53127.39490	0.02600	53509.37176	-0.01600	53516.45066	-0.08900
53127.41600	-0.00300	53509.37790	-0.04100	53516.45266	-0.08700
53127.42760	0.00000	53509.38336	-0.05300	53520.31128	-0.11100
53127.44020	-0.01100	53509.38580	-0.04400	53520.31727	-0.09500
53127.45300	-0.02100	53509.39304	-0.06600	53520.32665	-0.11200
53127.46570	-0.02400	53509.39766	-0.06800	53520.38326	-0.09000
53147.37120	-0.05600	53509.40033	-0.06100	53520.39185	-0.09600
53147.37240	-0.03800	53509.40318	-0.07500	53520.40300	-0.09300
53147.37370	-0.05700	53509.40650	-0.06600	53520.42157	-0.10000
53147.37760	-0.04400	53509.41035	-0.06900	53520.43311	-0.04800
53147.37880	-0.05500	53509.41525	-0.06800	53520.47083	-0.11300
53147.38370	-0.01900	53509.42838	-0.08300	53520.47415	-0.09800
53147.38490	-0.03800	53509.44903	-0.09700	53521.33200	-0.06100
53147.38620	-0.01300	53509.46005	-0.10000	53521.33738	-0.05900
53147.38750	-0.02600	53516.31872	0.25900	53521.34700	-0.03600
53147.38870	-0.00900	53516.32261	0.25700	53521.39207	0.08500
53147.39000	-0.01500	53516.33086	0.22300	53521.39867	0.11100
53147.39130	-0.01100	53516.34406	0.15700	53521.42523	0.22400
53147.39260	-0.00700	53516.35177	0.11300	53521.44107	0.30400
53147.39380	-0.00700	53516.35493	0.09700	53521.44832	0.34700
53147.39510	0.01200	53516.35736	0.08000	53521.45591	0.37700
53147.39640	-0.00200	53516.35919	0.07700	53521.46144	0.40100
53147.39760	0.02500	53516.36121	0.06000	53521.46759	0.43200
53147.39890	-0.01600	53516.36354	0.06100	53521.47327	0.45600
53147.40020	0.02900	53516.36797	0.04100	53521.47762	0.47300
53147.40150	0.01600	53516.37107	0.02200	53521.48378	0.48800
53147.40270	0.03000	53516.37495	0.01900	53521.48715	0.50100
53147.40400	0.02700	53516.37964	0.00100	53521.49623	0.52500
53147.43090	0.15000	53516.38246	-0.00300	53521.50193	0.51900
53147.43210	0.13100	53516.38504	-0.01500	53521.50772	0.52400
53147.43340	0.16200	53516.38747	-0.01200	53521.51503	0.49700
53147.43470	0.14900	53516.39273	-0.03400	53521.52426	0.51200
53147.43600	0.15200	53516.39563	-0.04500	53527.37858	-0.07400
53147.43720	0.15800	53516.40083	-0.00800	53527.38500	-0.11700
53509.30663	0.19300	53516.40525	-0.02300	53527.39006	-0.12400
53509.31394	0.16600	53516.40848	-0.02200	53527.39242	-0.11200
53509.32080	0.14300	53516.41066	-0.03600	53527.46058	-0.09600
53509.32470	0.11700	53516.41601	-0.03500	53527.48460	-0.07600
53509.32749	0.11300	53516.42612	-0.08700	53529.34039	-0.01100
53509.33322	0.08800	53516.42788	-0.08700	53529.35356	-0.03700

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
53529.35847	-0.03700	54234.41827	0.30700	54242.37125	-0.04900
53529.36397	-0.03300	54234.42169	0.28700	54242.37419	-0.05100
53529.36651	-0.03200	54234.42415	0.29000	54242.37849	-0.05400
53529.36959	-0.02400	54234.43083	0.25500	54242.38409	-0.05800
53529.37921	-0.02900	54234.43481	0.24100	54242.38627	-0.07000
53529.38740	-0.01800	54234.43721	0.22300	54242.39649	-0.06400
53529.38970	-0.02000	54234.43974	0.21400	54242.39973	-0.04200
53529.39636	-0.01100	54234.43986	0.20600	54243.28930	-0.05600
53529.39975	-0.01800	54234.43998	0.19600	54243.29294	-0.02000
53529.40272	-0.01100	54234.44299	0.20400	54243.29801	-0.05200
53529.41443	-0.01000	54234.44588	0.18500	54243.30118	-0.04500
53529.41797	-0.01800	54234.44946	0.16600	54243.30424	-0.05300
53529.42438	-0.01200	54234.45304	0.12500	54243.31148	-0.05100
53529.43613	-0.00900	54234.46865	0.09000	54243.32148	-0.05400
53529.44597	-0.01300	54234.47198	0.06500	54306.44137	0.13700
53529.45538	-0.02200	54234.47480	0.08200	54306.45040	0.10500
53529.46251	-0.00500	54234.47788	0.05800	54306.46889	0.05300
53529.46467	-0.02400	54235.30952	-0.03500	54306.49730	-0.02600
53529.47016	-0.02500	54235.31221	-0.01400	54307.32930	-0.04000
53529.47529	-0.02500	54235.31531	-0.03500	54307.33400	-0.07700
53529.48112	-0.02100	54235.31967	-0.03100	54308.29950	-0.05900
53529.48444	-0.03200	54235.32366	-0.03300	54308.32778	-0.09000
53529.48875	-0.04200	54235.32698	-0.04600	54308.40294	-0.10200
53529.49305	-0.03900	54235.32985	-0.04600	54308.40538	-0.13200
53529.49357	-0.03900	54235.33337	-0.05400	54309.30027	-0.09700
53529.49830	-0.04100	54235.33557	-0.05700	54309.30785	-0.09000
53534.33845	-0.11900	54235.33938	-0.05300	54311.31112	-0.08900
53534.34205	-0.12000	54235.34177	-0.05200	54311.31740	-0.11500
53534.34730	-0.11700	54235.34611	-0.05900	54311.32230	-0.11900
53534.35067	-0.11300	54235.35690	-0.07200	54311.32509	-0.07100
53534.35331	-0.11000	54235.36075	-0.07400	54312.33768	-0.06500
54234.31826	0.45500	54235.37569	-0.08400	54312.34147	-0.06700
54234.32201	0.45500	54235.37959	-0.08300	54312.34397	-0.05400
54234.32662	0.49500	54235.38647	-0.08200	54948.30569	-0.07345
54234.34017	0.50800	54235.39047	-0.09000	54948.31953	-0.08055
54234.35936	0.48800	54235.39366	-0.08000	54948.33343	-0.09682
54234.36207	0.48200	54235.41361	-0.07800	54948.34792	-0.08745
54234.36604	0.49500	54235.41707	-0.07700	54948.36326	-0.10555
54234.36937	0.52600	54235.42037	-0.07600	54948.37832	-0.09745
54234.37405	0.47100	54235.42672	-0.08400	54948.39107	-0.10182
54234.37788	0.42500	54237.32250	-0.12600	54948.40241	-0.10309
54234.38558	0.42300	54237.32706	-0.13000	54948.41402	-0.10855
54234.39173	0.39900	54237.32962	-0.12200	55010.28696	0.09350
54234.39515	0.37800	54237.33607	-0.11900	55010.29319	0.10480
54234.39849	0.39900	54237.34099	-0.11700	55010.29738	0.11890
54234.40231	0.36200	54242.36633	-0.04900	55010.30153	0.14530

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
55010.30539	0.16920	55010.39350	0.53760	55011.28871	-0.01406
55010.30957	0.19240	55010.39712	0.53450	55011.29495	-0.02131
55010.31363	0.21450	55010.40072	0.53620	55011.30117	-0.01713
55010.31776	0.23320	55010.40436	0.53360	55011.30727	-0.02038
55010.32127	0.24450	55010.40800	0.51620	55011.31249	-0.01231
55010.32518	0.26250	55010.41146	0.50020	55011.31771	-0.00119
55010.32898	0.28820	55010.41516	0.49330	55011.32293	-0.00763
55010.33260	0.30180	55010.41846	0.49640	55011.32816	-0.00363
55010.33629	0.32710	55010.42232	0.46900	55011.33471	-0.00769
55010.34206	0.34740	55010.43029	0.44260	55011.36699	-0.02231
55010.34579	0.36570	55010.43375	0.43310	55011.39635	-0.03131
55010.34906	0.38050	55010.43702	0.42780	55011.40057	-0.03075
55010.35233	0.39310	55010.44062	0.41360	55011.40483	-0.03481
55010.35560	0.40620	55010.44422	0.39710	55011.40877	-0.04619
55010.35909	0.42450	55010.44749	0.37770	55011.41274	-0.05075
55010.36271	0.43270	55010.45076	0.36980	55011.41697	-0.04863
55010.36618	0.45790	55010.45403	0.34980	55016.42342	-0.06563
55010.36945	0.46960	55010.45730	0.34070	55016.42862	-0.07587
55010.37313	0.48820	55010.46057	0.33340	55016.43435	-0.06825
55010.37681	0.49710	55010.46384	0.32150	55016.44043	-0.05292
55010.38009	0.50770	55010.46852	0.28770	55016.45243	-0.07133
55010.38336	0.51140	55010.47486	0.24220	55016.45796	-0.07342
55010.38663	0.52730	55010.47779	0.23740	55016.46468	-0.06888
55010.39020	0.53260	55010.48089	0.22930	55016.46980	-0.06071
TYC 3071-656-1, <i>V</i>					
59386.29097	-0.11500	59386.30949	-0.11000	59386.32827	-0.11100
59386.29210	-0.10300	59386.31031	-0.10900	59386.32979	-0.11700
59386.29265	-0.11100	59386.31112	-0.10500	59386.33038	-0.10300
59386.29322	-0.10900	59386.31195	-0.10900	59386.33097	-0.10300
59386.29377	-0.10100	59386.31276	-0.10800	59386.33155	-0.10400
59386.29454	-0.11500	59386.31357	-0.11100	59386.33214	-0.11700
59386.29536	-0.11100	59386.31439	-0.10300	59386.33272	-0.11000
59386.29617	-0.11500	59386.31520	-0.11200	59386.33331	-0.10400
59386.29699	-0.11700	59386.31602	-0.10700	59386.33389	-0.11500
59386.29781	-0.11300	59386.31684	-0.10800	59386.33448	-0.10800
59386.29864	-0.10300	59386.31765	-0.10600	59386.33506	-0.10800
59386.29945	-0.11600	59386.31847	-0.11600	59386.33565	-0.10800
59386.30027	-0.10600	59386.31930	-0.10500	59386.33623	-0.10600
59386.30132	-0.11300	59386.32011	-0.10600	59386.33682	-0.11400
59386.30214	-0.10700	59386.32093	-0.10300	59386.33740	-0.12000
59386.30295	-0.10800	59386.32174	-0.10700	59386.33799	-0.12200
59386.30377	-0.10700	59386.32255	-0.10500	59386.33858	-0.11600
59386.30460	-0.10500	59386.32337	-0.10700	59386.33917	-0.10800
59386.30541	-0.11300	59386.32418	-0.10600	59386.33976	-0.11200
59386.30623	-0.10400	59386.32499	-0.10000	59386.34034	-0.11600
59386.30705	-0.10600	59386.32581	-0.10400	59386.34421	-0.10600
59386.30786	-0.10700	59386.32663	-0.11400	59386.34506	-0.11100
59386.30868	-0.10500	59386.32746	-0.10400	59386.34564	-0.10000

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
59386.34623	-0.10700	59386.37317	-0.11000	59395.31422	-0.05800
59386.34682	-0.09300	59386.37376	-0.10800	59395.31422	-0.05800
59386.34741	-0.10300	59386.37435	-0.09900	59395.31520	-0.05400
59386.34799	-0.10000	59395.27036	-0.06400	59395.31520	-0.05500
59386.34858	-0.10500	59395.27133	-0.07900	59395.31618	-0.05800
59386.34917	-0.10500	59395.27329	-0.07000	59395.31618	-0.05900
59386.34976	-0.10300	59395.27426	-0.06700	59395.31715	-0.05700
59386.35034	-0.10400	59395.27523	-0.06900	59395.31715	-0.05800
59386.35093	-0.10100	59395.27620	-0.06100	59395.31812	-0.05600
59386.35151	-0.09200	59395.27719	-0.06200	59395.31812	-0.05600
59386.35210	-0.10000	59395.27816	-0.06800	59395.31910	-0.05600
59386.35268	-0.11900	59395.27913	-0.06400	59395.31910	-0.05600
59386.35327	-0.10800	59395.28010	-0.07300	59395.32007	-0.05500
59386.35384	-0.09800	59395.28108	-0.06300	59395.32007	-0.05500
59386.35443	-0.10000	59395.28206	-0.06400	59395.32104	-0.05200
59386.35501	-0.10500	59395.28303	-0.07100	59395.32203	-0.04600
59386.35560	-0.10000	59395.28400	-0.07000	59395.32300	-0.05300
59386.35618	-0.10300	59395.28498	-0.06200	59395.32397	-0.05200
59386.35677	-0.09800	59395.28596	-0.06400	59395.32494	-0.04500
59386.35736	-0.10300	59395.28693	-0.05900	59395.32591	-0.04900
59386.35794	-0.10800	59395.28791	-0.06700	59395.32690	-0.04700
59386.35853	-0.10300	59395.28888	-0.06300	59395.32787	-0.04700
59386.35911	-0.09900	59395.28986	-0.07400	59395.32884	-0.04300
59386.35970	-0.10500	59395.29083	-0.06700	59395.32981	-0.04200
59386.36028	-0.09600	59395.29181	-0.05800	59395.33080	-0.04200
59386.36087	-0.10700	59395.29375	-0.06600	59395.33177	-0.04300
59386.36145	-0.11300	59395.29473	-0.06600	59395.33274	-0.03700
59386.36204	-0.09700	59395.29571	-0.06500	59395.33372	-0.04100
59386.36262	-0.10600	59395.29668	-0.07200	59395.33469	-0.04800
59386.36321	-0.10700	59395.29765	-0.06100	59395.33566	-0.03800
59386.36380	-0.10000	59395.29863	-0.05700	59395.33663	-0.04300
59386.36438	-0.10100	59395.29961	-0.07000	59395.33762	-0.04500
59386.36497	-0.10000	59395.30058	-0.05400	59395.33859	-0.03400
59386.36555	-0.10800	59395.30155	-0.05700	59395.33956	-0.04500
59386.36614	-0.11300	59395.30252	-0.06300	59395.34053	-0.03800
59386.36671	-0.10300	59395.30351	-0.06900	59395.34150	-0.03700
59386.36730	-0.10000	59395.30448	-0.06000	59395.34248	-0.03800
59386.36788	-0.10400	59395.30545	-0.05400	59395.34346	-0.04200
59386.36847	-0.11100	59395.30642	-0.07400	59395.34443	-0.04000
59386.36906	-0.10600	59395.30741	-0.06100	59395.34541	-0.04000
59386.36965	-0.10200	59395.30838	-0.05400	59395.34638	-0.04000
59386.37024	-0.10500	59395.30935	-0.06000	59395.34735	-0.03200
59386.37082	-0.09600	59395.31032	-0.06200	59395.34833	-0.03800
59386.37141	-0.10600	59395.31130	-0.05800	59395.34931	-0.03500
59386.37200	-0.09800	59395.31228	-0.06100	59395.35028	-0.03300
59386.37259	-0.09500	59395.31325	-0.06600	59395.35125	-0.03100

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
59395.35222	-0.03900	59395.39601	-0.01100	59395.43233	-0.00300
59395.35321	-0.03800	59395.39698	-0.01100	59395.43295	0.00400
59395.35418	-0.03100	59395.39796	-0.00100	59395.43359	0.00700
59395.35515	-0.03200	59395.39894	-0.00600	59395.43421	-0.00600
59395.35612	-0.02600	59395.39991	-0.00100	59395.43484	-0.00300
59395.35709	-0.02900	59395.40088	0.00100	59395.43546	-0.00100
59395.35807	-0.02700	59395.40185	-0.00500	59395.43609	-0.00800
59395.35904	-0.03000	59395.40282	-0.00100	59395.43671	0.01000
59395.36001	-0.03000	59395.40378	-0.00200	59395.43735	-0.00300
59395.36098	-0.02600	59395.40477	0.00600	59395.43797	-0.01400
59395.36197	-0.02600	59395.40574	0.00100	59395.43860	-0.01100
59395.36294	-0.02700	59395.40671	0.00200	59395.43924	-0.00200
59395.36294	-0.02700	59395.40769	0.00700	59395.43986	0.00200
59395.36391	-0.01500	59395.40866	0.00600	59395.44049	0.00400
59395.36488	-0.02000	59395.40963	0.01000	59395.44112	0.00300
59395.36586	-0.01800	59395.41060	0.00400	59395.44175	0.00100
59395.36683	-0.02300	59395.41157	0.00200	59395.44238	0.00600
59395.36780	-0.01700	59395.41255	0.01000	59395.44304	0.00900
59395.36877	-0.01400	59395.41352	0.00700	59395.44367	-0.00700
59395.36975	-0.01800	59395.41449	0.00900	59395.44429	0.00500
59395.37072	-0.01500	59395.41546	0.01000	59395.44492	0.01000
59395.37169	-0.02300	59395.41664	-0.00700	59395.44554	-0.00700
59395.37266	-0.01400	59395.41727	0.00100	59395.44617	-0.00100
59395.37363	-0.01700	59395.41789	0.00000	59395.44679	0.01500
59395.37461	-0.01800	59395.41852	0.00400	59395.44742	0.00800
59395.37558	-0.01700	59395.41914	0.00500	59395.44804	-0.00100
59395.37655	-0.01300	59395.41977	0.00700	59395.44867	-0.00100
59395.37752	-0.01800	59395.42041	0.00600	59395.44929	0.00400
59395.37850	-0.01100	59395.42103	0.00100	59395.44992	-0.00500
59395.37947	-0.01300	59395.42166	0.00700	59395.45054	0.00900
59395.38044	-0.01700	59395.42229	-0.00700	59395.45117	0.01700
59395.38141	-0.00900	59395.42292	0.01100	59395.45179	0.00800
59395.38238	-0.01100	59395.42354	-0.00500	59395.45242	-0.00500
59395.38336	-0.00700	59395.42417	-0.00100	59395.45304	0.01600
59395.38433	-0.01100	59395.42480	0.00800	59395.45367	0.00800
59395.38530	-0.00800	59395.42543	-0.00700	59395.45429	-0.00600
59395.38627	-0.01300	59395.42606	0.00000	59395.45493	0.00300
59395.38725	-0.01600	59395.42669	0.00600	59395.45556	-0.00400
59395.38822	-0.01000	59395.42731	0.00400	59395.45617	0.00600
59395.38919	-0.00800	59395.42795	-0.00500	59395.45681	0.00300
59395.39016	-0.00700	59395.42856	-0.00500	59395.45743	0.01700
59395.39113	-0.01100	59395.42920	0.01000	59395.45806	0.00000
59395.39211	-0.01200	59395.42983	-0.00400	59395.45868	-0.00400
59395.39309	0.00300	59395.43045	-0.00900	59395.45931	0.01300
59395.39406	-0.00500	59395.43108	0.00100	59395.45993	0.01300
59395.39503	-0.00300	59395.43171	-0.00100	59395.46056	-0.00200

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
59395.46118	0.00200	59395.48998	-0.00400	59396.27902	0.35900
59395.46182	0.00200	59395.49061	0.00600	59396.27999	0.36700
59395.46243	0.00200	59395.49124	-0.01400	59396.28097	0.37100
59395.46307	0.00300	59395.49186	-0.01000	59396.28194	0.37700
59395.46369	0.00700	59395.49249	-0.00500	59396.28485	0.38700
59395.46432	0.00900	59395.49310	-0.00400	59396.28583	0.38900
59395.46494	0.00100	59395.49373	-0.00100	59396.28680	0.39700
59395.46557	-0.00100	59395.49436	-0.00700	59396.28777	0.40400
59395.46619	0.01300	59395.49498	-0.00100	59396.28874	0.41000
59395.46682	0.00400	59395.49560	-0.00400	59396.28973	0.41000
59395.46744	-0.00100	59395.49623	-0.00400	59396.29070	0.41200
59395.46807	0.01000	59395.49685	-0.00600	59396.29167	0.41600
59395.46869	0.00200	59395.49748	-0.01800	59396.29264	0.42600
59395.46933	-0.01600	59395.49810	-0.01200	59396.29362	0.43400
59395.46995	-0.01200	59395.49873	-0.00900	59396.29459	0.43500
59395.47058	0.00000	59395.49935	-0.01000	59396.29594	0.43600
59395.47120	-0.00100	59395.49998	-0.01300	59396.29691	0.44800
59395.47183	0.00800	59395.50060	-0.00600	59396.29789	0.45600
59395.47245	-0.00600	59395.50123	0.00200	59396.29886	0.45400
59395.47308	0.00200	59395.50185	-0.01000	59396.29983	0.45300
59395.47370	-0.00600	59395.50248	-0.00700	59396.30080	0.46500
59395.47434	-0.00400	59395.50310	0.00600	59396.30179	0.46500
59395.47497	0.00000	59395.50373	-0.00100	59396.30276	0.47100
59395.47559	-0.00500	59395.50435	-0.00900	59396.30373	0.47700
59395.47622	0.00000	59395.50498	-0.01000	59396.30470	0.47900
59395.47684	-0.00600	59395.50560	-0.00400	59396.30568	0.48200
59395.47747	-0.00500	59395.50623	0.00500	59396.30666	0.48400
59395.47809	-0.00500	59395.50685	-0.00900	59396.30763	0.49300
59395.47872	-0.01200	59395.50748	-0.00700	59396.30860	0.50100
59395.47934	-0.00500	59395.50811	-0.02400	59396.30958	0.50300
59395.47997	-0.00600	59395.50874	-0.00300	59396.31055	0.50500
59395.48059	-0.00300	59395.50936	-0.00900	59396.31152	0.50900
59395.48122	-0.00900	59395.50999	-0.02300	59396.31249	0.51400
59395.48184	-0.00900	59395.51061	-0.00800	59396.31347	0.51200
59395.48247	-0.01100	59395.51124	-0.02600	59396.31444	0.53100
59395.48309	0.00400	59395.51186	-0.02800	59396.31542	0.52600
59395.48373	-0.01500	59395.51249	-0.02100	59396.31639	0.53600
59395.48435	-0.00100	59396.26889	0.31900	59396.31737	0.52900
59395.48498	0.00600	59396.27025	0.31500	59396.31737	0.52800
59395.48560	-0.00800	59396.27122	0.32000	59396.31834	0.52700
59395.48623	-0.01000	59396.27219	0.32100	59396.31931	0.53200
59395.48685	-0.00100	59396.27316	0.32700	59396.32028	0.54300
59395.48748	-0.00400	59396.27415	0.33600	59396.32163	0.54100
59395.48810	-0.00600	59396.27512	0.34200	59396.32260	0.54500
59395.48873	-0.00200	59396.27706	0.34800	59396.32357	0.54600
59395.48935	-0.00500	59396.27805	0.35300	59396.32454	0.55700

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
59396.32553	0.55600	59396.36973	0.49900	59396.41522	0.28400
59396.32650	0.56200	59396.37070	0.49300	59396.41620	0.27600
59396.32748	0.56200	59396.37167	0.50200	59396.41620	0.27500
59396.32845	0.55900	59396.37264	0.49700	59396.41717	0.27300
59396.32943	0.56300	59396.37399	0.48300	59396.41815	0.27600
59396.33040	0.56900	59396.37497	0.48600	59396.41913	0.26200
59396.33137	0.56200	59396.37594	0.48000	59396.42010	0.24900
59396.33234	0.56900	59396.37691	0.47900	59396.42107	0.25400
59396.33331	0.57300	59396.37789	0.47300	59396.42204	0.24900
59396.33429	0.56200	59396.37886	0.46700	59396.42301	0.24200
59396.33526	0.55900	59396.37983	0.45800	59396.42399	0.24300
59396.33624	0.56600	59396.38080	0.45900	59396.42533	0.23300
59396.33722	0.56300	59396.38178	0.46600	59396.42630	0.22900
59396.33819	0.57300	59396.38275	0.45300	59396.42727	0.22500
59396.33916	0.57000	59396.38372	0.44400	59396.42825	0.21700
59396.34014	0.56100	59396.38470	0.43400	59396.42922	0.21500
59396.34112	0.56700	59396.38568	0.43400	59396.43019	0.20600
59396.34209	0.57100	59396.38665	0.43100	59396.43116	0.20200
59396.34306	0.56900	59396.38762	0.43400	59396.43213	0.20200
59396.34403	0.56700	59396.38859	0.42100	59396.43311	0.19800
59396.34500	0.57500	59396.38956	0.41600	59396.43408	0.19800
59396.34598	0.56800	59396.39054	0.41300	59396.43505	0.19500
59396.34732	0.55900	59396.39151	0.41700	59396.43602	0.18300
59396.34829	0.56100	59396.39248	0.40300	59396.43700	0.17900
59396.34928	0.56100	59396.39345	0.40000	59396.43797	0.16900
59396.35025	0.56300	59396.39443	0.39900	59396.43894	0.16200
59396.35122	0.55500	59396.39540	0.39600	59396.43991	0.16800
59396.35222	0.56400	59396.39637	0.39200	59396.44186	0.16000
59396.35319	0.55700	59396.39734	0.37800	59396.44283	0.15600
59396.35416	0.55400	59396.39831	0.37700	59396.44380	0.14700
59396.35513	0.55000	59396.39967	0.37200	59396.44477	0.15000
59396.35610	0.54800	59396.40064	0.36700	59396.44576	0.14600
59396.35708	0.54300	59396.40161	0.36500	59396.44673	0.13800
59396.35805	0.54200	59396.40259	0.35200	59396.44770	0.13600
59396.35902	0.53300	59396.40356	0.35600	59396.44867	0.15100
59396.35999	0.53500	59396.40453	0.34500	59396.44965	0.13100
59396.36097	0.53500	59396.40550	0.34100	59396.45099	0.12800
59396.36194	0.53300	59396.40647	0.33600	59396.45196	0.11600
59396.36291	0.53100	59396.40745	0.32900	59396.45293	0.12900
59396.36389	0.52800	59396.40842	0.31600	59396.45391	0.11600
59396.36487	0.51700	59396.40939	0.31700	59396.45489	0.10700
59396.36584	0.51900	59396.41036	0.31600	59396.45586	0.10700
59396.36681	0.51400	59396.41134	0.30400	59396.45683	0.09800
59396.36681	0.51400	59396.41231	0.29900	59396.45781	0.09900
59396.36778	0.51200	59396.41328	0.29100	59396.45878	0.10800
59396.36875	0.50600	59396.41425	0.29200	59396.45975	0.08900

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
59396.46072	0.08400	59396.49710	-0.01000	59396.52946	-0.11500
59396.46169	0.09400	59396.49807	-0.01000	59396.53009	-0.12300
59396.46268	0.08400	59396.49904	-0.01700	59396.53070	-0.11200
59396.46365	0.09800	59396.50002	-0.03200	59396.53134	-0.12200
59396.46462	0.08800	59396.50766	-0.10200	59396.53196	-0.13700
59396.46559	0.07000	59396.50828	-0.09900	59396.53259	-0.12300
59396.46559	0.07100	59396.50895	-0.11300	59396.53321	-0.14400
59396.46657	0.06100	59396.50976	-0.09800	59396.53384	-0.13400
59396.46754	0.06400	59396.51055	-0.11200	59396.53446	-0.12500
59396.46851	0.05300	59396.51117	-0.09800	59396.53509	-0.12100
59396.46948	0.05100	59396.51193	-0.09600	59396.53571	-0.12400
59396.47046	0.05200	59396.51255	-0.10200	59396.53645	-0.11400
59396.47143	0.05400	59396.51318	-0.11000	59396.53678	-0.11200
59396.47240	0.04200	59396.51381	-0.10700	59396.53711	-0.10700
59396.47337	0.04400	59396.51444	-0.12000	59396.53744	-0.11500
59396.47434	0.04100	59396.51506	-0.12500	59396.53776	-0.11500
59396.47532	0.03600	59396.51569	-0.12200	59396.53808	-0.11500
59396.47629	0.03900	59396.51631	-0.12100	59396.53842	-0.11600
59396.47764	0.02600	59396.51694	-0.11800	59396.53874	-0.11000
59396.47862	0.03000	59396.51756	-0.12400	59396.53907	-0.10200
59396.47959	0.03500	59396.51819	-0.11400	59396.53939	-0.10200
59396.48056	0.04100	59396.51881	-0.13000	59396.53972	-0.13500
59396.48153	0.00800	59396.51944	-0.12500	59396.54005	-0.13700
59396.48250	0.00800	59396.52007	-0.11800	59396.54038	-0.11900
59396.48348	0.00700	59396.52069	-0.12100	59396.54070	-0.12000
59396.48445	0.01000	59396.52132	-0.12500	59396.54102	-0.12300
59396.48542	0.00800	59396.52195	-0.12500	59396.54136	-0.11100
59396.48639	0.00600	59396.52257	-0.11900	59396.54168	-0.10100
59396.48737	0.01100	59396.52320	-0.13100	59396.54201	-0.11000
59396.48834	0.01800	59396.52382	-0.13000	59396.54234	-0.10600
59396.48931	-0.00700	59396.52445	-0.12500	59396.54267	-0.11300
59396.49028	0.00600	59396.52507	-0.11200	59396.54299	-0.09600
59396.49125	0.00800	59396.52570	-0.12900	59396.54331	-0.12300
59396.49223	0.00100	59396.52632	-0.12000	59396.54365	-0.10600
59396.49320	-0.00600	59396.52696	-0.13800	59396.54397	-0.12500
59396.49417	-0.01400	59396.52759	-0.13000	59396.54430	-0.11800
59396.49514	-0.01900	59396.52821	-0.11100	59396.54463	-0.10900
59396.49613	-0.01700	59396.52884	-0.12200	59396.54496	-0.11700
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59396.27288	0.43200	59396.28066	0.46400	59396.28845	0.50700
59396.27385	0.43600	59396.28164	0.47600	59396.28943	0.50700
59396.27483	0.43900	59396.28262	0.48000	59396.29040	0.51000
59396.27580	0.44400	59396.28359	0.48000	59396.29137	0.51700
59396.27678	0.44700	59396.28456	0.48400	59396.29234	0.52400
59396.27775	0.44900	59396.28554	0.49600	59396.29331	0.52600
59396.27872	0.46200	59396.28651	0.49800	59396.29430	0.53500
59396.27969	0.45900	59396.28748	0.50300	59396.29564	0.54200

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
59396.29663	0.54300	59396.34180	0.65800	59396.38732	0.53300
59396.29760	0.54600	59396.34277	0.66600	59396.38829	0.52100
59396.29857	0.54900	59396.34373	0.65600	59396.38926	0.52300
59396.29954	0.55500	59396.34472	0.66100	59396.39024	0.52000
59396.30051	0.56400	59396.34569	0.65800	59396.39122	0.51100
59396.30149	0.57000	59396.34703	0.65600	59396.39219	0.50500
59396.30246	0.56700	59396.34800	0.66200	59396.39316	0.50300
59396.30343	0.57200	59396.34897	0.65300	59396.39414	0.49800
59396.30441	0.57700	59396.34995	0.64700	59396.39511	0.49500
59396.30539	0.58200	59396.35093	0.65100	59396.39608	0.48100
59396.30636	0.58500	59396.35190	0.65300	59396.39705	0.48500
59396.30734	0.59500	59396.35289	0.64800	59396.39803	0.47400
59396.30831	0.59400	59396.35386	0.64700	59396.39937	0.47000
59396.30929	0.59000	59396.35484	0.65000	59396.40034	0.46300
59396.31026	0.59600	59396.35581	0.64600	59396.40131	0.45700
59396.31123	0.60200	59396.35679	0.64100	59396.40230	0.45900
59396.31220	0.60600	59396.35776	0.63700	59396.40327	0.45000
59396.31318	0.60700	59396.35873	0.63100	59396.40424	0.44600
59396.31415	0.61200	59396.35970	0.63300	59396.40521	0.44300
59396.31512	0.60800	59396.36068	0.62400	59396.40619	0.44000
59396.31609	0.61600	59396.36165	0.62400	59396.40716	0.43100
59396.31706	0.62600	59396.36262	0.62500	59396.40813	0.43000
59396.31804	0.63400	59396.36359	0.62300	59396.40910	0.42600
59396.31901	0.62900	59396.36456	0.62200	59396.41007	0.41500
59396.31999	0.63600	59396.36554	0.62100	59396.41105	0.40900
59396.32134	0.63800	59396.36651	0.61500	59396.41202	0.40900
59396.32231	0.63700	59396.36748	0.60800	59396.41299	0.39400
59396.32328	0.63800	59396.36847	0.60300	59396.41396	0.39400
59396.32425	0.65000	59396.36944	0.60200	59396.41494	0.39100
59396.32522	0.64900	59396.37041	0.59300	59396.41591	0.39100
59396.32620	0.65400	59396.37138	0.58500	59396.41688	0.38200
59396.32717	0.65400	59396.37235	0.58900	59396.41785	0.39000
59396.32816	0.65000	59396.37370	0.58700	59396.41882	0.36900
59396.32914	0.65500	59396.37467	0.57800	59396.41980	0.36300
59396.33011	0.65300	59396.37564	0.57900	59396.42077	0.36400
59396.33108	0.65100	59396.37661	0.57200	59396.42174	0.35600
59396.33205	0.66100	59396.37759	0.56900	59396.42271	0.34900
59396.33303	0.65500	59396.37856	0.56200	59396.42369	0.34600
59396.33400	0.65500	59396.37954	0.55900	59396.42504	0.34200
59396.33497	0.65800	59396.38051	0.55900	59396.42601	0.33700
59396.33594	0.66000	59396.38149	0.55300	59396.42601	0.33700
59396.33691	0.65600	59396.38246	0.55000	59396.42698	0.32700
59396.33790	0.65700	59396.38343	0.54000	59396.42796	0.33200
59396.33887	0.65900	59396.38440	0.54400	59396.42893	0.31900
59396.33984	0.66100	59396.38538	0.53300	59396.42990	0.31800
59396.34081	0.65900	59396.38635	0.53400	59396.43087	0.31700

Table 2: Continued

HJD-2 400 000	Δm	HJD-2 400 000	Δm	HJD-2 400 000	Δm
59396.43184	0.31400	59396.48220	0.13800	59396.52489	0.00200
59396.43281	0.30600	59396.48319	0.16300	59396.52553	-0.00300
59396.43378	0.29800	59396.48416	0.12300	59396.52615	-0.00200
59396.43476	0.29800	59396.48513	0.18400	59396.52678	-0.00700
59396.43572	0.29200	59396.48610	0.11600	59396.52740	-0.01700
59396.43669	0.28500	59396.48708	0.10700	59396.52803	-0.01900
59396.43768	0.28600	59396.48805	0.11000	59396.52865	-0.01400
59396.43865	0.28500	59396.48902	0.10500	59396.52928	-0.00500
59396.43962	0.28100	59396.48999	0.11600	59396.52990	-0.01300
59396.44448	0.26600	59396.49097	0.14200	59396.53053	-0.02800
59396.44546	0.26000	59396.49194	0.11900	59396.53115	0.00100
59396.44643	0.24700	59396.49291	0.11400	59396.53178	-0.01000
59396.44740	0.26000	59396.49388	0.09500	59396.53240	-0.01200
59396.44838	0.26900	59396.49485	0.08600	59396.53303	-0.01000
59396.44936	0.24400	59396.49583	0.09800	59396.53366	0.00100
59396.45070	0.24100	59396.49680	0.09000	59396.53429	-0.02300
59396.45167	0.22500	59396.49777	0.10000	59396.53491	-0.01400
59396.45264	0.23900	59396.49875	0.10200	59396.53554	-0.00700
59396.45362	0.22400	59396.49973	0.11000	59396.53628	-0.00400
59396.45459	0.22100	59396.50070	0.11200	59396.53660	-0.01400
59396.45556	0.21500	59396.50747	0.02200	59396.53693	-0.01900
59396.45653	0.21000	59396.50811	0.00700	59396.53726	-0.00300
59396.45750	0.20500	59396.50873	0.01800	59396.53759	0.00800
59396.45848	0.21600	59396.50953	-0.00200	59396.53791	0.00300
59396.45946	0.20100	59396.51038	0.00700	59396.53823	0.01000
59396.46043	0.20400	59396.51100	0.00900	59396.53856	-0.01400
59396.46141	0.21100	59396.51174	-0.00600	59396.53889	-0.00700
59396.46238	0.19100	59396.51238	0.01400	59396.53922	0.00700
59396.46335	0.19100	59396.51300	0.00900	59396.53954	-0.00700
59396.46432	0.21100	59396.51363	-0.00300	59396.53987	-0.00300
59396.46529	0.17100	59396.51425	0.00200	59396.54020	-0.01400
59396.46628	0.17900	59396.51488	-0.00300	59396.54053	-0.01100
59396.46725	0.17600	59396.51551	-0.00200	59396.54085	0.01900
59396.46822	0.16600	59396.51614	-0.02700	59396.54117	0.00800
59396.46919	0.15700	59396.51676	-0.01100	59396.54150	-0.01800
59396.47017	0.15700	59396.51739	-0.01400	59396.54183	0.00200
59396.47114	0.15500	59396.51801	-0.00500	59396.54216	0.00700
59396.47211	0.14800	59396.51864	-0.01100	59396.54248	-0.00400
59396.47308	0.16300	59396.51926	0.00300	59396.54282	0.01100
59396.47406	0.15700	59396.51989	0.00000	59396.54314	0.00600
59396.47503	0.15000	59396.52051	-0.00400	59396.54347	-0.01700
59396.47600	0.14300	59396.52114	0.00200	59396.54380	0.01000
59396.47734	0.14600	59396.52176	-0.00200	59396.54413	-0.00800
59396.47831	0.13400	59396.52239	-0.00600	59396.54445	0.02000
59396.47929	0.14000	59396.52301	-0.00600	59396.54478	0.00300
59396.48026	0.14100	59396.52365	-0.00100		
59396.48124	0.12700	59396.52426	-0.00500		