THE ASTRONOMICAL JOURNAL VOLUME 114, NUMBER 1 JULY 1997

THE MACHO PROJECT LMC VARIABLE STAR INVENTORY. V. CLASSIFICATION AND ORBITS OF 611 ECLIPSING BINARY STARS

C. ALCOCK,[1,2] R. A. ALLSMAN,[3] D. ALVES,[1,2,10] T. S. AXELROD,[4] A. C. BECKER,[7] D. P. BENNETT,[1,2] K. H. COOK,[1,2] K. C. FREEMAN,[4] K. GRIEST,[2,5] C. H. S. LACY,[12] M. J. LEHNER,[2,5] S. L. MARSHALL,[1,2] D. MINNITI,[1,2] B. A. PETERSON,[4] M. R. PRATT,[2,6,7] P. J. QUINN,[4,11] A. W. RODGERS,[4] C. W. STUBBS,[2,7] W. SUTHERLAND,[8] AND D. L. WELCH[9]

(The MACHO Collaboration)

Received 1996 June 23; revised 1997 April 15

ABSTRACT

We report the characteristics of 611 eclipsing binary stars in the Large Megallanic Cloud found by using the MACHO Project photometry database. The sample is magnitude limited, and extends down the main sequence to about spectral type A0. Many evolved binaries are also included. Each eclipsing binary is classified according to the traditional scheme of the *General Catalogue of Variable Stars* (EA and EB), and also according to a new decimal classification scheme defined in this paper. The new scheme is sensitive to the two major sources of variance in eclipsing binary star light curves—the sum of radii, and the surface-brightness ratio, and allow greater precision in characterizing the light curves. Examples of each type of light curve and their variations are given. Sixty-four of the eclipsing binaries have eccentric, rather than circular, orbits. The ephemeris and principal photometric characteristics of each eclipsing binary are listed in a table. Photometric orbits based on the Nelson–Davis–Etzel model have been fitted to all light curves. These data will be useful for planning future observations of these binaries. Plots of all data and fitted orbits and a table of the fitted orbital parameters are available on the AAS CD-ROM series, Vol. 9, 1997. These data are also available at the MACHO home page (http://wwwmacho.mcmaster.ca/). © *1997 American Astronomical Society.* [S0004-6256(97)03607-8]

1. INTRODUCTION

There have been two previous large surveys for eclipsing binary stars in the Large Magellanic Cloud (LMC). The first was that of the Harvard workers, summarized by Payne-Gaposchkin (1971) and Gaposchkin (1972). They list characteristics of 78 LMC eclipsing binaries (10 of these stars are also included in this survey). Their discoveries resulted from the visual examination of about 2000 photographic plates. The second was that of the EROS project (Grison *et al.* 1995). They list characteristics of 79 LMC eclipsing binaries (23 of these stars are also included in this survey). Their discoveries resulted as a byproduct of a gravitational microlensing survey of the bar of the LMC.

The MACHO Project photometry database contains photometric data for approximately 37 000 variable stars discovered during the first 400 days of observations in 22 LMC fields as part of the microlensing survey. An early rough estimate of the number of eclipsing binary stars in the database was 1200. Operationally, the observed color–magnitude space was divided into a number of independent bins: main sequence, Cepheids, RR Lyr, long-period variables, and others. This paper is a result of selecting relatively bright, large-amplitude eclipsing binaries from the main sequence ($V-R<0.3$) and Cepheid ($0.3<V-R<0.6$) bins. The distribution of the selected eclipsing binaries in color-magnitude space is shown in Fig. 1. The R magnitude limit for selection from the main-sequence bin (from preliminary magnitude estimates) was set at 18.0; for the Cepheid bin it was 18.5. Only those variables with photometric amplitudes greater than 0.2 mag were selected.

2. ANALYSIS AND RESULTS

Variable stars were visually identified as being eclipsing binaries, rather than some other type of variable star, by examining plots of their light curves based on the three best

[1]Lawrence Livermore National Laboratory, Livermore, CA 94550; Electronic mail: alcock, alves, bennett, dminniti, kcook, stuart@igpp.llnl.gov
[2]Center for Particle Astrophysics, University of California, Berkeley, CA 94720.
[3]Supercomputing Facility, Australian National University, Canberra, ACT 0200, Australia; Electronic mail: robyn@mso.anu.edu.au
[4]Mt. Stromlo and Siding Spring Observatories, Australian National University, Weston, ACT 2611, Australia; Electronic mail: tsa, kcf, peterson, alex@mso.anu.edu.au
[5]Department of Physics, University of California, San Diego, CA 92093; Electronic mail: kgriest, jguern, mlehner@ucsd.edu
[6]Department of Physics, University of California, Santa Barbara, CA 93106.
[7]Departments of Astronomy and Physics, University of Washington, Seattle, WA 98195; Electronic mail: becker, mrp, stubbs@astro.washington.edu
[8]Department of Physics, University of Oxford, Oxford OX1 3RH, U.K. Electronic mail: w.sutherland@physics.ox.ac.uk
[9]Department of Physics and Astronomy, McMaster University, Hamilton, ON L8S 4M1, Canada; Electronic mail: welch@physics.mcmaster.ca
[10]Department of Physics, University of California, Davis, CA 95616.
[11]European Southern Observatory, Karl-Schwarzchild Str. 2, D-85748, Garching, Germany; Electronic mail: pjq@eso.org
[12]Department of Physics, University of Arkansas, Fayetteville, AR 72701; Electronic mail: clacy@comp.uark.edu

 0004-6256/97/114(1)/326/15/$10.00

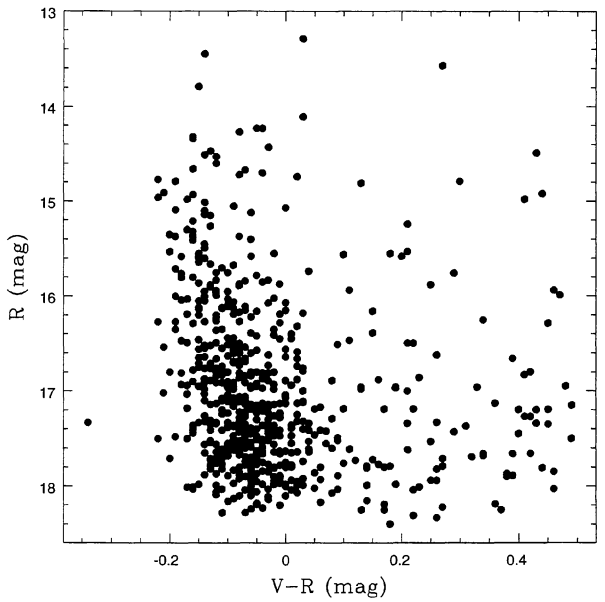

FIG. 1. The distribution of the selected eclipsing binary stars in the magnitude–color index plane.

guesses for their period made by a period-finding program (Reimann 1994). The "true" value of the orbital period was selected from these by eye, independently for V and R light curves of each eclipsing binary. Occasionally, when the "true" period was not one of the three given by the program, the period was determined by using the period-finding program of Lacy (1993). The weighted mean of the two different periods (for V and R) determined in this way was used in further analysis. Results are listed in Tables 1 and 2.

The $V-R$ color index listed in Table 1 is based on the Kron–Cousins photometric system. The uncertainty of a $V-R$ value is about 0.03 mag (standard error). The uncertainty of a V value is about 0.07 mag, based on repeated observations of stars in overlap regions of adjacent fields. The positional uncertainties are about 1.0 arcsec (standard error), although occasionally errors as large as 4 arcsec are seen in overlap regions of adjacent fields. Notes in Table 1 identify light curves in which there are possible ambiguities in identifying the "true" periods. When the reality of a very faint secondary eclipse might be questioned, the note "True $P=P\times 2$?" was appended to indicate the alternative interpretation. Likewise, when it appeared that a very faint secondary eclipse might possibly exist, the note "True $P=P/2$?" was appended.

The differences between the two independently determined values (for V and R) of the period provided a way to measure the standard error of a period value determined by the procedures used. The differences would be expected to have a standard deviation of approximately $\sqrt{2}$ times the standard deviation of an individual determination of the period if the number of observations used for the V and R light curves are approximately equal. Also, it was expected that the accuracy of the period determination should depend on the length of the period itself. Statistics were therefore determined to measure this dependence. These are given in Table 3. These statistics are confirmed by measured periods of binaries with multiple independent observations: There are regions of overlap between adjacent observed fields, so some binaries were observed independently on multiple frames (these are marked by an asterisk in Tables 1, 2, and 4). In fact, 25 of the binaries were measured on 2 or 3 adjacent fields. The statistics of period differences between these multiple measures are consistent with the larger sample. We find from examining a log-log graph that the uncertainty of an averaged period determination can be estimated within a factor of 2 by using the relation

$$\sigma = 0.000021 \cdot P^{1.73}, \quad (1)$$

where the period P and its standard deviation σ are measured in days.

The frequency distribution of periods of eclipsing binaries shown in Table 3 may be compared to that shown by eclipsing binaries in the Milky Way (Farinella & Paolicchi 1978). The overall shape of the distribution for the LMC is similar to that shown by the Milky Way, but the most commonly occurring periods in the LMC data are shorter than the most commonly occurring periods in the Milky Way data. In the LMC the most common periods are between 1 and 2 days. In the Milky Way the most common periods are between 2.5 and 3.2 days. The origin of this difference is unknown.

Also listed in Table 1 are the classification types. The *General Catalogue of Variable Stars* (GCVS, Kholopov 1985) lists two types that are applicable to our set of photometric data: EA and EB. There are no EW systems in our data because their luminosity is below our detection limit. The major difference between these two types is that in the EBs "it is impossible to specify the moments of the beginning and end of eclipses (because of a continuous change of the system's apparent combined brightness between eclipses)." This effect is basically due to the large geometric sizes of the stars causing ellipsoidal tidal distortions and a large reflection effect in such systems.

In our experience, the two major sources of variance in the shapes of eclipsing binary light curves are (1) the sum of relative radii (r_1+r_2), and (2) the surface brightness ratio J_s/J_p. The angle of inclination has a great effect on the absolute depths of the eclipses, of course, but not much effect on the shapes or relative depths of the two eclipses. A decimal classification system based on these ideas is displayed in Fig. 2. The relative-size axis runs horizontally, and the surface-brightness-ratio axis runs vertically. Classes 1, 2, and 3 have a surface brightness ratio near unity; classes 4, 5, and 6 have a surface brightness ratio near 0.5; classes 7, 8, and 9 have a surface brightness ratio near 0.18. Classes 1, 4, and 7 have a sum of radii near 0.4; classes 2, 5, and 8 have a sum of radii near 0.7; classes 3, 6, and 9 have a sum of radii near unity. Class 10 is reserved for "Algol-like" systems in which the effects of a secondary component larger than the primary and a large mass ratio are evident in the light curve from the broad and deep "wings" on the eclipses. Examples of our classification scheme applied to the stars in our sample are displayed in Figs. 3–16. The combined GCVS and decimal types were assigned by eye and are listed in Table 1.

TABLE 1. Properties of eclipsing binary stars in the Large Magellanic Cloud.

α (J2000.0)	δ (J2000.0)	Type	Max	Min I	Min II	V–R	Epoch JD 2400000+	σ	P	DI	N_V	σ_V	N_R	σ_R	Notes
04:49:51.9	-67:41:38	EB/ 3	16.46	16.73	16.73	-0.14	49073.6030	0.0005	0.459804	0.312	120	0.023	126	0.027	
04:49:52.1	-67:42:10	EA/ 2	15.15	15.77	15.76	-0.19	49074.0574	0.0004	1.633115	0.204	117	0.018	127	0.014	
04:53:45.9	-67:40:00	EB/ 2	17.83	18.20	18.19	-0.09	49073.5139	0.0015	1.050414	0.208	122	0.059	121	0.060	
04:53:46.5	-68:21:54	EB/ 3	17.00	17.49	17.48	-0.05	49073.5919	0.0004	0.561962	0.376	118	0.035	112	0.031	
04:53:48.7	-68:10:53	EA/ 7	16.74	18.97	16.89	-0.05	49074.4374	0.0020	4.924249	0.156	117	0.032	117	0.059	
04:53:50.7	-68:08:40	EA/ 1	17.83	18.16	18.20	-0.06	49076.0964	0.0036	3.403887	0.132	122	0.042	121	0.050	
04:54:05.9	-67:43:49	EA/ 1	17.58	17.90	17.91	-0.05	49073.4311	0.0040	3.884715	0.116	124	0.055	109	0.044	
04:54:24.5	-69:06:49	EA/10	14.99	15.80	15.31	0.00	49075.5813	0.0057	4.994171	0.156	119	0.024	44	0.020	HV 12493
04:54:25.7	-69:12:59	EB/ 3	17.80	18.30	18.23	-0.01	49073.1436	0.0008	0.609200	0.308	125	0.044	66	0.052	
04:54:41.6	-68:46:58	EB/ 3	16.83	17.41	17.38	-0.05	49073.3292	0.0013	1.832150	0.276	122	0.035	133	0.035	
04:54:50.3	-68:58:52	EA/ 2	16.49	16.91	16.80	-0.09	49073.4847	0.0011	1.388344	0.184	132	0.038	69	0.030	
04:54:59.0	-68:51:29	EA/10	17.84	18.25	17.94	0.15	49073.2560	0.0037	1.396659	0.140	104	0.054	121	0.048	
04:55:12.8	-68:52:25	EA/ 2	15.16	15.42	15.40	-0.16	49073.1531	0.0021	2.079790	0.120	127	0.031	134	0.032	
04:55:20.8	-68:51:10	EA/ 1	17.42	17.84	17.73	-0.09	49075.8696	0.0023	3.212571	0.100	122	0.035	129	0.043	Eccentric orbit
04:55:32.8	-68:53:38	EB/ 3	16.91	17.42	17.38	-0.10	49074.1174	0.0010	1.350568	0.264	119	0.028	131	0.029	
04:55:33.1	-69:15:42	EA/ 3	16.22	16.79	16.67	-0.12	49073.2839	0.0005	1.244053	0.232	109	0.017	70	0.020	
04:55:34.3	-68:05:07	EA/ 2	17.74	18.08	18.03	-0.01	49074.7226	0.0021	2.258636	0.172	95	0.033	117	0.045	
04:55:44.0	-68:53:48	EA/ 2	17.11	17.58	17.58	-0.11	49074.6073	0.0009	1.572633	0.196	63	0.027	126	0.030	
04:55:58.6	-69:13:49	EA/ 5	17.67	18.83	17.87	0.08	49075.1969	0.0082	8.286015	0.136	127	0.058	131	0.057	
04:56:11.4	-69:11:55	EB/ 6	15.50	15.97	15.79	-0.13	49072.9939	0.0012	1.732123	0.244	119	0.016	131	0.026	
04:56:15.3	-69:00:21	EA/ 2	16.58	17.03	17.04	-0.07	49072.7762	0.0006	1.213451	0.180	100	0.025	123	0.024	
04:56:26.6	-67:42:28	EA/ 8	17.60	18.50	17.75	-0.01	49073.7517	0.0030	2.069144	0.216	123	0.072	54	0.042	
04:56:46.5	-68:35:05	EB/ 6	16.09	16.38	16.21	-0.12	49075.6896	0.0037	2.457737	0.184	134	0.027	121	0.024	
04:56:49.9	-68:48:17	EB/ 3	17.81	18.25	18.20	-0.08	49073.6284	0.0012	0.978048	0.228	119	0.037	125	0.046	
04:57:02.9	-68:36:41	EA/ 3	16.95	17.47	17.42	-0.08	49071.9826	0.0017	1.974753	0.236	132	0.033	128	0.025	
04:57:16.8	-69:08:16	EB/ 6	16.42	16.60	16.57	0.47	49048.3661	0.1831	76.521071	0.140	130	0.028	135	0.016	
04:57:30.5	-68:49:51	EB/ 3	15.30	15.69	15.68	-0.15	49073.2164	0.0005	0.787357	0.364	113	0.018	131	0.021	
04:57:34.2	-68:54:02	EA/ 2	17.64	18.29	18.15	-0.11	49074.3355	0.0018	1.363139	0.160	108	0.055	119	0.060	
04:58:06.3	-69:14:25	EA/ 9	16.93	17.15	16.93	-0.06	49074.8541	0.0092	4.195453	0.152	125	0.031	135	0.037	
04:58:24.5	-69:11:56	EB/ 6	16.01	16.65	16.47	-0.22	49073.3983	0.0030	1.337458	0.244	115	0.083	107	0.098	
04:58:34.1	-68:39:30	EB/ 2	17.73	18.15	18.08	-0.14	49073.6733	0.0019	1.116621	0.152	117	0.071	124	0.065	
04:59:00.8	-68:50:05	EA/ 5	17.63	17.97	17.78	-0.13	49073.9261	0.0022	0.943181	0.184	123	0.048	129	0.046	
04:59:32.3	-69:05:11	EA/ 2	16.65	16.88	16.88	-0.11	49073.4090	0.0021	2.124212	0.164	125	0.023	125	0.022	
04:59:41.3	-68:57:53	EA/10	17.53	18.37	17.66	0.21	49077.1964	0.0216	17.001332	0.108	110	0.043	130	0.036	
04:59:41.8	-69:12:21	EB/ 2	17.05	17.39	17.38	-0.09	49073.4139	0.0023	1.919130	0.196	126	0.031	125	0.033	
05:00:17.3	-68:52:37	EB/10	15.26	15.59	15.49	-0.14	49074.0529	0.0044	2.773784	0.112	85	0.028	61	0.025	
05:00:32.6	-69:02:12	EA/ 8	17.40	17.83	17.47	-0.07	49073.0696	0.0041	1.940621	0.184	109	0.036	134	0.043	
05:00:57.3	-69:08:38	EA/ 8	17.44	18.28	17.51	0.04	49073.6144	0.0023	2.693001	0.172	116	0.045	132	0.027	
05:00:59.0	-69:45:21	EA/ 2	16.20	16.74	16.69	-0.11	49072.6781	0.0009	1.907149	0.224	166	0.023	168	0.022	
05:01:06.4	-68:53:26	EB/ 2	17.79	18.05	18.04	-0.06	49071.5330	0.0055	2.174151	0.164	121	0.040	62	0.046	
05:01:15.4	-69:37:33	EA/ 1	17.80	18.10	18.06	-0.10	49072.7080	0.0056	3.062098	0.100	116	0.037	143	0.058	
05:01:19.0	-69:05:18	EA/ 2	16.87	17.25	17.20	-0.06	49073.4887	0.0021	1.713244	0.200	121	0.045	127	0.031	
05:01:24.9	-69:46:44	EA/ 2	17.47	17.91	17.91	-0.06	49073.2350	0.0011	1.580360	0.156	142	0.038	142	0.033	
05:01:37.8	-69:58:53	EB/ 6	14.32	14.73	14.58	-0.12	49072.9498	0.0017	3.224943	0.244	156	0.014	85	0.011	
05:01:39.6	-68:51:04	EA/ 1	15.02	15.50	15.34	-0.13	49075.3625	0.0009	4.035197	0.088	292	0.018	290	0.015	Eccentric orbit
05:01:42.4	-69:20:37	EA/ 5	17.48	18.56	17.75	-0.06	49074.4153	0.0012	1.639882	0.204	284	0.047	172	0.052	
05:01:49.2	-69:19:45	EB/ 2	17.20	17.58	17.57	-0.10	49073.4913	0.0012	1.020578	0.224	283	0.040	164	0.049	
05:01:52.4	-70:13:47	EB/ 3	17.06	17.49	17.37	0.19	49081.8522	0.0537	31.424271	0.284	132	0.044	83	0.032	
05:01:55.5	-69:41:02	EA/ 2	16.40	17.05	17.02	-0.09	49072.4386	0.0017	3.106303	0.164	141	0.034	164	0.021	Eccentric orbit
05:02:03.6	-68:59:59	EB/ 2	17.45	17.83	17.72	-0.03	49075.6521	0.0031	2.646302	0.172	161	0.041	235	0.048	
05:02:54.7	-68:53:05	EA/ 1	16.56	16.96	16.88	-0.15	49072.8724	0.0010	2.789203	0.124	278	0.022	296	0.030	
05:02:56.2	-69:58:55	EB/ 2	16.84	17.13	17.05	-0.10	49073.6096	0.0014	1.206801	0.188	158	0.030	159	0.027	
05:02:56.4	-69:42:29	EB/ 3	17.49	18.20	18.04	-0.04	49073.8004	0.0020	1.472378	0.232	167	0.079	152	0.044	
05:03:03.0	-69:33:48	EB/ 2	17.71	18.03	18.00	-0.03	49074.1930	0.0034	2.092929	0.192	162	0.044	157	0.046	
05:03:05.2	-69:07:04	EA/ 2	17.05	17.39	17.36	0.00	49073.4711	0.0021	1.410064	0.168	267	0.039	123	0.044	
05:03:16.7	-70:13:39	EA/ 7	17.96	19.32	17.99	0.18	49073.7534	0.0139	13.288737	0.152	146	0.083	154	0.058	
05:03:28.8	-70:09:40	EA/ 7	17.32	18.37	17.47	-0.08	49073.3823	0.0019	2.427861	0.168	161	0.052	163	0.054	
05:03:35.6	-69:23:30	EA/10	16.86	17.22	16.97	-0.06	49073.5245	0.0047	4.187490	0.128	265	0.036	271	0.033	Asymmetric LC
05:03:37.2	-69:08:31	EA/ 2	16.49	16.85	16.79	-0.05	49073.6632	0.0008	1.591968	0.192	253	0.023	285	0.022	
05:03:41.1	-68:02:36	EA/ 8	18.24	18.95	18.31	0.23	49078.1105	0.0173	10.402331	0.112	152	0.073	163	0.063	
05:03:44.5	-68:02:42	EA/ 1	17.20	17.57	17.45	-0.16	49072.5476	0.0046	4.397010	0.088	164	0.043	168	0.038	Eccentric orbit
05:03:54.7	-70:10:52	EA/ 8	17.52	18.54	17.62	-0.10	49073.5437	0.0013	1.657608	0.188	142	0.037	160	0.055	
05:03:54.9	-68:04:32	EA/ 1	17.24	17.82	17.55	-0.16	49072.6635	0.0019	2.059894	0.088	139	0.037	157	0.039	Eccentric orbit
05:03:59.4	-68:29:40	EA/ 5	17.02	17.54	17.23	-0.07	49073.7337	0.0036	2.241182	0.192	168	0.030	61	0.032	
05:04:03.2	-68:35:20	EA/ 1	17.58	17.89	17.92	-0.05	49073.2701	0.0050	2.259070	0.132	145	0.045	86	0.060	Eccentric orbit
05:04:06.2	-69:16:00	EB/ 3	17.93	18.37	18.37	-0.06	49073.6274	0.0015	1.070605	0.252	254	0.056	213	0.057	
05:04:11.7	-69:12:11	EA/ 2	16.12	16.38	16.36	0.25	49073.5674	0.0012	1.305384	0.156	275	0.029	279	0.019	
05:04:12.8	-68:57:14	EB/ 2	16.60	17.04	17.00	-0.13	49073.3580	0.0010	1.511214	0.212	287	0.029	260	0.037	
05:04:14.3	-68:45:04	EA/ 7	17.50	19.14	17.59	-0.14	49074.4768	0.0035	3.765614	0.168	285	0.076	175	0.103	
05:04:17.0	-69:03:42	EA/ 2	16.71	17.11	17.09	-0.14	49072.8968	0.0007	0.838178	0.208	247	0.029	257	0.035	
05:04:32.7	-69:25:57	EB/ 3	17.97	18.37	18.24	0.03	49074.6165	0.0047	2.564352	0.240	256	0.051	234	0.060	
05:04:37.8	-69:07:11	EA/ 1	17.48	17.80	17.84	0.07	49073.3001	0.0031	2.491388	0.144	262	0.045	216	0.045	Eccentric orbit
05:04:40.0	-69:48:53	EA/ 2	16.00	16.65	16.55	-0.11	49072.2080	0.0011	2.178036	0.224	164	0.026	168	0.024	
05:04:45.4	-69:01:48	EB/ 2	15.43	16.05	16.01	-0.14	49073.8545	0.0007	1.817641	0.232	258	0.019	276	0.021	HV 13052
05:04:51.0	-70:08:59	EB/ 3	15.33	15.55	15.55	-0.14	49072.8611	0.0011	1.166887	0.264	145	0.019	144	0.015	
05:04:55.7	-68:03:06	EA/ 2	16.50	16.81	16.73	-0.08	49072.7279	0.0008	1.046877	0.184	169	0.018	169	0.023	
05:04:56.9	-70:11:56	EA/ 1	15.34	15.97	15.80	-0.06	49074.3163	0.0007	2.485299	0.152	166	0.013	157	0.017	
05:05:01.4	-68:55:22	EB/ 8	16.03	16.32	16.11	-0.09	49073.0058	0.0028	2.777802	0.176	230	0.026	248	0.022	
05:05:02.2	-70:06:13	EA/ 8	17.06	18.04	17.22	-0.05	49074.9726	0.0016	2.527035	0.208	158	0.039	118	0.039	
05:05:04.9	-69:05:54	EA/ 3	17.14	17.54	17.35	-0.05	49073.6345	0.0015	1.206189	0.224	139	0.028	99	0.030	
05:05:07.0	-68:16:23	EA/ 1	16.89	17.24	17.23	-0.14	49071.8939	0.0023	2.746879	0.104	148	0.040	116	0.036	
05:05:08.4	-67:59:23	EB/ 3	14.66	15.10	15.01	-0.21	49073.6468	0.0008	1.368982	0.248	162	0.021	156	0.021	
05:05:27.9	-68:58:56	EA/ 4	17.74	18.02	17.91	-0.12	49073.1440	0.0019	1.542481	0.136	195	0.040	219	0.050	
05:05:28.3	-68:07:33	EA/ 2	16.27	16.71	16.63	-0.18	49073.6406	0.0006	1.479213	0.168	167	0.015	157	0.019	
05:05:38.7	-69:02:04	EA/ 3	18.19	18.81	18.81	0.44	49079.6402	0.0113	11.215468	0.212	179	0.067	226	0.062	

TABLE 1. (continued)

α (J2000.0)	δ (J2000.0)	Type	Max	Min I	Min II	V–R	Epoch JD 2400000+	σ	P	DI	N_V	σ_V	N_R	σ_R	Notes
05:05:39.2	-68:11:43	EA/ 8	16.76	17.85	16.86	-0.07	49071.7336	0.0016	3.814663	0.176	146	0.026	163	0.035	
05:05:42.0	-68:47:32	EA/ 5	17.02	18.21	17.21	0.16	49083.6805	0.0202	24.506199	0.152	265	0.075	268	0.065	Asymmetric LC
05:05:42.8	-70:05:21	EA/ 8	17.79	18.39	17.82	0.01	49073.2851	0.0036	2.724043	0.168	159	0.049	87	0.051	
05:05:43.0	-68:53:56	EA/ 7	17.44	18.74	17.53	-0.07	49071.4723	0.0030	2.984929	0.164	243	0.047	270	0.054	
05:05:50.2	-69:49:02	EA/ 1	17.74	18.12	18.07	-0.06	49072.9412	0.0026	2.785756	0.108	134	0.045	150	0.049	Eccentric orbit
05:05:57.2	-68:46:45	EB/ 6	16.69	17.00	16.85	-0.16	49073.2991	0.0018	0.736005	0.384	275	0.046	218	0.058	
05:05:58.6	-70:07:14	EA/ 1	17.95	18.52	18.66	-0.06	49075.6239	0.0039	3.082179	0.140	131	0.049	158	0.053	Eccentric orbit
05:05:59.0	-68:39:49	EA/10	15.82	16.20	15.96	-0.10	49071.1977	0.0037	3.854434	0.124	128	0.019	152	0.019	
05:05:59.3	-69:06:30	EA/ 4	16.31	17.10	16.46	-0.02	49077.3431	0.0021	4.543839	0.176	198	0.025	256	0.025	
05:06:00.0	-68:57:18	EA/ 1	17.20	17.47	17.41	-0.01	49071.6786	0.0049	3.931116	0.100	272	0.055	293	0.043	
05:06:09.8	-69:11:11	EA/ 2	17.25	17.63	17.60	-0.03	49072.7180	0.0012	1.516047	0.184	241	0.037	287	0.045	
05:06:21.8	-69:06:54	EA/ 2	17.68	18.08	18.02	-0.06	49073.7719	0.0021	1.255205	0.192	216	0.060	107	0.064	
05:06:22.4	-68:37:54	EA/ 5	17.18	18.00	17.40	-0.07	49073.7967	0.0012	1.604507	0.192	67	0.030	76	0.024	
05:06:25.7	-68:20:57	EA/10	16.95	17.54	17.25	0.00	49077.3654	0.0172	13.424542	0.136	148	0.055	149	0.046	
05:06:28.5	-68:56:41	EA/ 8	16.05	17.07	16.29	-0.07	49065.9185	0.0059	8.492107	0.180	280	0.051	290	0.046	HV 12323
05:06:34.4	-68:25:44	EA/ 2	14.79	15.15	15.15	-0.17	49072.1075	0.0021	2.154339	0.164	137	0.040	167	0.042	
05:06:37.8	-69:14:23	EA/ 2	16.30	16.75	16.69	-0.06	49072.5158	0.0014	2.273251	0.204	254	0.025	252	0.038	
05:06:38.8	-69:10:27	EB/ 2	17.63	17.91	17.84	-0.06	49072.5317	0.0025	1.516110	0.196	254	0.041	257	0.051	
05:06:42.2	-69:02:27	EA/ 7	16.99	17.39	17.04	-0.08	49073.7226	0.0031	3.457469	0.148	274	0.031	273	0.037	
05:06:43.4	-68:36:10	EA/ 1	15.44	15.88	15.83	-0.15	49071.3147	0.0060	4.018642	0.128	147	0.020	168	0.023	Eccentric orbit
05:06:51.6	-68:23:01	EA/ 1	17.41	17.75	17.74	-0.14	49074.1642	0.0016	2.031327	0.108	151	0.038	162	0.049	
05:06:53.9	-68:58:11	EA/ 8	17.79	19.09	17.83	-0.04	49072.8979	0.0016	2.982391	0.156	232	0.061	270	0.055	
05:06:54.2	-69:11:42	EA/ 8	16.94	17.79	17.13	-0.02	49071.4210	0.0018	3.043501	0.188	212	0.040	262	0.042	
05:06:55.5	-68:06:40	EA/ 2	16.54	17.09	16.87	-0.13	49073.9058	0.0006	0.814541	0.232	158	0.027	148	0.028	
05:06:59.4	-69:10:51	EA/ 1	17.66	17.97	17.88	-0.07	49073.2359	0.0017	1.608436	0.104	183	0.044	278	0.047	
05:06:59.8	-68:14:23	EA/ 2	16.95	17.20	17.18	-0.11	49073.5329	0.0011	0.810429	0.160	133	0.029	162	0.032	
05:07:04.0	-70:27:43	EA/ 2	16.11	16.51	16.44	-0.16	49073.7391	0.0010	1.410481	0.192	203	0.029	108	0.022	
05:07:05.3	-69:51:55	EB/ 6	16.57	16.85	16.75	-0.08	49073.3945	0.0016	1.148765	0.236	167	0.022	69	0.019	
05:07:14.4	-68:56:16	EA/ 1	17.84	18.29	18.26	-0.02	49072.8730	0.0020	2.267870	0.172	262	0.061	246	0.066	
05:07:15.8	-68:50:04	EA/ 1	17.59	18.25	18.11	-0.13	49074.5366	0.0011	1.388028	0.144	268	0.069	266	0.061	
05:07:22.9	-70:02:25a	EA/10	17.42	18.07	17.68	0.36	49061.5305	0.0293	31.276000	0.128	195	0.050	150	0.038	*, Asymmetric LC
05:07:22.9	-70:02:25b	EA/10	17.56	18.21	17.87	0.43	49061.5216	0.0367	31.276000	0.124	167	0.058	78	0.046	*, Asymmetric LC
05:07:22.9	-70:02:25c	EA/10	17.58	18.26	17.83	0.45	49061.5227	0.0371	31.276000	0.124	117	0.045	165	0.045	*, Asymmetric LC
05:07:24.6	-68:29:33	EA/ 4	16.37	16.84	16.63	-0.14	49074.9019	0.0011	1.672529	0.140	167	0.023	148	0.023	
05:07:26.2	-68:54:00	EB/ 5	17.58	18.09	17.81	0.07	49074.6446	0.0054	4.675084	0.184	236	0.061	135	0.044	
05:07:28.4	-69:25:40	EA/10	17.96	18.71	18.23	0.27	49060.5637	0.0417	42.191738	0.096	200	0.073	216	0.064	
05:07:31.7	-69:10:12	EB/ 2	17.58	18.17	18.16	-0.06	49073.2839	0.0010	1.310989	0.224	265	0.054	273	0.060	
05:07:35.2	-70:28:05	EA/ 2	16.84	17.23	17.20	-0.04	49071.6738	0.0038	3.242303	0.128	191	0.058	105	0.029	
05:07:40.7	-69:20:30	EA/ 3	15.93	16.33	16.19	-0.09	49074.6914	0.0012	1.653471	0.260	217	0.023	216	0.024	
05:07:42.7	-68:02:38	EA/ 8	17.07	17.53	17.18	-0.06	49073.4198	0.0021	1.538949	0.180	118	0.039	153	0.033	
05:07:46.4	-69:58:17	EB/ 3	16.40	16.72	16.71	-0.07	49074.6456	0.0021	2.129283	0.280	155	0.025	160	0.025	
05:07:48.9	-68:27:35	EA/ 5	16.11	17.50	16.44	-0.14	49074.6721	0.0009	2.656132	0.212	154	0.024	161	0.026	HV 12324
05:07:49.0	-69:51:37a	EA/ 8	17.95	18.68	18.11	-0.12	49073.0686	0.0063	1.616142	0.200	193	0.046	53	0.127	*
05:07:49.0	-69:51:37b	EA/ 8	17.92	18.96	18.04	-0.04	49073.0588	0.0033	1.616142	0.196	156	0.096	75	0.062	*
05:07:53.9	-69:18:00	EA/ 1	17.53	18.28	18.16	-0.07	49072.7655	0.0010	1.832039	0.148	274	0.049	282	0.052	
05:07:59.5	-69:12:13	EA/ 2	15.91	16.33	16.29	-0.10	49073.9576	0.0015	2.959171	0.200	212	0.024	280	0.025	
05:08:02.7	-68:35:45	EB/ 2	17.24	17.76	17.69	-0.13	49073.5438	0.0008	0.818542	0.236	154	0.034	153	0.038	
05:08:10.3	-69:32:36	EA/10	15.96	16.73	16.18	-0.10	49075.4905	0.0017	4.203378	0.140	167	0.020	217	0.023	
05:08:12.3	-70:13:18	EB/ 6	16.59	16.82	16.77	-0.09	49074.0610	0.0025	1.776760	0.172	167	0.024	158	0.031	
05:08:15.5	-69:29:06	EA/ 1	15.77	16.07	16.03	0.04	49075.7279	0.0016	2.899306	0.140	137	0.016	198	0.017	
05:08:25.5	-68:57:32	EA/ 8	16.93	17.22	17.05	0.01	49073.4255	0.0037	2.333103	0.176	247	0.043	116	0.031	
05:08:28.1	-68:48:26	EA/ 1	14.15	14.40	14.40	-0.16	49073.4429	0.0031	2.995570	0.132	272	0.015	120	0.010	
05:08:37.7	-68:39:53	EB/ 3	16.86	17.06	17.04	0.26	49072.1304	0.0035	1.908268	0.140	160	0.025	152	0.024	
05:08:44.8	-68:34:27	EA/ 2	16.78	17.22	17.25	-0.11	49072.5585	0.0014	2.048885	0.164	140	0.023	169	0.026	Eccentric orbit
05:08:48.8	-69:54:23	EA/ 2	18.16	18.62	18.60	-0.11	49073.4270	0.0016	1.265113	0.172	204	0.046	94	0.059	
05:08:51.8	-68:51:49	EA/ 1	17.58	18.04	17.97	-0.12	49075.5717	0.0026	2.569896	0.104	277	0.068	107	0.055	
05:08:52.3	-70:29:23	EB/ 3	17.63	17.90	17.90	-0.13	49074.5642	0.0020	1.086917	0.224	174	0.042	143	0.051	
05:08:53.4	-70:14:09	EA/ 8	17.12	17.47	17.19	-0.10	49069.7884	0.0132	5.703426	0.112	111	0.034	134	0.067	
05:09:00.2	-68:34:05a	EA/ 2	16.69	17.13	17.01	-0.06	49073.3749	0.0012	0.795161	0.216	165	0.031	68	0.037	*
05:09:00.2	-68:34:05b	EA/ 2	16.66	17.08	16.97	-0.12	49073.3731	0.0008	0.795161	0.212	111	0.026	160	0.036	*
05:09:06.0	-68:14:57	EA/10	16.44	17.36	16.65	-0.09	49069.3318	0.0029	4.643895	0.148	179	0.029	171	0.040	
05:09:08.9	-69:16:30a	EA/ 2	17.93	18.51	18.46	-0.02	49073.3431	0.0035	2.327928	0.184	237	0.067	126	0.060	*
05:09:08.9	-69:16:30b	EA/ 2	17.98	18.51	18.45	-0.03	49073.3313	0.0044	2.327928	0.200	243	0.071	103	0.066	*
05:09:20.9	-68:37:41a	EA/ 8	17.25	17.86	17.34	0.02	49074.7985	0.0039	3.445695	0.180	185	0.044	102	0.036	*
05:09:20.9	-68:37:41b	EA/ 8	17.23	17.83	17.35	-0.01	49074.7939	0.0029	3.445695	0.176	161	0.028	166	0.033	*
05:09:22.6	-69:48:08	EA/ 9	18.20	18.52	18.31	-0.07	49073.7269	0.0014	0.738538	0.176	198	0.049	206	0.057	
05:09:27.6	-68:56:20	EA/ 4	16.74	17.14	16.96	-0.18	49074.1250	0.0010	1.827972	0.140	278	0.026	287	0.031	
05:09:29.1	-68:55:03	EA/ 1	14.56	14.98	14.82	-0.22	49071.5509	0.0008	2.678781	0.132	266	0.016	287	0.014	Eccentric orbit
05:09:39.2	-68:28:29	EA/ 1	17.18	17.52	17.45	-0.14	49072.6149	0.0019	3.023388	0.088	155	0.024	166	0.035	Eccentric orbit
05:09:45.0	-68:53:02	EA/10	16.17	16.47	16.16	-0.06	49074.3670	0.0023	2.594230	0.124	264	0.026	287	0.032	
05:09:49.2	-68:53:03	EB/ 3	14.91	15.76	15.67	-0.06	49073.4782	0.0005	0.973607	0.388	190	0.037	292	0.040	
05:09:51.1	-68:54:12	EA/ 2	15.99	16.31	16.21	-0.11	49073.7159	0.0010	1.420416	0.156	260	0.024	270	0.024	
05:10:00.5	-68:33:54	EA/ 1	15.81	16.07	16.07	-0.08	49074.0241	0.0011	1.757161	0.140	200	0.018	103	0.018	
05:10:07.1	-68:42:20	EA/ 8	17.46	18.56	17.59	-0.04	49075.3367	0.0042	4.110722	0.156	186	0.079	94	0.050	
05:10:11.1	-69:35:21	EA/ 6	17.63	18.26	17.93	-0.07	49074.0461	0.0017	1.132236	0.220	202	0.046	180	0.059	
05:10:11.8	-69:06:25	EB/ 3	17.23	17.93	17.91	0.01	49073.3615	0.0005	0.525750	0.332	259	0.049	127	0.045	
05:10:12.3	-69:07:00	EA/ 8	17.15	18.29	17.23	-0.04	49073.8270	0.0025	3.742500	0.176	284	0.041	115	0.050	
05:10:21.8	-70:40:47	EA/10	17.72	18.40	18.06	0.45	49128.8869	0.0632	63.745562	0.128	203	0.062	209	0.052	
05:10:26.1	-68:47:47a	EA/ 2	16.13	16.42	16.42	-0.12	49073.6083	0.0011	1.691433	0.156	205	0.022	101	0.017	*
05:10:26.1	-68:47:47b	EA/ 2	16.08	16.39	16.38	-0.19	49074.4550	0.0007	1.691433	0.160	290	0.017	287	0.019	*
05:10:27.2	-69:10:36	EB/ 3	15.65	15.95	15.91	-0.12	49073.0639	0.0021	2.059214	0.300	250	0.027	162	0.025	
05:10:27.2	-68:43:58	EA/10	16.40	17.07	16.69	0.01	49069.9561	0.0046	5.845910	0.140	203	0.027	103	0.033	
05:10:28.7	-69:20:48	EA/ 1	15.43	15.73	15.73	-0.15	49072.6010	0.0043	3.773084	0.132	199	0.015	210	0.055	Eccentric orbit
05:10:35.1	-69:27:54	EA/ 1	18.12	18.41	18.38	-0.05	49072.6527	0.0038	2.278119	0.128	193	0.068	172	0.063	
05:10:52.8	-70:07:24	EA/ 7	17.77	18.99	17.77	0.25	49070.4800	0.0251	23.523031	0.160	90	0.041	105	0.039	

TABLE 1. (continued)

α (J2000.0)	δ (J2000.0)	Type	Max	Min I	Min II	V–R	Epoch JD 2400000+	σ	P	DI	N_V	σ_V	N_R	σ_R	Notes
05:10:56.5	-70:16:05	EB/ 3	16.99	17.32	17.32	0.13	49080.3700	0.0198	12.047568	0.452	198	0.060	189	0.045	
05:10:58.2	-68:06:54	EA/ 7	17.55	18.27	17.61	-0.08	49071.6006	0.0031	2.870581	0.164	143	0.052	111	0.038	
05:11:00.0	-68:57:05	EB/ 8	17.81	18.09	17.90	-0.15	49073.9052	0.0027	1.198060	0.172	231	0.042	269	0.049	
05:11:02.8	-69:13:09	EA/ 1	15.49	15.87	15.79	-0.15	49075.3360	0.0008	2.152902	0.152	266	0.016	298	0.018	
05:11:05.3	-69:15:17	EA/ 2	17.63	18.09	17.93	-0.06	49072.8915	0.0009	1.061744	0.180	257	0.037	262	0.052	
05:11:07.2	-68:38:56	EA/ 8	17.50	18.54	17.61	-0.08	49071.1703	0.0015	2.922721	0.156	179	0.050	173	0.046	
05:11:14.6	-69:16:17	EB/ 3	16.56	16.98	16.98	-0.12	49073.3328	0.0006	1.005995	0.292	211	0.024	247	0.029	
05:11:14.9	-68:51:37	EA/ 3	16.69	17.13	17.08	-0.12	49073.6739	0.0010	1.384465	0.224	207	0.031	286	0.031	
05:11:17.1	-69:10:15	EA/ 2	17.41	17.70	17.63	0.03	49074.0512	0.0040	2.173591	0.164	184	0.040	252	0.067	
05:11:20.5	-69:09:15	EA/ 1	16.95	17.50	17.36	0.08	49073.6831	0.0008	1.345229	0.184	207	0.030	262	0.038	
05:11:22.7	-69:01:07	EB/ 6	18.09	18.39	18.24	0.09	49074.4045	0.0042	1.414724	0.260	200	0.058	222	0.059	
05:11:22.9	-69:33:26	EA/ 1	17.19	17.67	17.51	-0.12	49073.4139	0.0019	2.722817	0.128	124	0.040	145	0.039	
05:11:23.7	-70:32:18	EA/ 1	17.13	17.52	17.49	-0.03	49075.1806	0.0022	3.978280	0.124	188	0.035	191	0.036	
05:11:34.5	-70:11:30	EA/ 1	17.85	18.25	18.10	-0.16	49072.9079	0.0019	1.596039	0.136	184	0.065	200	0.054	
05:11:51.4	-69:20:49a	EA/ 1	16.97	17.38	17.27	-0.11	49073.1832	0.0019	1.760130	0.136	201	0.043	176	0.037	*, Eccentric orbit
05:11:51.4	-69:20:49b	EA/ 1	16.98	17.38	17.26	-0.11	49073.1854	0.0013	1.760130	0.124	284	0.040	287	0.041	*, Eccentric orbit
05:11:52.9	-69:11:25	EB/ 3	16.76	17.01	16.99	-0.15	49073.5212	0.0008	0.751882	0.272	275	0.031	280	0.032	
05:11:56.3	-69:07:42	EA/ 1	17.66	18.33	18.31	-0.13	49072.5412	0.0011	1.456543	0.172	211	0.046	182	0.056	Eccentric orbit
05:12:09.3	-69:24:44a	EA/ 5	17.53	18.50	17.90	-0.11	49072.6596	0.0011	1.011518	0.232	188	0.051	168	0.066	*
05:12:09.3	-69:24:44b	EA/ 5	17.47	18.42	17.80	-0.12	49072.6607	0.0010	1.011518	0.240	263	0.071	218	0.075	*
05:12:18.5	-68:58:33	EA/ 1	16.83	17.15	17.12	-0.14	49073.5148	0.0018	2.390570	0.132	236	0.026	286	0.035	Eccentric orbit
05:12:19.5	-70:37:33	EA/ 7	17.20	18.49	17.27	0.21	49073.3687	0.0020	4.136456	0.152	206	0.045	204	0.026	
05:12:27.8	-69:20:51a	EA/ 2	16.83	17.22	17.20	-0.09	49074.6742	0.0014	1.982178	0.188	285	0.027	289	0.033	*
05:12:27.8	-69:20:51b	EA/ 2	16.89	17.30	17.25	-0.09	49074.6757	0.0021	1.982178	0.180	181	0.038	175	0.027	*
05:12:39.8	-68:46:04a	EA/10	16.42	17.22	16.57	-0.11	49075.1642	0.0022	3.945214	0.152	181	0.031	202	0.026	*
05:12:39.8	-68:46:04b	EA/10	16.39	17.19	16.53	-0.14	49075.1645	0.0016	3.945214	0.156	276	0.024	271	0.030	*
05:12:46.0	-68:41:51	EA/ 1	16.99	17.30	17.31	-0.07	49072.3273	0.0026	2.718076	0.128	188	0.031	167	0.033	Eccentric orbit
05:12:56.1	-70:13:08	EA/ 8	17.16	17.72	17.29	-0.15	49071.8764	0.0027	2.262063	0.204	187	0.049	190	0.058	
05:12:59.1	-70:39:09	EA/ 8	17.35	18.05	17.40	-0.05	49072.5709	0.0016	2.434712	0.164	191	0.038	199	0.037	
05:13:05.8	-68:34:02	EA/10	16.01	16.37	16.09	-0.07	49073.0633	0.0044	4.673440	0.148	178	0.023	177	0.030	
05:13:08.3	-69:08:02	EA/ 2	16.34	16.91	16.82	-0.09	49073.4342	0.0005	1.240546	0.180	243	0.033	270	0.023	
05:13:08.4	-69:18:24	EA/ 8	17.07	18.05	17.20	-0.11	49070.9893	0.0018	2.941914	0.184	229	0.044	251	0.055	
05:13:11.8	-69:20:06	EA/ 5	16.42	16.72	16.61	-0.08	49073.5455	0.0019	1.406627	0.180	210	0.033	209	0.035	
05:13:12.4	-69:18:19	EA/ 8	17.31	18.01	17.36	-0.03	49073.2698	0.0020	3.221586	0.152	255	0.039	271	0.049	
05:13:21.9	-69:27:25a	EA/ 1	16.76	17.40	17.35	-0.14	49073.6209	0.0009	1.788425	0.160	217	0.039	120	0.026	*
05:13:21.9	-69:27:25b	EA/ 1	16.60	17.23	17.22	-0.20	49073.6206	0.0021	1.788425	0.156	180	0.033	33	0.040	*
05:13:23.9	-69:22:50	EA/ 1	15.58	16.24	16.19	-0.09	49072.3861	0.0011	2.636648	0.136	203	0.020	128	0.019	Eccentric orbit
05:13:26.9	-68:42:08	EA/10	16.78	17.12	16.85	-0.06	49073.5784	0.0047	6.412789	0.100	178	0.027	193	0.026	
05:13:31.6	-69:18:53	EA/ 2	16.76	17.05	17.00	-0.17	49074.4778	0.0011	1.094756	0.156	273	0.027	265	0.047	
05:13:32.7	-68:49:53	EB/ 3	17.95	18.62	18.38	-0.09	49074.0446	0.0010	0.781123	0.264	272	0.085	266	0.061	
05:13:33.1	-68:46:24	EA/10	15.82	16.88	16.05	-0.14	49073.7241	0.0014	4.591040	0.152	285	0.029	296	0.028	HV 5669
05:13:36.1	-69:22:41a	EA/ 1	15.80	16.45	16.25	-0.19	49074.6491	0.0006	2.108783	0.148	291	0.016	290	0.024	*, Eccentric orbit
05:13:36.1	-69:22:41b	EA/ 1	15.96	16.61	16.43	-0.15	49074.6471	0.0007	2.108783	0.140	219	0.022	107	0.018	*, Eccentric orbit
05:13:40.2	-69:18:22	EA/ 2	16.32	16.62	16.60	-0.21	49073.9666	0.0014	0.956466	0.180	39	0.022	148	0.023	
05:13:41.1	-69:32:41	EA/ 1	15.25	15.58	15.56	-0.16	49074.3664	0.0036	5.458345	0.144	155	0.019	107	0.012	Eccentric orbit
05:13:43.3	-69:26:05	EA/ 2	17.02	17.25	17.20	-0.08	49073.5423	0.0052	2.683877	0.164	220	0.041	106	0.030	
05:13:50.1	-70:05:52	EA/ 1	17.11	17.65	17.63	-0.14	49073.3684	0.0023	3.418164	0.144	214	0.047	92	0.028	Eccentric orbit
05:14:08.3	-69:23:00a	EA/ 1	16.84	17.28	17.15	-0.17	49074.0549	0.0012	1.628436	0.160	290	0.036	281	0.047	*
05:14:08.3	-69:23:00b	EA/ 1	17.00	17.54	17.35	-0.12	49074.0531	0.0020	1.628436	0.152	221	0.045	108	0.044	*
05:14:09.8	-70:23:19	EA/ 1	16.61	17.16	17.09	-0.14	49073.2403	0.0015	2.332567	0.168	126	0.037	72	0.021	
05:14:14.7	-69:55:52	EA/ 1	18.17	18.47	18.46	-0.04	49073.0255	0.0024	1.713467	0.156	139	0.045	194	0.053	True P = P/2 ?
05:14:17.3	-69:33:57	EA/ 5	17.70	18.34	17.96	-0.09	49072.7072	0.0021	1.049503	0.228	152	0.050	98	0.047	
05:14:19.0	-68:48:41	EB/ 3	17.35	17.57	17.58	0.01	49073.8308	0.0095	4.454758	0.276	268	0.054	246	0.038	
05:14:26.6	-68:15:48	EA/ 1	17.82	18.45	18.16	-0.07	49074.4931	0.0015	1.914395	0.096	146	0.050	182	0.048	Eccentric orbit
05:14:32.6	-69:12:27	EA/ 2	16.47	17.13	17.10	-0.15	49073.6351	0.0004	1.232423	0.224	234	0.024	289	0.031	
05:14:33.6	-69:02:09	EA/ 5	17.63	18.05	17.89	0.02	49072.3526	0.0041	3.193564	0.188	211	0.057	272	0.048	
05:14:35.5	-69:59:00	EA/ 8	17.50	17.92	17.50	-0.04	49072.1101	0.0044	4.374721	0.108	191	0.036	213	0.059	
05:14:42.8	-69:20:01	EB/ 6	13.27	13.57	13.40	-0.14	49074.8709	0.0130	6.750423	0.196	73	0.027	47	0.022	
05:14:47.8	-68:40:21	EA/ 8	17.62	17.94	17.70	0.00	49073.8650	0.0043	2.606822	0.144	187	0.040	181	0.048	
05:14:53.8	-70:31:29	EB/ 6	17.24	18.04	17.74	-0.19	49073.1422	0.0005	0.813769	0.248	185	0.036	199	0.059	
05:14:53.9	-69:55:48	EA/ 8	17.92	18.86	18.01	-0.02	49073.1905	0.0023	2.856013	0.156	206	0.059	205	0.059	
05:14:59.4	-69:29:59	EA/ 9	17.00	17.42	17.10	-0.07	49073.3979	0.0023	1.464622	0.220	169	0.041	94	0.028	
05:15:20.5	-69:03:37	EB/ 2	17.78	18.08	18.02	-0.03	49074.3405	0.0097	3.292463	0.176	180	0.054	42	0.046	
05:15:21.8	-69:18:41	EA/10	16.35	17.26	16.56	-0.13	49073.6877	0.0021	4.247555	0.148	277	0.027	289	0.028	
05:15:29.5	-69:09:50	EA/ 1	17.61	18.02	17.99	-0.12	49073.2109	0.0013	1.680136	0.144	244	0.047	219	0.059	
05:15:35.9	-70:59:26	EA/ 1	17.39	17.99	17.91	-0.07	49074.4746	0.0038	3.158653	0.092	141	0.037	77	0.042	Eccentric orbit
05:15:36.4	-69:08:22	EA/10	16.00	16.57	16.07	-0.10	49074.2920	0.0029	3.524831	0.152	195	0.028	292	0.028	
05:15:40.2	-69:17:14	EA/ 8	16.14	16.75	16.22	0.00	49074.5934	0.0021	4.567214	0.168	274	0.020	288	0.021	
05:15:41.3	-68:42:58	EA/ 2	16.66	17.06	17.06	0.02	49072.8527	0.0013	1.860805	0.168	187	0.034	194	0.028	
05:15:41.5	-70:04:39	EA/ 2	15.37	15.87	15.87	-0.18	49073.7817	0.0007	1.761068	0.224	202	0.020	181	0.015	
05:15:48.4	-69:59:24a	EA/10	15.38	15.84	15.44	0.41	48993.6111	0.0829	155.282400	0.128	212	0.026	206	0.017	*
05:15:48.4	-69:59:24b	EA/10	15.34	15.80	15.42	0.44	48993.6360	0.0879	155.282400	0.124	318	0.030	172	0.017	*
05:15:48.4	-70:34:55	EB/ 3	14.87	15.17	15.13	-0.14	49073.4067	0.0011	1.184339	0.500	154	0.025	157	0.019	
05:15:56.3	-69:53:30	EA/ 8	18.59	19.37	18.74	0.37	49075.9968	0.0243	11.833678	0.192	231	0.079	145	0.062	
05:16:01.0	-68:45:32	EA/ 1	18.04	18.60	18.52	-0.10	49074.6365	0.0028	2.015485	0.132	277	0.071	121	0.047	Eccentric orbit
05:16:01.2	-69:22:43a	EB/ 3	17.10	17.34	17.30	0.02	49072.9727	0.0027	1.675113	0.192	237	0.034	281	0.037	*, EROS 1024
05:16:01.2	-69:22:43b	EB/ 3	17.11	17.33	17.31	0.03	49072.9739	0.0030	1.675113	0.208	309	0.037	296	0.040	*, EROS 1024
05:16:07.7	-68:50:04	EA/ 7	17.70	19.00	17.79	-0.08	49073.4412	0.0022	2.499096	0.180	249	0.070	115	0.062	True P = Px2 ?
05:16:09.0	-70:20:27	EA/ 7	17.46	19.91	17.55	-0.01	49068.1792	0.0048	6.442518	0.124	175	0.087	75	0.065	
05:16:10.9	-69:14:05	EA/ 2	17.71	18.25	18.17	-0.11	49074.7530	0.0020	1.777479	0.172	255	0.057	220	0.062	
05:16:17.5	-69:28:07	EA/ 7	17.19	17.47	17.20	-0.07	49073.1190	0.0032	3.219837	0.124	269	0.036	283	0.046	
05:16:21.2	-70:40:05	EA/ 8	15.76	16.73	15.90	0.20	49073.5411	0.0005	1.174050	0.212	102	0.023	158	0.019	HV 12576
05:16:23.6	-69:29:22	EB/ 3	16.59	17.03	16.90	-0.18	49073.1211	0.0007	0.977186	0.252	296	0.028	307	0.035	
05:16:26.6	-69:20:33	EA/ 5	14.75	15.11	14.90	-0.16	49072.2022	0.0028	3.634581	0.184	288	0.031	292	0.020	EROS 1055
05:16:34.3	-70:06:27	EB/ 2	17.46	17.73	17.69	-0.08	49072.4705	0.0033	2.634337	0.160	166	0.033	209	0.042	

TABLE 1. (continued)

α (J2000.0)	δ (J2000.0)	Type	Max	Min I	Min II	V–R	Epoch JD 2400000+	σ	P	DI	N_V	σ_V	N_R	σ_R	Notes
05:16:36.6	-70:38:24a	EA/ 2	17.26	17.57	17.55	-0.09	49073.5891	0.0015	1.314731	0.168	211	0.044	105	0.029	*
05:16:36.6	-70:38:24b	EA/ 2	17.21	17.53	17.52	-0.13	49073.5913	0.0013	1.314731	0.168	141	0.028	152	0.038	*
05:16:44.9	-68:39:12	EB/ 6	17.77	18.06	17.97	0.01	49073.9136	0.0031	1.376015	0.208	191	0.043	166	0.047	
05:16:46.4	-69:31:00	EB/ 3	15.98	16.37	16.37	-0.17	49073.6896	0.0006	0.930780	0.260	312	0.032	315	0.032	
05:16:47.7	-69:15:24	EA/10	17.08	17.65	17.27	-0.02	49073.6831	0.0017	2.521524	0.136	275	0.037	273	0.042	
05:16:55.3	-69:11:49	EA/ 1	17.05	17.53	17.48	-0.09	49074.9280	0.0070	4.285645	0.112	248	0.037	82	0.038	Eccentric orbit
05:16:59.3	-69:09:59	EB/ 3	18.04	18.39	18.38	0.14	49073.5296	0.0039	0.860396	0.196	59	0.049	33	0.072	
05:17:02.5	-69:27:24	EA/ 2	15.97	16.31	16.30	-0.15	49073.6022	0.0014	1.860573	0.192	319	0.030	318	0.032	EROS 1031
05:17:05.9	-70:26:33	EA/ 7	17.42	17.84	17.45	-0.03	49073.9276	0.0055	5.157916	0.120	219	0.049	107	0.032	
05:17:06.4	-69:40:58	EA/ 2	16.99	17.55	17.52	-0.13	49074.5041	0.0008	1.635836	0.196	186	0.028	312	0.033	
05:17:15.5	-69:26:15	EA/ 1	16.75	17.03	17.00	-0.13	49074.4669	0.0028	2.400251	0.132	259	0.031	275	0.032	Eccentric orbit
05:17:21.7	-69:33:53	EA/ 7	16.08	17.45	16.18	-0.12	49075.5655	0.0019	4.721048	0.168	256	0.033	286	0.039	EROS 1062
05:17:25.9	-69:35:04	EA/ 8	15.63	16.81	15.77	-0.10	49073.5988	0.0040	6.025818	0.184	283	0.055	289	0.071	EROS 1069
05:17:34.3	-69:44:23	EA/ 1	16.82	17.18	17.13	-0.09	49072.9265	0.0048	6.130045	0.088	93	0.018	111	0.033	Eccentric orbit
05:17:37.9	-69:45:35	EA/ 8	18.00	18.42	18.16	-0.08	49073.2498	0.0028	1.330588	0.156	164	0.053	200	0.070	
05:17:41.8	-69:27:58	EA/ 5	15.76	16.17	15.89	-0.13	49073.7400	0.0018	2.687279	0.176	293	0.028	323	0.024	EROS 1040
05:17:46.0	-70:10:34	EA/ 8	18.04	18.91	18.07	-0.06	49072.3015	0.0016	1.711699	0.152	121	0.067	215	0.056	
05:17:59.9	-69:55:38	EB/ 3	16.77	17.05	17.05	-0.04	49072.3100	0.0024	2.474951	0.192	303	0.031	298	0.037	
05:18:04.7	-69:48:19	EA/ 1	14.37	14.66	14.65	-0.14	49072.1704	0.0012	3.107089	0.144	278	0.013	315	0.016	Eccentric orbit
05:18:12.3	-69:36:50	EB/ 3	16.34	17.03	16.84	-0.15	49073.4598	0.0004	0.883444	0.264	305	0.034	306	0.033	EROS 1005
05:18:14.1	-69:58:53	EA/ 2	18.11	18.47	18.44	0.08	49073.2609	0.0017	1.574041	0.168	293	0.051	301	0.059	
05:18:15.6	-69:50:55	EA/ 1	17.44	18.05	18.03	-0.10	49073.0506	0.0015	2.413710	0.128	303	0.045	306	0.047	Eccentric orbit
05:18:16.4	-69:34:50	EA/ 7	17.39	17.89	17.48	0.22	49074.4229	0.0021	1.611656	0.160	286	0.047	304	0.058	EROS 1022
05:18:20.8	-69:34:54	EB/ 3	16.33	16.63	16.55	-0.12	49073.4659	0.0009	1.042593	0.244	268	0.024	282	0.026	EROS 1007
05:18:22.5	-69:31:44	EB/ 3	17.26	17.52	17.53	-0.11	49073.4139	0.0014	1.012557	0.200	240	0.037	260	0.046	
05:18:29.5	-69:27:24	EA/ 8	16.84	19.27	16.94	-0.07	49072.5434	0.0011	3.962321	0.188	316	0.074	299	0.054	
05:18:30.4	-69:34:49	EA/ 2	17.42	17.99	17.96	-0.12	49073.1793	0.0007	1.117937	0.208	288	0.045	282	0.041	
05:18:34.3	-69:23:36	EA/ 8	16.85	17.74	16.96	-0.09	49072.9623	0.0015	2.765128	0.188	321	0.040	306	0.049	EROS 1045
05:18:38.7	-71:07:34	EA/10	18.39	19.13	18.92	0.27	49082.3746	0.0344	19.952681	0.140	123	0.073	152	0.066	
05:18:40.9	-68:33:04	EA/ 8	17.39	18.65	17.47	0.01	49073.4046	0.0033	4.050264	0.164	161	0.049	81	0.045	
05:18:47.4	-69:37:05	EA/ 1	17.48	17.90	17.74	-0.11	49073.4398	0.0011	1.100519	0.156	238	0.040	306	0.049	
05:18:48.3	-69:40:33	EA/ 2	17.61	17.99	17.93	-0.05	49073.3404	0.0021	1.883981	0.160	183	0.045	271	0.047	EROS 1032
05:18:49.4	-69:46:06	EB/ 3	17.35	17.61	17.60	-0.03	49073.0663	0.0029	1.859606	0.232	308	0.040	260	0.041	
05:18:53.0	-70:04:18a	EA/ 8	16.50	17.92	16.71	-0.10	49073.8145	0.0022	3.546687	0.200	315	0.048	260	0.059	*
05:18:53.0	-70:04:18b	EA/ 8	16.66	18.08	16.85	-0.11	49073.8136	0.0019	3.546687	0.196	224	0.044	190	0.068	*
05:18:54.5	-69:46:35	EA/ 1	17.43	17.86	17.81	-0.08	49073.4966	0.0017	2.397269	0.144	293	0.041	311	0.048	
05:18:57.4	-68:12:44	EA/ 8	16.98	17.40	17.06	-0.11	49073.8462	0.0014	1.200991	0.160	181	0.037	183	0.037	
05:19:01.7	-69:35:04	EB/ 3	17.30	17.61	17.54	-0.08	49073.8915	0.0023	1.315080	0.228	204	0.047	223	0.042	EROS 1011
05:19:02.1	-70:07:26	EA/10	17.98	19.63	18.03	0.09	49070.6344	0.0089	13.678886	0.104	192	0.092	172	0.074	
05:19:05.2	-69:09:19	EA/10	16.34	16.62	16.37	-0.10	49072.9424	0.0012	1.136952	0.172	235	0.025	126	0.022	
05:19:07.1	-70:34:21	EB/ 3	15.87	16.14	16.06	-0.15	49073.3528	0.0012	1.070229	0.240	160	0.023	156	0.021	
05:19:21.7	-69:14:10	EA/ 8	16.57	17.29	16.74	-0.03	49072.6434	0.0019	2.551985	0.184	216	0.032	105	0.039	
05:19:25.5	-68:31:37	EA/ 7	17.89	20.73	18.04	-0.01	49073.4364	0.0014	2.174615	0.188	137	0.048	91	0.054	
05:19:31.0	-69:20:39	EA/ 1	18.17	18.54	18.49	-0.06	49073.9546	0.0056	1.666069	0.132	185	0.063	109	0.114	Eccentric orbit
05:19:37.0	-69:32:15	EA/ 7	17.93	18.80	18.00	-0.12	49073.2590	0.0020	2.487944	0.156	269	0.064	255	0.075	True P = Px2 ?
05:19:39.5	-69:14:03	EB/ 3	16.35	16.59	16.56	0.01	49074.0511	0.0259	16.862486	0.500	246	0.025	115	0.023	
05:19:45.1	-69:42:21	EA/ 2	17.31	17.67	17.61	-0.07	49075.4804	0.0032	2.380720	0.172	280	0.050	224	0.057	
05:19:45.4	-69:01:23	EA/ 1	17.61	17.92	17.91	-0.02	49073.9214	0.0030	2.675588	0.144	213	0.044	241	0.047	
05:19:45.7	-71:14:20	EB/ 3	15.71	16.40	16.39	-0.12	49073.6919	0.0006	0.796066	0.336	114	0.028	103	0.037	
05:19:47.6	-69:00:28	EA/ 8	18.51	19.56	18.65	0.36	49073.2915	0.0019	1.394693	0.192	161	0.082	222	0.054	
05:19:47.7	-69:39:41	EB/ 9	17.68	18.09	17.85	0.29	49072.5795	0.0068	3.731612	0.192	291	0.054	275	0.044	
05:19:47.9	-69:28:45	EA/ 6	15.12	15.48	15.33	-0.20	49073.2008	0.0010	1.718555	0.228	308	0.021	315	0.020	EROS 1026
05:19:51.3	-69:40:03	EA/ 2	16.15	16.55	16.50	-0.08	49072.5649	0.0009	1.323990	0.216	300	0.038	322	0.026	
05:19:56.8	-68:24:52	EA/ 2	17.37	17.68	17.66	-0.06	49073.2947	0.0036	1.854033	0.172	111	0.037	155	0.042	
05:20:00.3	-68:21:41	EB/ 3	17.33	17.56	17.50	-0.02	49074.0040	0.0014	0.738910	0.288	169	0.030	163	0.034	
05:20:04.9	-68:19:59	EA/10	17.64	19.14	17.86	0.04	49073.1670	0.0026	3.906061	0.168	181	0.061	181	0.048	
05:20:16.7	-69:41:18	EA/ 1	17.76	18.04	18.02	0.03	49072.3111	0.0024	1.876489	0.136	282	0.057	237	0.058	
05:20:17.2	-70:00:44a	EA/ 2	16.88	17.37	17.36	-0.06	49072.5522	0.0013	2.116250	0.168	218	0.033	214	0.038	*
05:20:17.2	-70:00:44b	EA/ 2	16.71	17.22	17.22	-0.08	49072.5517	0.0012	2.116250	0.164	316	0.028	286	0.048	*
05:20:19.5	-70:01:57	EB/ 6	17.49	17.78	17.63	-0.07	49072.7398	0.0026	1.160315	0.188	210	0.046	184	0.043	
05:20:27.4	-68:06:13	EA/ 2	17.60	18.06	18.05	-0.05	49073.1571	0.0009	0.955973	0.184	180	0.040	180	0.044	
05:20:32.8	-68:20:01	EA/ 8	16.67	17.85	16.87	0.21	49074.5011	0.0014	2.548421	0.136	86	0.035	180	0.046	
05:20:35.7	-68:12:18	EA/ 1	17.29	17.68	17.66	-0.07	49073.1630	0.0023	2.275275	0.120	151	0.029	179	0.033	Eccentric orbit
05:20:35.7	-69:34:16	EA/10	16.00	16.47	16.15	-0.15	49073.4149	0.0022	3.224803	0.136	285	0.043	314	0.029	EROS 1048
05:20:39.6	-69:33:07	EB/ 3	16.57	16.82	16.81	-0.16	49073.9211	0.0016	0.864707	0.224	268	0.048	277	0.043	EROS 1004
05:20:43.7	-68:59:24	EA/ 2	17.03	17.68	17.66	-0.04	49073.6933	0.0005	1.284829	0.224	219	0.033	240	0.037	
05:20:44.4	-70:27:57	EB/ 3	17.95	18.18	18.13	0.34	49102.9033	0.0769	34.404127	0.224	176	0.048	208	0.035	
05:20:48.6	-68:47:33	EA/ 1	17.35	17.95	17.87	-0.03	49067.6757	0.0029	6.618857	0.088	151	0.040	148	0.040	
05:20:51.7	-68:59:25	EA/ 2	17.23	17.62	17.49	0.33	49073.9192	0.0012	0.767817	0.184	143	0.045	241	0.032	
05:21:00.7	-69:29:46	EA/ 2	14.88	15.17	15.16	-0.19	49073.3209	0.0008	1.300813	0.184	299	0.028	324	0.021	
05:21:05.8	-68:20:12	EA/ 2	17.42	17.76	17.69	-0.13	49073.7817	0.0037	1.933488	0.112	146	0.034	182	0.054	Eccentric orbit
05:21:06.0	-69:27:07	EB/ 6	17.83	18.37	18.10	-0.16	49073.8049	0.0011	0.630955	0.268	200	0.069	187	0.069	
05:21:11.6	-68:43:36	EA/ 1	17.72	18.24	18.17	-0.05	49073.6879	0.0021	2.509715	0.140	153	0.044	165	0.053	Eccentric orbit
05:21:12.9	-69:50:50	EA/ 2	16.77	17.21	17.14	-0.12	49073.3953	0.0015	2.160549	0.140	293	0.033	302	0.048	Eccentric orbit
05:21:14.4	-68:24:02	EA/ 2	16.37	16.77	16.74	-0.10	49074.6357	0.0012	1.880182	0.204	182	0.019	171	0.030	
05:21:15.2	-69:18:20	EA/ 8	17.92	18.71	17.98	-0.01	49074.8800	0.0024	1.955324	0.184	188	0.053	238	0.060	
05:21:19.2	-68:13:33	EA/ 4	17.27	17.60	17.48	-0.09	49074.0564	0.0015	1.834590	0.140	181	0.035	177	0.036	
05:21:19.8	-68:12:51	EA/ 2	17.45	17.76	17.74	-0.02	49072.2003	0.0081	3.984440	0.160	185	0.040	185	0.045	
05:21:23.3	-70:33:00a	EA/ 1	17.24	17.49	17.48	0.41	49108.1780	0.0469	49.481800	0.096	109	0.042	157	0.018	*
05:21:23.3	-70:33:00b	EA/ 1	17.20	17.44	17.43	0.42	49083.3604	0.0261	49.481800	0.088	188	0.031	218	0.018	*
05:21:29.5	-69:14:56	EA/ 8	17.95	18.27	17.98	0.01	49072.4903	0.0037	1.974877	0.136	230	0.049	220	0.062	True P = Px2 ?
05:21:34.4	-69:31:28	EA/ 3	15.67	16.15	15.95	-0.15	49073.5667	0.0008	1.142008	0.228	284	0.024	143	0.026	
05:21:34.9	-69:25:36	EA/ 1	16.30	16.61	16.59	-0.15	49073.3054	0.0021	2.598795	0.112	261	0.026	122	0.025	Eccentric orbit
05:21:37.4	-69:24:22	EA/ 1	17.54	17.86	17.76	-0.08	49072.4581	0.0026	2.134976	0.120	250	0.049	145	0.054	

TABLE 1. (continued)

α (J2000.0)	δ (J2000.0)	Type	Max	Min I	Min II	V–R	Epoch JD 2400000+	σ	P	DI	N_V	σ_V	N_R	σ_R	Notes
05:21:43.5	-69:24:43a	EA/ 1	15.86	16.39	16.36	-0.12	49071.5059	0.0011	3.388094	0.124	314	0.018	153	0.019	Ecc. orbit, EROS 1052
05:21:43.5	-69:24:43b	EA/ 1	15.99	16.53	16.48	-0.10	49071.5072	0.0012	3.388094	0.124	243	0.019	229	0.023	Ecc. orbit, EROS 1052
05:21:48.5	-69:57:35a	EA/ 1	17.97	18.35	18.32	-0.07	49073.0506	0.0024	1.812735	0.120	202	0.065	177	0.067	*
05:21:48.5	-69:57:35b	EA/ 1	17.79	18.20	18.16	-0.08	49073.9432	0.0018	1.812735	0.148	293	0.049	267	0.056	*
05:21:48.8	-69:38:36	EA/ 8	15.77	16.07	15.84	-0.08	49073.5052	0.0031	2.712796	0.140	240	0.025	148	0.028	EROS 1043
05:21:49.5	-69:22:16	EB/ 6	15.62	16.19	15.97	0.18	49051.7886	0.0397	37.561999	0.328	288	0.032	54	0.024	EROS 1078
05:21:56.2	-68:11:29	EB/ 3	17.37	17.88	17.65	-0.06	49073.0711	0.0009	0.904053	0.208	177	0.037	171	0.041	
05:21:57.6	-70:02:03a	EA/ 8	17.69	18.02	17.78	-0.05	49072.9643	0.0017	1.114619	0.188	214	0.044	179	0.044	*
05:21:57.6	-70:02:03b	EA/ 8	17.52	17.83	17.58	-0.09	49072.9604	0.0013	1.114619	0.184	312	0.035	307	0.049	*
05:22:05.5	-69:17:02	EA/ 5	17.97	18.61	18.14	0.00	49073.9530	0.0013	1.012475	0.224	172	0.043	177	0.047	
05:22:06.7	-69:46:30	EA/10	17.46	17.85	17.54	0.01	49074.9884	0.0039	3.481191	0.128	208	0.034	259	0.044	
05:22:07.4	-69:48:22	EA/ 1	18.26	18.67	18.56	0.22	49073.8497	0.0024	2.051136	0.120	241	0.056	288	0.049	Eccentric orbit
05:22:08.6	-69:46:25	EA/ 8	17.21	18.37	17.37	0.06	49074.2379	0.0016	2.452688	0.196	193	0.043	218	0.035	
05:22:12.8	-70:03:29a	EA/ 1	17.31	17.64	17.60	-0.04	49073.6974	0.0031	2.138751	0.124	216	0.053	124	0.035	*, Eccentric orbit
05:22:12.8	-70:03:29b	EA/ 1	17.14	17.46	17.41	-0.07	49073.7009	0.0022	2.138751	0.132	267	0.032	308	0.036	*, Eccentric orbit
05:22:14.7	-69:28:25	EA/10	16.58	17.00	16.69	0.09	49071.0991	0.0127	10.235071	0.156	316	0.039	152	0.030	
05:22:14.9	-70:10:56	EA/ 8	17.36	18.11	17.44	0.04	49073.0643	0.0053	6.008393	0.136	185	0.038	111	0.047	
05:22:15.8	-69:44:14	EA/ 3	15.91	16.37	16.29	-0.14	49074.3333	0.0021	1.954439	0.228	59	0.018	137	0.029	
05:22:17.0	-69:41:57	EA/ 6	17.47	17.92	17.70	0.05	49073.3094	0.0016	0.747168	0.216	286	0.054	61	0.041	EROS 1002
05:22:30.7	-69:44:10	EA/10	16.85	17.49	17.07	-0.05	49071.3552	0.0031	3.152465	0.136	85	0.030	100	0.031	
05:22:35.7	-69:31:44	EA/ 2	15.21	15.62	15.56	-0.16	49073.4825	0.0008	2.183387	0.160	276	0.023	150	0.016	EROS 1036
05:22:41.3	-70:06:48	EA/ 1	16.93	17.24	17.19	-0.04	49071.5236	0.0045	4.209394	0.124	219	0.045	107	0.034	
05:22:44.6	-69:31:43	EA/ 2	15.15	15.41	15.37	-0.16	49073.7220	0.0016	2.150595	0.156	288	0.024	150	0.018	
05:22:55.8	-69:51:13	EB/ 3	15.09	15.33	15.34	-0.13	49073.7824	0.0005	0.766471	0.332	294	0.018	324	0.017	
05:23:10.6	-70:03:19	EA/ 8	17.37	19.74	17.53	-0.01	49072.7162	0.0017	3.182889	0.176	211	0.074	115	0.043	
05:23:16.5	-70:10:06	EB/ 2	17.56	17.81	17.82	0.26	49074.4190	0.0036	1.071196	0.172	197	0.079	117	0.050	
05:23:16.8	-69:39:10	EA/ 8	17.34	17.94	17.47	0.17	49072.5368	0.0028	1.853507	0.204	165	0.047	198	0.043	
05:23:20.9	-70:14:27	EA/ 8	17.75	18.08	17.79	0.00	49072.6033	0.0044	1.726811	0.172	148	0.039	109	0.051	
05:23:33.4	-70:02:47	EB/ 3	18.42	18.81	18.74	0.46	49051.4580	0.0785	38.457299	0.208	214	0.075	145	0.055	
05:23:38.5	-68:36:20	EA/ 4	17.57	18.16	17.90	-0.10	49072.9178	0.0016	1.526018	0.148	177	0.036	147	0.047	Eccentric orbit
05:23:38.8	-68:58:16	EA/ 7	18.07	18.40	18.11	-0.03	49072.6402	0.0042	1.615637	0.160	229	0.055	219	0.063	True P = Px2 ?
05:23:41.1	-69:04:52	EA/ 8	17.59	18.74	17.64	-0.05	49074.7541	0.0031	3.569187	0.168	157	0.058	190	0.061	
05:23:43.3	-69:27:59	EB/ 3	17.25	17.54	17.46	-0.10	49073.7905	0.0019	1.357332	0.240	314	0.036	319	0.041	
05:23:48.8	-69:21:34	EA/ 1	17.81	18.33	18.28	-0.05	49073.8173	0.0031	2.011603	0.120	220	0.047	235	0.061	Eccentric orbit
05:23:49.4	-69:14:22	EA/ 6	16.36	16.95	16.74	-0.08	49073.5362	0.0009	1.051278	0.276	242	0.026	226	0.049	
05:23:52.9	-68:23:14	EA/10	17.79	19.14	18.05	0.10	49072.1925	0.0023	3.722509	0.172	175	0.049	178	0.049	
05:23:56.3	-70:35:23	EA/ 4	17.24	17.65	17.52	-0.02	49073.1123	0.0034	4.312954	0.088	211	0.041	221	0.036	Eccentric orbit
05:24:08.1	-69:17:37	EA/10	17.40	17.82	17.52	0.48	49077.2047	0.0672	39.534890	0.124	218	0.049	231	0.039	
05:24:09.2	-68:52:27	EA/ 1	16.61	16.91	16.90	-0.07	49072.3696	0.0016	2.531708	0.124	232	0.025	224	0.028	Eccentric orbit
05:24:10.6	-69:33:45	EA/ 1	16.88	17.21	17.20	0.00	49073.2003	0.0021	2.072121	0.148	278	0.032	313	0.053	
05:24:41.8	-69:49:34	EA/ 2	16.85	17.19	17.16	-0.03	49073.9250	0.0019	2.012105	0.184	308	0.033	166	0.032	
05:24:42.6	-69:56:48	EA/ 8	16.90	18.96	17.00	-0.02	49071.4525	0.0023	5.796022	0.140	300	0.068	100	0.054	
05:24:55.6	-68:07:08	EA/ 8	17.35	17.78	17.36	-0.02	49073.0121	0.0020	1.712632	0.160	173	0.038	84	0.026	True P = Px2 ?
05:25:02.5	-68:31:12	EB/ 3	15.08	15.75	15.65	-0.16	49073.1562	0.0004	0.992205	0.292	174	0.019	179	0.019	
05:25:03.4	-70:31:57	EA/ 1	17.86	18.80	18.42	0.06	49073.0367	0.0047	3.753574	0.112	199	0.072	98	0.069	Eccentric orbit
05:25:23.2	-69:05:21	EA/ 8	17.52	18.26	17.71	-0.02	49073.2150	0.0012	1.476855	0.220	202	0.047	222	0.049	
05:25:32.1	-69:49:39	EA/ 8	16.43	16.80	16.54	-0.01	49074.5414	0.0027	2.534109	0.168	212	0.027	294	0.030	
05:25:37.4	-70:03:23	EA/ 8	18.08	18.91	18.15	0.26	49073.3802	0.0032	2.143097	0.148	226	0.069	274	0.052	
05:25:40.8	-69:02:33	EA/ 3	14.17	14.41	14.37	-0.04	49072.9058	0.0021	1.443667	0.204	176	0.024	92	0.020	
05:25:44.7	-70:06:23	EA/ 2	17.97	18.44	18.29	0.49	49080.4789	0.0355	19.984570	0.160	242	0.065	265	0.052	
05:25:46.3	-69:31:04	EA/ 7	16.21	17.64	16.29	0.03	49070.4004	0.0021	5.874307	0.152	207	0.023	321	0.022	HV 12228
05:25:47.1	-69:20:56	EA/ 2	17.77	18.13	18.11	0.00	49073.1547	0.0023	1.459910	0.204	201	0.050	235	0.047	
05:25:53.1	-69:41:07	EA/10	17.65	17.99	17.73	0.41	49076.0562	0.0356	18.155360	0.108	262	0.048	311	0.043	
05:25:54.4	-69:27:25	EB/ 3	16.89	17.46	17.43	-0.08	49073.3895	0.0004	0.574523	0.320	301	0.038	251	0.047	
05:25:55.0	-69:55:12	EA/10	16.33	17.85	16.57	-0.05	49071.3460	0.0015	4.144599	0.160	280	0.028	320	0.037	
05:25:56.2	-69:14:36	EB/ 3	17.68	18.20	18.09	0.43	49068.4336	0.0534	37.100852	0.252	176	0.057	184	0.037	
05:25:57.4	-70:23:39	EB/10	17.36	17.64	17.49	-0.05	49073.2111	0.0057	3.824834	0.108	245	0.041	251	0.039	
05:26:03.5	-69:26:38	EB/ 3	15.03	15.32	15.25	-0.16	49072.9905	0.0010	1.903708	0.240	299	0.015	325	0.016	
05:26:04.1	-68:29:51	EA/10	18.11	19.30	18.39	0.26	49070.4006	0.0212	18.181907	0.144	168	0.077	177	0.066	
05:26:04.4	-69:17:11	EA/ 1	15.83	16.40	16.32	-0.12	49074.3997	0.0005	1.664101	0.164	198	0.018	252	0.023	
05:26:06.7	-69:43:50	EB/ 3	18.27	18.59	18.52	0.46	49054.6185	0.1032	52.286090	0.192	243	0.059	283	0.050	
05:26:13.0	-70:32:02	EA/ 1	17.46	18.07	18.07	-0.03	49072.2114	0.0020	3.025031	0.176	243	0.037	93	0.041	
05:26:15.0	-69:04:58	EA/ 2	17.56	17.81	17.83	0.04	49074.0310	0.0018	1.047928	0.152	192	0.056	233	0.053	
05:26:20.8	-70:35:57	EA/ 1	17.91	18.64	18.69	0.14	49073.5416	0.0060	6.588186	0.076	190	0.063	112	0.058	
05:26:21.6	-69:05:45	EA/ 2	15.81	16.20	16.14	-0.04	49072.8966	0.0008	1.505924	0.176	226	0.021	246	0.019	
05:26:23.2	-68:42:08	EA/ 5	16.62	16.94	16.85	-0.08	49073.5713	0.0009	1.134362	0.176	183	0.022	181	0.024	
05:26:34.1	-69:20:32	EA/ 7	17.61	19.65	17.71	-0.04	49073.5392	0.0015	3.405577	0.164	240	0.087	237	0.055	
05:26:35.0	-69:52:14	EB/ 3	17.91	18.33	18.28	0.00	49073.3597	0.0014	0.691716	0.292	241	0.067	152	0.062	
05:26:36.9	-68:48:02	EA/ 5	15.52	15.88	15.74	-0.02	49073.1506	0.0011	1.579397	0.160	263	0.029	126	0.013	
05:26:41.6	-70:37:36	EA/ 8	18.03	18.45	18.18	0.27	49066.2368	0.0538	38.062415	0.204	239	0.056	258	0.047	
05:26:49.8	-69:33:38	EA/ 2	16.43	16.78	16.83	-0.09	49073.6597	0.0009	0.995426	0.200	314	0.043	287	0.043	
05:26:50.6	-69:09:29	EA/ 7	16.64	16.93	16.66	0.00	49077.8232	0.0049	6.428377	0.120	221	0.024	238	0.027	True P = Px2 ?
05:26:53.3	-69:59:49	EA/ 2	16.38	16.79	16.78	-0.02	49074.0730	0.0010	2.431003	0.172	316	0.023	319	0.021	
05:26:53.5	-69:06:16	EA/ 3	15.26	15.66	15.63	-0.08	49072.6337	0.0010	2.124267	0.224	230	0.020	167	0.016	
05:27:04.8	-69:29:02	EB/ 3	16.60	16.87	16.86	-0.11	49073.4473	0.0007	0.788246	0.244	312	0.022	313	0.031	
05:27:05.5	-70:34:07	EA/ 1	18.35	18.63	18.62	0.17	49070.5835	0.0067	4.947878	0.088	175	0.058	242	0.067	Eccentric orbit
05:27:11.4	-69:50:52	EB/ 3	16.70	16.99	16.97	0.02	49073.6564	0.0017	1.538536	0.260	297	0.027	306	0.033	EROS 1020
05:27:33.0	-70:21:22	EB/ 6	17.77	18.62	18.25	-0.17	49073.5220	0.0008	0.895991	0.264	242	0.055	222	0.072	
05:27:42.2	-70:36:00	EA/ 1	15.61	16.30	16.24	-0.18	49074.6263	0.0005	2.109150	0.152	189	0.018	191	0.022	HV 12605
05:27:43.0	-69:41:23	EA/ 2	18.04	18.57	18.56	0.42	49088.8283	0.0178	20.350105	0.144	161	0.056	259	0.049	EROS 1076
05:27:52.2	-69:26:02	EA/ 6	15.75	16.49	15.97	-0.14	49071.9275	0.0013	4.055099	0.144	303	0.021	252	0.023	
05:28:08.9	-69:27:35	EB/ 3	15.51	15.78	15.74	-0.19	49073.4774	0.0007	1.577820	0.196	311	0.014	327	0.017	
05:28:14.2	-70:23:11	EA/ 1	17.57	17.92	17.95	-0.12	49074.0557	0.0027	3.320073	0.112	223	0.048	248	0.061	
05:28:22.1	-69:51:10	EA/ 1	17.51	17.91	17.79	-0.20	49072.9602	0.0021	2.027270	0.148	277	0.048	234	0.055	
05:28:23.8	-69:56:32	EA/ 5	16.14	16.77	16.35	-0.19	49074.9529	0.0011	2.471314	0.232	305	0.022	300	0.033	

TABLE 1. (continued)

α (J2000.0)	δ (J2000.0)	Type	Max	Min I	Min II	V–R	Epoch JD 2400000+	σ	P	DI	N_V	σ_V	N_R	σ_R	Notes
05:28:35.5	-69:51:04	EA/ 8	15.57	16.69	15.71	-0.18	49070.6029	0.0020	5.638830	0.188	321	0.035	297	0.036	
05:28:45.7	-69:25:18	EB/ 6	15.83	16.09	16.01	-0.17	49073.1290	0.0006	1.079427	0.248	303	0.018	310	0.015	
05:28:53.1	-69:52:27	EA/ 6	17.58	18.22	18.03	0.42	49102.2042	0.0689	87.788309	0.284	252	0.069	313	0.044	
05:29:00.5	-70:35:36	EA/ 2	17.84	18.17	18.17	-0.12	49074.1491	0.0018	1.259803	0.200	177	0.054	214	0.054	
05:29:03.4	-68:58:33	EA/ 3	17.48	17.77	17.74	-0.07	49072.9392	0.0022	1.440117	0.212	164	0.040	123	0.040	
05:29:14.2	-69:20:34	EA/ 2	17.58	17.89	17.87	-0.08	49073.5531	0.0016	1.373200	0.152	186	0.040	90	0.046	
05:29:23.4	-70:22:29	EA/ 1	17.57	17.99	17.88	-0.13	49072.5047	0.0020	2.206995	0.128	233	0.051	255	0.052	
05:29:25.1	-69:48:13	EA/ 1	16.80	17.51	17.50	-0.21	49073.0335	0.0006	1.966280	0.180	239	0.027	312	0.034	
05:29:25.9	-68:42:22	EA/ 8	18.17	18.73	18.28	0.25	49074.0476	0.0183	7.794541	0.168	172	0.068	169	0.061	
05:29:32.2	-69:01:47	EA/ 8	17.45	17.82	17.52	-0.10	49073.0433	0.0017	0.803831	0.208	137	0.038	157	0.051	
05:29:37.5	-69:46:35	EB/ 2	17.26	17.53	17.48	-0.22	49074.7527	0.0020	1.367739	0.176	232	0.044	272	0.052	
05:29:39.4	-69:04:09	EA/ 2	16.69	17.36	17.36	-0.10	49073.4473	0.0007	1.356458	0.164	180	0.025	84	0.033	
05:29:44.1	-69:39:42	EB/ 2	17.21	17.65	17.63	0.05	49073.4516	0.0010	0.969636	0.232	278	0.034	142	0.036	
05:29:46.1	-69:08:29	EA/ 1	16.67	17.12	17.07	0.02	49073.8555	0.0013	1.256558	0.164	165	0.062	92	0.027	
05:30:01.8	-70:21:22	EA/ 1	17.60	18.07	17.98	-0.12	49073.0449	0.0025	2.587778	0.120	235	0.053	252	0.060	Eccentric orbit
05:30:02.9	-70:09:45	EA/ 7	17.58	18.36	17.64	-0.08	49072.9467	0.0055	3.941556	0.136	234	0.061	231	0.090	
05:30:07.2	-68:50:35	EA/ 1	17.01	17.40	17.29	-0.10	49072.6488	0.0018	2.602895	0.096	114	0.027	181	0.029	Eccentric orbit
05:30:12.3	-69:56:25	EA/10	17.90	18.47	18.38	0.34	49076.0899	0.0900	68.464873	0.128	230	0.082	294	0.062	
05:30:18.2	-68:55:16	EA/ 5	15.56	15.96	15.78	-0.11	49073.4228	0.0009	1.669068	0.212	145	0.014	186	0.019	
05:30:18.3	-69:55:38	EA/ 7	17.01	18.40	17.09	-0.17	49074.6208	0.0016	3.420121	0.172	262	0.038	318	0.048	
05:30:20.1	-68:59:08	EA/ 2	15.74	16.29	16.24	-0.13	49073.6958	0.0007	2.088090	0.160	148	0.013	184	0.015	Eccentric orbit
05:30:22.4	-69:41:25	EA/ 5	15.71	16.53	15.88	0.21	49073.2966	0.0003	0.645043	0.200	296	0.031	135	0.031	
05:30:28.9	-69:40:40	EA/ 8	17.75	18.08	17.83	-0.06	49073.4671	0.0024	1.556072	0.180	294	0.059	137	0.044	
05:30:32.9	-69:28:41	EA/10	15.07	15.58	15.37	-0.17	49071.8929	0.0018	3.462824	0.152	301	0.019	142	0.020	
05:30:33.3	-69:05:42	EB/ 3	16.07	16.46	16.45	-0.12	49073.2613	0.0006	0.958011	0.244	155	0.017	91	0.019	
05:30:35.2	-68:42:46	EA/ 1	16.09	16.66	16.64	-0.08	49073.5021	0.0009	2.863910	0.132	180	0.017	188	0.017	Eccentric orbit
05:30:36.7	-69:06:25	EA/ 1	15.63	16.11	16.05	-0.12	49077.0082	0.0258	26.686598	0.116	176	0.047	91	0.059	
05:30:36.8	-69:16:40	EB/ 3	17.21	17.85	17.78	-0.10	49073.1724	0.0007	0.760479	0.260	184	0.050	88	0.038	
05:30:38.1	-69:09:39	EA/10	16.56	16.92	16.74	0.34	49125.5860	0.1570	72.370035	0.096	133	0.036	65	0.034	
05:30:39.5	-70:22:54	EA/ 1	14.92	15.12	15.06	0.43	49072.5034	0.0018	2.298840	0.048	186	0.029	259	0.029	Outside-eclipse wave
05:30:44.1	-70:11:24	EB/ 6	16.82	17.11	16.96	-0.05	49073.7942	0.0059	3.115505	0.412	258	0.043	249	0.040	Asymmetric LC
05:30:52.1	-69:08:44	EB/ 6	17.58	17.84	17.78	-0.07	49072.9232	0.0020	0.792454	0.356	183	0.041	92	0.044	
05:31:02.0	-70:49:22	EA/ 1	17.12	17.56	17.57	-0.04	49073.7428	0.0019	2.361859	0.164	197	0.033	254	0.037	Eccentric orbit
05:31:03.9	-69:09:30	EA/ 8	16.77	17.13	16.81	-0.04	49073.0432	0.0023	1.549648	0.100	179	0.040	168	0.042	
05:31:05.2	-69:07:10	EA/ 5	17.64	18.14	17.96	0.01	49073.6794	0.0011	1.089580	0.192	178	0.038	174	0.050	
05:31:07.1	-70:34:37	EA/ 7	16.71	17.31	16.79	-0.11	49073.6897	0.0014	2.559395	0.156	236	0.027	230	0.023	
05:31:12.4	-68:52:22	EA/ 1	17.07	17.53	17.46	-0.07	49073.9085	0.0027	3.371327	0.136	156	0.029	106	0.041	
05:31:15.3	-69:20:24	EA/ 1	16.96	17.42	17.41	-0.14	49073.9182	0.0017	2.265097	0.112	174	0.032	166	0.030	Eccentric orbit
05:31:23.4	-70:13:24	EA/ 2	18.25	19.07	18.46	0.14	49072.5052	0.0022	1.200369	0.208	180	0.067	86	0.053	
05:31:28.4	-68:50:25	EA/ 8	17.69	18.96	17.77	0.11	49076.4085	0.0045	5.421244	0.148	136	0.095	176	0.054	
05:31:28.7	-69:17:51	EA/10	14.08	14.81	14.51	-0.16	49070.1027	0.0042	4.502424	0.172	89	0.019	174	0.053	
05:31:28.7	-69:13:54	EB/ 3	14.44	14.78	14.74	-0.12	49073.9663	0.0022	4.037241	0.228	153	0.012	170	0.020	
05:31:29.9	-70:09:54	EA/ 1	17.54	17.93	17.91	-0.11	49072.9120	0.0015	1.343879	0.172	254	0.053	115	0.042	
05:31:30.3	-69:17:40	EB/ 3	14.30	14.64	14.56	-0.13	49073.3871	0.0006	1.197263	0.224	73	0.010	146	0.013	
05:31:31.8	-70:04:26	EB/ 2	17.21	17.62	17.59	-0.16	49072.8836	0.0014	1.486382	0.196	304	0.039	288	0.051	
05:31:33.7	-69:56:41	EA/ 1	16.58	17.16	17.13	-0.15	49071.6559	0.0025	7.815672	0.096	305	0.034	173	0.029	
05:31:36.3	-68:59:25	EB/ 3	17.26	17.94	17.98	-0.05	49073.3720	0.0005	0.558852	0.352	143	0.069	182	0.049	
05:31:36.7	-69:22:09	EB/ 6	17.42	18.12	17.85	-0.10	49073.4388	0.0006	0.783016	0.240	173	0.035	184	0.046	
05:31:44.1	-70:56:31	EB/ 6	16.98	17.25	17.10	-0.34	49073.6209	0.0020	1.280462	0.192	172	0.033	166	0.052	
05:31:45.9	-70:11:27	EA/ 7	16.78	17.60	16.85	-0.08	49071.3163	0.0030	5.429460	0.140	266	0.037	118	0.031	
05:31:47.5	-69:11:00	EA/ 2	17.15	17.69	17.60	-0.13	49074.0002	0.0007	0.844139	0.232	172	0.037	185	0.046	
05:31:49.7	-71:13:29	EA/ 2	16.40	16.69	16.66	0.46	49052.3652	0.0890	78.788084	0.124	152	0.029	72	0.028	
05:31:50.0	-69:22:54	EA/10	17.37	18.19	17.47	-0.01	49075.5217	0.0029	4.285552	0.140	131	0.039	184	0.048	
05:32:10.2	-70:01:34	EB/ 3	17.14	17.45	17.43	-0.07	49074.0972	0.0034	1.796981	0.204	170	0.043	55	0.040	
05:32:14.9	-71:19:03	EB/ 6	16.83	17.11	17.01	-0.09	49073.3374	0.0021	1.067973	0.240	130	0.027	72	0.023	
05:32:18.6	-69:23:19	EA/ 2	16.53	16.82	16.81	-0.12	49074.9589	0.0015	2.259971	0.152	180	0.018	182	0.025	
05:32:22.9	-69:27:51	EB/10	17.98	18.16	18.14	0.39	49061.2742	0.0654	15.070636	0.004	168	0.066	180	0.046	
05:32:26.3	-70:23:18	EA/ 6	16.58	17.12	16.71	-0.09	49072.1910	0.0029	2.744969	0.188	215	0.041	120	0.021	
05:32:27.6	-69:30:38	EB/ 3	17.23	17.82	17.67	-0.16	49072.9568	0.0016	1.011655	0.228	180	0.070	164	0.073	
05:32:30.5	-70:08:34	EA/ 2	18.50	19.93	18.76	0.18	49073.0288	0.0064	3.697068	0.216	176	0.116	89	0.111	
05:32:34.2	-70:02:18	EB/ 3	18.06	18.35	18.33	0.02	49074.2274	0.0041	1.577018	0.180	172	0.058	77	0.054	
05:32:38.0	-68:43:22	EA/ 6	17.55	17.97	17.68	0.09	49073.3152	0.0037	1.948483	0.272	183	0.045	177	0.035	
05:32:39.7	-68:42:57	EA/ 1	17.11	17.42	17.43	-0.08	49074.2270	0.0061	4.147475	0.104	185	0.052	179	0.055	
05:32:41.8	-69:51:10	EA/ 1	16.71	17.28	17.23	-0.11	49073.6761	0.0046	4.954435	0.060	145	0.023	91	0.029	Eccentric orbit
05:32:45.3	-70:51:12	EB/ 9	17.90	18.15	18.01	-0.11	49073.5759	0.0028	0.646520	0.232	207	0.043	81	0.052	
05:32:46.5	-71:24:44	EA/ 1	17.04	17.38	17.36	-0.09	49073.0555	0.0050	5.021360	0.084	174	0.034	75	0.045	True P = P/2 ?
05:32:48.4	-69:12:05	EA/ 2	14.94	15.25	15.23	-0.14	49072.3560	0.0009	2.926043	0.160	183	0.012	188	0.011	
05:32:49.7	-69:54:47	EA/10	16.76	17.52	16.86	-0.03	49074.7465	0.0044	5.750040	0.128	147	0.025	91	0.034	
05:32:56.8	-70:44:39a	EB/ 3	17.26	17.87	17.84	-0.13	49073.2351	0.0007	0.595250	0.380	230	0.044	106	0.063	*
05:32:56.8	-70:44:39b	EB/ 3	17.17	17.76	17.75	-0.17	49072.9367	0.0004	0.595250	0.380	237	0.060	245	0.048	*
05:32:59.9	-69:56:40	EA/ 8	17.25	19.33	17.48	-0.08	49072.5598	0.0018	3.368216	0.196	182	0.063	89	0.069	
05:33:01.8	-69:26:47	EA/ 2	14.57	15.00	14.97	-0.19	49073.7575	0.0009	1.749389	0.208	182	0.022	156	0.019	
05:33:12.6	-70:07:01	EA/ 1	16.98	17.29	17.29	-0.09	49073.7419	0.0041	5.394999	0.092	187	0.030	87	0.027	
05:33:19.4	-69:23:51	EB/ 3	17.04	17.60	17.54	-0.03	49073.7458	0.0007	1.095645	0.256	174	0.034	161	0.030	
05:33:20.0	-69:37:19	EB/ 3	17.12	17.66	17.50	-0.12	49074.2203	0.0015	0.912582	0.376	106	0.053	129	0.040	
05:33:20.2	-69:08:13	EA/ 8	17.20	18.51	17.60	-0.01	49074.1564	0.0015	1.695226	0.224	146	0.050	133	0.057	
05:33:26.2	-70:31:16	EA/ 8	17.37	17.80	17.41	-0.09	49073.7384	0.0031	2.945916	0.156	166	0.033	216	0.037	
05:33:32.8	-70:56:58	EA/10	16.96	17.54	17.05	-0.10	49072.1414	0.0021	2.519669	0.160	158	0.028	169	0.035	
05:33:38.5	-69:39:27	EB/ 2	17.75	18.03	18.02	-0.08	49075.3894	0.0042	2.294308	0.188	181	0.043	180	0.046	
05:33:50.5	-70:24:47	EA/ 7	18.00	19.94	18.12	-0.06	49074.2998	0.0021	3.627913	0.132	150	0.063	225	0.064	
05:33:54.5	-69:57:04	EA/ 6	16.70	17.20	16.83	0.22	49073.3165	0.0005	0.435778	0.212	178	0.027	82	0.025	
05:33:55.6	-70:19:06	EA/ 1	17.19	17.68	17.64	-0.03	49073.7914	0.0024	4.569504	0.128	147	0.031	230	0.034	
05:33:56.1	-69:08:08	EB/ 3	14.14	14.53	14.47	-0.05	49074.3345	0.0014	2.579419	0.256	137	0.017	184	0.016	
05:34:13.7	-69:50:16	EA/ 8	18.22	18.73	18.27	0.06	49073.3715	0.0053	2.625527	0.168	164	0.048	120	0.054	True P = Px2 ?

TABLE 1. (continued)

α (J2000.0)	δ (J2000.0)	Type	Max	Min I	Min II	V–R	Epoch JD 2400000+	σ	P	DI	N_V	σ_V	N_R	σ_R	Notes
05:34:20.0	-69:35:25	EA/ 1	17.96	18.37	18.30	0.06	49072.8209	0.0020	1.607895	0.152	165	0.060	171	0.044	
05:34:33.6	-69:49:42	EA/ 8	17.37	17.76	17.44	-0.02	49072.2578	0.0031	2.394346	0.164	128	0.031	157	0.036	
05:34:34.2	-70:12:54	EA/ 2	17.21	17.76	17.72	-0.08	49074.0517	0.0013	1.839752	0.204	232	0.035	222	0.041	
05:34:36.8	-70:45:17	EA/ 8	17.94	19.08	18.10	0.17	49071.9052	0.0113	13.895313	0.128	212	0.063	113	0.072	Eccentric orbit
05:34:41.3	-69:31:39	EB/ 3	13.54	13.91	13.89	-0.15	49073.7109	0.0011	1.404740	0.324	102	0.019	134	0.019	
05:34:45.7	-69:16:53	EA/ 1	16.79	17.28	17.14	-0.10	49074.0939	0.0014	2.091902	0.116	152	0.023	183	0.034	Eccentric orbit
05:34:47.7	-71:18:06	EA/ 8	17.07	18.87	17.22	-0.06	49074.1612	0.0016	3.103120	0.196	169	0.046	171	0.041	
05:34:52.2	-70:18:27	EA/ 1	17.92	18.42	18.28	0.16	49075.1290	0.0041	3.560163	0.132	152	0.046	213	0.041	
05:34:54.2	-69:01:57	EB/ 3	15.77	16.44	16.42	-0.03	49072.6107	0.0006	1.568935	0.244	96	0.021	134	0.015	
05:34:57.7	-69:50:06	EA/ 8	17.28	17.74	17.32	-0.01	49072.3349	0.0052	4.286434	0.152	176	0.032	159	0.041	
05:35:00.3	-70:18:42	EA/ 1	17.45	17.83	17.78	-0.05	49073.2541	0.0026	2.605634	0.144	195	0.044	224	0.037	Eccentric orbit
05:35:02.0	-69:44:18	EA/ 1	14.74	15.10	14.97	-0.22	49073.0162	0.0012	2.989787	0.144	123	0.013	170	0.013	Eccentric orbit
05:35:09.7	-68:42:32	EA/ 2	16.53	16.85	16.79	-0.06	49074.4562	0.0017	1.938269	0.184	173	0.026	91	0.021	
05:35:11.8	-69:49:14	EA/ 5	17.10	17.61	17.42	0.03	49073.5650	0.0009	0.968996	0.228	155	0.034	144	0.031	
05:35:14.7	-70:40:19	EA/ 7	17.78	19.01	17.84	-0.02	49073.0444	0.0018	3.136661	0.172	219	0.054	224	0.059	
05:35:17.7	-70:11:40	EA/ 1	18.15	18.54	18.46	0.19	49073.1709	0.0054	4.771891	0.100	215	0.052	218	0.061	
05:35:18.1	-68:52:50	EB/ 3	15.02	15.55	15.42	0.30	49073.4716	0.0060	1.255207	0.240	171	0.065	86	0.080	HV 2691
05:35:19.4	-69:57:19	EA/ 2	17.70	18.16	18.14	-0.06	49072.7310	0.0013	1.260832	0.160	182	0.045	183	0.046	
05:35:21.8	-69:59:08	EA/ 2	18.12	18.56	18.55	-0.05	49073.4835	0.0018	1.566765	0.168	153	0.058	114	0.045	
05:35:23.6	-70:00:36	EA/ 2	17.59	17.95	17.96	0.09	49073.3050	0.0025	1.790518	0.180	182	0.041	130	0.045	
05:35:25.5	-69:41:24	EB/ 3	14.46	14.72	14.66	-0.16	49074.3834	0.0014	1.577241	0.260	36	0.008	100	0.011	
05:35:26.2	-69:37:20	EA/ 5	15.32	15.65	15.53	-0.20	49074.2596	0.0012	1.474020	0.160	170	0.020	104	0.017	
05:35:26.3	-71:30:35	EA/ 8	17.16	17.73	17.25	-0.05	49072.0857	0.0020	2.345815	0.192	143	0.032	148	0.035	
05:35:28.2	-70:03:35	EA/ 8	17.54	18.55	17.63	0.01	49070.6521	0.0026	3.105148	0.180	180	0.044	187	0.040	
05:35:28.5	-69:54:42	EA/ 1	17.20	17.46	17.42	-0.08	49072.1269	0.0045	2.833253	0.116	173	0.034	184	0.044	Eccentric orbit
05:35:28.7	-70:47:10	EA/ 1	17.44	17.95	17.89	-0.09	49072.4166	0.0013	1.852129	0.132	188	0.036	234	0.039	
05:35:28.7	-69:58:50	EA/ 5	18.58	19.20	18.79	0.26	49072.9885	0.0071	7.311676	0.124	152	0.061	150	0.051	Eccentric orbit
05:35:29.4	-69:40:42	EB/ 3	16.18	17.00	16.98	-0.17	49073.2856	0.0003	0.750504	0.316	185	0.035	193	0.031	
05:35:30.7	-68:56:12	EB/ 3	14.74	15.19	15.11	0.02	49074.5132	0.0012	1.848979	0.220	105	0.016	90	0.013	
05:35:36.2	-69:12:04	EA/ 2	18.25	18.42	18.42	0.38	49073.7315	0.0047	1.341978	0.144	171	0.054	178	0.044	
05:35:37.8	-68:58:57	EB/ 3	16.24	16.75	16.61	-0.01	49073.6242	0.0028	1.360632	0.188	104	0.061	57	0.058	
05:35:40.6	-69:18:02	EB/ 6	14.13	14.53	14.41	-0.08	49074.3085	0.0014	3.408628	0.256	163	0.014	157	0.011	
05:35:41.5	-69:27:05	EA/ 8	15.44	16.88	15.54	0.21	49072.8511	0.0002	0.941504	0.180	185	0.020	182	0.018	
05:35:46.4	-69:51:55	EA/10	16.78	18.16	17.04	0.03	49079.1363	0.0048	8.139369	0.156	185	0.047	178	0.052	
05:35:49.1	-70:32:01	EA/ 2	17.94	18.65	18.64	-0.06	49073.4687	0.0011	1.152985	0.220	177	0.047	173	0.053	
05:35:49.1	-69:37:56	EA/ 1	14.64	15.03	15.01	-0.08	49072.7302	0.0014	3.092123	0.132	134	0.015	185	0.017	Eccentric orbit
05:35:50.8	-69:12:01	EA/ 2	14.13	14.58	14.59	0.03	49073.6148	0.0006	2.762575	0.184	147	0.013	183	0.009	
05:35:58.5	-69:13:34	EA/ 2	16.52	16.80	16.78	0.15	49073.4633	0.0016	1.447098	0.180	115	0.024	171	0.026	
05:35:58.7	-69:40:17	EB/ 3	15.77	16.07	16.07	-0.18	49073.4291	0.0006	0.804636	0.280	144	0.015	190	0.025	
05:36:06.9	-69:05:55	EB/ 3	15.82	16.29	16.14	-0.01	49073.6460	0.0008	1.293857	0.252	136	0.018	189	0.017	
05:36:12.5	-70:22:27	EA/ 7	17.36	18.63	17.41	0.03	49073.0859	0.0019	3.611742	0.148	210	0.038	205	0.042	
05:36:14.6	-69:13:33	EA/ 2	16.06	16.53	16.51	0.00	49072.9545	0.0008	1.824190	0.180	162	0.020	170	0.020	
05:36:14.9	-70:53:29a	EA/ 2	17.93	18.21	18.15	-0.06	49072.9753	0.0034	2.234501	0.132	157	0.044	162	0.046	*
05:36:14.9	-70:53:29b	EA/ 2	17.88	18.14	18.16	-0.05	49072.9767	0.0029	2.234501	0.148	222	0.047	210	0.045	*
05:36:17.1	-69:08:23	EA/ 1	16.89	17.23	17.19	0.02	49073.1117	0.0013	1.962791	0.132	149	0.025	184	0.025	
05:36:20.3	-69:06:16	EA/ 1	16.56	16.97	16.74	0.00	49073.3361	0.0011	2.403987	0.104	142	0.022	167	0.018	Eccentric orbit
05:36:20.4	-70:59:45	EA/ 1	17.25	17.60	17.56	-0.05	49071.7907	0.0047	3.317354	0.148	171	0.032	170	0.044	Eccentric orbit
05:36:25.3	-68:49:34	EA/ 8	17.67	19.28	17.84	0.31	49076.1333	0.0079	14.306290	0.180	180	0.059	92	0.048	
05:36:26.8	-69:35:19	EB/ 3	15.55	16.18	16.12	-0.16	49073.8287	0.0003	0.833272	0.276	164	0.023	156	0.024	
05:36:32.2	-71:01:32	EA/ 8	17.11	18.50	17.28	0.00	49071.9956	0.0015	3.150733	0.196	150	0.037	173	0.030	
05:36:32.3	-69:20:53	EB/ 3	13.10	13.65	13.54	0.03	49074.0464	0.0086	8.097698	0.308	72	0.029	98	0.031	
05:36:34.4	-69:15:22	EB/ 3	14.64	15.04	14.96	-0.04	49073.4783	0.0004	1.360962	0.224	171	0.010	189	0.011	
05:36:34.9	-69:33:51	EA/ 1	17.02	17.38	17.36	-0.08	49072.5376	0.0010	1.323814	0.148	163	0.032	176	0.025	
05:36:35.1	-69:10:29	EA/ 1	16.03	16.53	16.36	-0.03	49074.9862	0.0014	2.072979	0.152	146	0.028	189	0.035	Eccentric orbit
05:36:43.3	-69:06:08	EA/ 2	17.02	17.64	17.61	0.03	49072.3998	0.0008	1.447397	0.156	167	0.027	185	0.045	Eccentric orbit
05:36:47.5	-69:13:21	EA/ 5	17.08	17.43	17.27	0.23	49073.2004	0.0022	1.776616	0.152	137	0.034	165	0.036	
05:36:48.7	-69:17:00	EA/ 1	14.96	15.45	15.37	-0.09	49073.3806	0.0010	3.853434	0.116	189	0.011	189	0.013	Eccentric orbit
05:36:57.8	-69:09:43	EB/ 3	15.62	15.90	15.90	0.10	49072.7061	0.0015	1.496126	0.232	186	0.021	184	0.026	
05:37:00.7	-70:09:33	EA/ 3	17.46	17.76	17.75	-0.09	49073.8560	0.0025	1.401188	0.168	142	0.045	115	0.051	
05:37:02.6	-69:20:46	EB/ 3	16.08	16.44	16.40	-0.05	49073.7886	0.0005	0.981512	0.232	187	0.014	182	0.018	
05:37:35.6	-70:39:58	EA/ 8	16.77	17.19	16.83	-0.02	49075.6817	0.0032	3.742604	0.168	181	0.028	238	0.025	
05:37:42.1	-70:12:58	EA/ 1	16.10	16.44	16.30	-0.09	49075.0599	0.0015	2.755736	0.144	215	0.020	240	0.019	
05:37:50.3	-70:06:20	EA/ 6	15.98	16.29	16.11	-0.02	49071.7383	0.0031	3.550778	0.184	163	0.019	181	0.022	
05:37:59.5	-70:34:04	EB/ 6	17.98	18.38	18.18	0.01	49073.9303	0.0043	1.857535	0.336	181	0.065	179	0.061	
05:38:18.5	-70:41:09	EA/ 2	14.39	14.67	14.61	-0.03	49074.6580	0.0011	2.191370	0.140	209	0.016	217	0.020	
05:38:28.4	-69:27:04	EA/ 2	16.59	16.88	16.84	0.02	49073.6954	0.0017	1.628661	0.160	188	0.034	95	0.021	
05:38:29.3	-69:37:00	EB/ 3	16.65	17.00	16.89	-0.03	49072.8084	0.0015	1.172960	0.236	154	0.030	99	0.023	
05:38:30.8	-69:40:16	EA/ 2	17.70	18.03	17.95	-0.04	49074.3729	0.0029	1.864281	0.148	174	0.052	111	0.042	
05:38:35.4	-70:33:40	EA/ 2	17.64	18.03	18.00	-0.01	49071.9564	0.0029	2.529159	0.152	220	0.043	219	0.054	
05:38:38.5	-69:53:21	EA/10	17.04	17.40	17.22	0.13	49075.6714	0.0069	5.420107	0.108	150	0.033	175	0.037	
05:38:40.5	-69:29:22	EB/ 3	14.84	15.20	15.12	-0.14	49074.2199	0.0008	1.524993	0.244	141	0.013	83	0.010	
05:38:48.2	-69:34:08	EA/ 1	17.13	17.48	17.38	0.19	49072.2898	0.0022	2.133356	0.152	178	0.050	96	0.025	
05:38:56.1	-71:26:51	EA/ 6	18.22	18.67	18.64	0.38	49110.7831	0.1163	55.787802	0.180	159	0.079	173	0.061	
05:39:07.1	-70:17:31	EA/ 1	17.33	17.59	17.57	0.02	49073.3155	0.0022	2.413826	0.128	231	0.044	239	0.032	
05:39:30.7	-69:39:12	EB/ 3	14.90	15.14	15.13	0.13	49074.2910	0.0020	1.716449	0.188	167	0.024	101	0.019	
05:39:33.3	-69:53:33	EA/ 8	16.56	18.08	16.74	0.11	49074.4152	0.0044	8.073115	0.172	164	0.050	191	0.042	
05:39:39.5	-70:13:45	EA/ 6	17.79	18.35	18.13	0.12	49073.1932	0.0012	0.915033	0.240	232	0.056	118	0.040	
05:39:39.8	-70:13:26	EA/ 2	17.80	18.21	18.16	0.21	49073.8285	0.0044	3.254455	0.156	220	0.062	119	0.051	
05:39:41.8	-69:34:25	EB/ 3	15.48	16.02	15.88	-0.06	49073.0685	0.0007	1.306871	0.240	183	0.020	99	0.016	HV 5989
05:39:43.4	-70:42:48	EA/ 7	17.64	18.43	17.66	0.04	49074.7702	0.0045	4.106112	0.140	220	0.052	219	0.053	
05:39:43.5	-70:55:57	EA/ 2	18.08	18.48	18.43	0.00	49073.0294	0.0027	1.486931	0.152	141	0.054	95	0.051	
05:39:46.3	-70:36:51	EA/10	17.34	17.78	17.48	0.08	49073.8846	0.0034	3.963416	0.120	221	0.038	230	0.031	
05:39:51.4	-70:26:22	EA/ 2	17.75	18.43	18.39	-0.02	49073.7411	0.0018	1.461908	0.172	216	0.059	105	0.054	
05:39:55.4	-69:36:06	EA/ 5	16.78	17.11	17.00	0.03	49073.2987	0.0012	1.215050	0.164	164	0.035	90	0.016	

TABLE 1. (continued)

α (J2000.0)	δ (J2000.0)	Type	Max	Min I	Min II	V–R	Epoch JD 2400000+	σ	P	DI	N_V	σ_V	N_R	σ_R	Notes
05:40:00.1	-70:16:54	EA/ 3	13.80	14.12	14.02	0.27	49060.6218	0.0605	79.920281	0.180	162	0.019	61	0.009	
05:40:01.7	-69:36:07	EA/ 2	16.04	16.72	16.70	0.11	49072.0832	0.0017	2.262284	0.156	169	0.081	90	0.020	
05:40:02.4	-69:44:47	EA/ 2	16.02	16.62	16.57	0.29	49073.7585	0.0021	2.044866	0.200	171	0.047	100	0.036	
05:40:05.0	-71:01:13	EB/ 3	17.42	17.75	17.70	0.06	49073.8931	0.0014	0.794632	0.236	161	0.036	100	0.037	
05:40:08.7	-71:24:49	EA/ 8	18.17	19.87	18.29	-0.01	49072.5436	0.0016	2.144570	0.184	167	0.075	166	0.058	
05:40:09.0	-70:37:19	EA/10	17.27	17.73	17.37	0.10	49076.4280	0.0077	7.611105	0.120	169	0.035	203	0.037	
05:40:11.7	-69:55:04	EB/ 3	14.49	15.17	15.06	-0.07	49073.4359	0.0005	1.248267	0.264	162	0.028	192	0.019	
05:40:13.0	-70:18:47	EA/ 8	16.17	16.63	16.29	-0.01	49075.6220	0.0026	2.556633	0.168	238	0.037	119	0.022	
05:40:21.8	-70:00:08	EA/ 6	17.91	18.42	18.11	0.14	49073.2875	0.0024	1.824957	0.192	163	0.056	170	0.053	
05:40:23.9	-70:22:32	EB/ 2	17.33	17.91	17.87	-0.02	49073.5419	0.0012	1.174865	0.248	201	0.049	113	0.045	
05:40:51.1	-70:34:46	EB/ 6	17.86	18.28	18.03	0.05	49073.1283	0.0022	1.467724	0.216	181	0.045	220	0.056	
05:40:58.2	-70:11:08	EA/ 1	17.88	18.29	18.16	-0.01	49074.8919	0.0052	3.278572	0.152	199	0.077	62	0.060	
05:41:09.5	-70:44:45	EA/ 6	15.74	16.04	15.91	-0.07	49072.8859	0.0022	2.216937	0.208	210	0.027	240	0.019	
05:41:10.9	-70:43:18	EA/10	18.37	19.16	18.58	0.17	49074.3793	0.0063	5.747045	0.132	166	0.052	208	0.063	
05:41:12.2	-70:51:59	EA/ 9	17.09	17.52	17.21	-0.04	49073.1939	0.0017	1.581486	0.200	227	0.042	234	0.043	
05:41:34.0	-70:43:26	EA/ 5	16.73	17.11	16.89	0.45	49073.7312	0.0052	4.832913	0.156	204	0.029	91	0.021	
05:41:41.5	-70:22:01	EA/ 2	17.96	18.27	18.18	0.00	49073.2123	0.0020	1.191816	0.152	189	0.042	188	0.054	
05:41:45.1	-70:57:42	EB/ 6	17.91	18.34	18.10	-0.01	49073.5281	0.0019	1.093601	0.232	174	0.049	163	0.055	
05:41:53.1	-71:24:48	EA/ 5	17.40	17.71	17.58	-0.09	49073.6816	0.0022	0.976919	0.168	157	0.031	79	0.042	
05:41:56.5	-70:22:06	EB/ 6	17.47	17.88	17.67	-0.07	49073.6256	0.0021	1.390015	0.204	162	0.046	197	0.044	
05:42:14.7	-71:16:56	EA/ 1	16.33	16.73	16.64	0.02	49073.2249	0.0011	1.702853	0.140	177	0.022	58	0.018	
05:42:47.7	-71:03:23	EB/ 2	17.99	18.29	18.25	0.02	49074.8752	0.0037	2.184046	0.180	146	0.040	164	0.053	
05:42:55.8	-71:33:38	EA/ 8	17.10	18.19	17.25	-0.06	49073.2904	0.0027	2.908772	0.184	183	0.045	81	0.043	
05:44:33.5	-71:09:33	EA/ 2	15.72	16.18	16.16	-0.05	49075.9407	0.0017	3.774112	0.192	181	0.022	151	0.017	
05:44:59.0	-70:14:37	EA/ 2	17.80	18.08	18.06	-0.03	49073.4039	0.0026	2.038592	0.140	201	0.041	192	0.039	
05:45:04.7	-71:11:48	EB/ 3	17.88	18.29	18.25	0.02	49073.6312	0.0012	0.601116	0.340	161	0.060	165	0.054	
05:45:10.5	-71:34:13	EB/ 3	17.96	18.33	18.31	-0.05	49074.0753	0.0022	1.633056	0.216	173	0.045	173	0.055	
05:45:11.6	-71:05:00	EB/ 6	17.75	18.17	18.03	0.40	49096.1423	0.0744	36.978993	0.344	156	0.074	119	0.032	
05:45:52.2	-71:19:04	EA/ 7	17.11	18.08	17.18	-0.01	49074.9053	0.0030	3.404035	0.144	149	0.040	151	0.045	
05:46:00.9	-70:26:05	EA/10	18.51	20.03	18.70	0.22	49061.1191	0.0270	32.538799	0.108	169	0.090	186	0.081	
05:46:17.1	-70:55:05	EA/ 7	18.37	20.12	18.42	0.13	49072.7728	0.0025	3.239925	0.160	168	0.101	166	0.070	
05:46:26.9	-71:16:48	EA/ 1	17.97	18.34	18.32	0.32	49073.8295	0.0027	1.780867	0.128	140	0.067	173	0.051	
05:46:37.9	-71:14:46	EA/ 9	17.93	19.50	18.05	0.03	49072.9757	0.0029	2.982038	0.192	145	0.094	123	0.054	
05:46:44.6	-70:55:49	EA/10	17.62	18.00	17.69	0.49	49100.9492	0.0753	44.345171	0.100	174	0.061	180	0.041	
05:46:50.8	-70:45:49	EA/ 9	17.57	18.30	17.77	-0.04	49073.3493	0.0012	1.378292	0.212	193	0.041	149	0.044	
05:46:59.0	-71:12:15	EA/ 2	18.10	18.37	18.33	-0.03	49072.8129	0.0027	1.602093	0.148	174	0.050	169	0.050	
05:47:12.5	-70:45:26	EA/10	17.70	18.25	17.77	-0.07	49072.8451	0.0022	1.165939	0.168	181	0.044	171	0.056	
05:47:32.5	-70:42:32	EA/ 1	17.58	17.98	17.77	0.40	49041.0623	0.0408	37.893154	0.124	187	0.041	192	0.031	
05:47:39.4	-70:58:41	EA/ 2	17.63	18.17	18.13	-0.05	49074.3821	0.0020	2.081976	0.196	161	0.041	131	0.055	
05:47:43.4	-71:02:12	EA/ 8	17.31	18.19	17.44	-0.06	49072.0887	0.0015	2.298377	0.200	163	0.053	179	0.037	
05:48:27.9	-70:58:16	EA/ 8	16.31	17.36	16.36	0.15	49077.0429	0.0081	28.562519	0.164	185	0.023	102	0.018	
05:48:30.3	-70:43:56	EA/ 3	17.02	17.21	17.23	0.39	49068.2609	0.0220	16.300123	0.148	183	0.031	198	0.020	
05:48:48.1	-70:46:10	EA/ 2	17.88	18.14	18.10	-0.06	49073.2543	0.0029	1.348015	0.140	134	0.062	150	0.041	
05:49:48.6	-70:45:31	EA/10	18.20	19.18	18.50	0.39	49064.2712	0.0259	16.936674	0.144	170	0.082	183	0.067	
05:49:50.8	-70:30:54	EA/ 6	18.04	18.43	18.23	0.05	49073.6348	0.0025	1.028770	0.200	161	0.056	91	0.045	

Notes to Table 1.

* An asterisk indicates that there are multiple sets of observations of this star. The line of data above or below the asterisk refers to independent observations of the same star.

The 1274 light curves (637 each in V and R) were fitted with the Nelson–Davis–Etzel (NDE) model (Etzel 1981; Popper & Etzel 1981). This model is deemed adequate for analysis of all the light curves in our data set. Future work on highly distorted systems should be done with a more complicated model, possibly similar to that of Wilson (1979). Magnitudes are relative to the median magnitude in the plots. Observations with estimated uncertainties greater than 10% in intensity were excluded. In fitting these light curves, certain auxiliary quantities must be provided. Limb-darkening coefficients were estimated by using the system's preliminary $V-R$ color index to obtain an approximate surface temperature (Bessell 1979), then obtaining the coefficients themselves from Wade & Rucinski (1985) by assuming a value of $\log g=4.2$. Gravity-brightening coefficients were estimated from the formula in Martynov (1973). Equal coefficients were assumed for both stars. These methods are deemed adequate when considering the poor quality of most of our light curves. In Table 1, Max, Min I, and Min II refer to the V magnitudes at maximum brightness, and V magnitudes at the minima; the epoch given is that of primary minimum; σ is the standard error of the epoch; P is the orbital period in days [its uncertainty can be estimated with Eq. (1)]; DI is the duration of primary eclipse in phase units; N_V and N_R are the number of observations in the V and R filters; and σ_V and σ_R are the standard deviations of the residuals from the fits.

In almost all cases, it was possible to achieve convergence of the model while varying five principal parameters: J_S, the surface brightness of the secondary ($J_P=1$), r_p, the radius of the primary component, i, the angle of orbital inclination, $\Delta\phi$, the phase of primary eclipse, and Δm_q, the magnitude at quadrature. Because of the large observational scatter in the data, it was necessary in nearly all cases to fix at reasonable values k, the ratio of radii, and q, the mass ratio, in order to achieve convergence. Thus, only the sum of radii is accurately determined by this procedure, not the individual radii.

TABLE 2. Additional properties of eccentric eclipsing binary stars in the Large Magellanic Cloud.

α (J2000.0)	δ (J2000.0)	e	e cos ω	e sin ω	ϕ_{sec}	DII	Notes
04:55:20.8	-68:51:10	0.167	0.0688	0.1518	0.545	0.128	
05:01:39.6	-68:51:04	0.271	-0.0085	0.2712	0.494	0.140	
05:01:55.5	-69:41:02	0.023	-0.0227	-0.0040	0.486	0.164	
05:03:44.5	-68:02:42	0.281	-0.1850	-0.2114	0.380	0.064	
05:03:54.9	-68:04:32	0.220	-0.0290	0.2177	0.481	0.128	
05:04:03.2	-68:35:20	0.295	0.1469	-0.2553	0.598	0.088	
05:04:37.8	-69:07:11	0.247	-0.1292	-0.2108	0.415	0.104	
05:05:50.2	-69:49:02	0.318	0.2234	-0.2270	0.646	0.072	
05:05:58.6	-70:07:14	0.289	-0.0896	-0.2748	0.441	0.080	
05:06:43.4	-68:36:10	0.053	0.0191	-0.0499	0.512	0.116	
05:08:44.8	-68:34:27	0.076	0.0275	-0.0705	0.518	0.144	
05:09:29.1	-68:55:03	0.071	-0.0237	-0.0671	0.485	0.120	
05:09:39.2	-68:28:29	0.030	0.0302	-0.0012	0.519	0.088	
05:10:28.7	-69:20:48	0.227	0.0469	-0.2217	0.531	0.092	
05:11:51.4	-69:20:49a	0.038	0.0304	-0.0235	0.520	0.128	*
05:11:51.4	-69:20:49b	0.039	0.0385	0.0059	0.525	0.124	*
05:11:56.3	-69:07:42	0.026	-0.0262	-0.0011	0.483	0.172	
05:12:18.5	-68:58:33	0.056	0.0454	0.0333	0.530	0.136	
05:12:46.0	-68:41:51	0.042	0.0252	0.0331	0.516	0.132	
05:13:23.9	-69:22:50	0.043	0.0398	-0.0149	0.525	0.132	
05:13:36.1	-69:22:41a	0.027	-0.0179	-0.0199	0.489	0.144	*
05:13:36.1	-69:22:41b	0.023	-0.0169	-0.0157	0.489	0.136	*
05:13:41.1	-69:32:41	0.054	0.0210	-0.0498	0.514	0.132	
05:13:50.1	-70:05:52	0.062	-0.0494	-0.0373	0.468	0.136	
05:14:26.6	-68:15:48	0.167	-0.0442	0.1607	0.471	0.132	
05:15:35.9	-70:59:26	0.237	-0.0004	0.2368	0.500	0.144	
05:16:01.0	-68:45:32	0.071	-0.0339	0.0621	0.478	0.148	
05:16:55.3	-69:11:49	0.024	0.0016	-0.0238	0.501	0.108	
05:17:15.5	-69:26:15	0.038	-0.0372	-0.0065	0.476	0.132	
05:17:34.3	-69:44:23	0.207	-0.1679	0.1210	0.392	0.104	
05:18:04.7	-69:48:19	0.038	0.0343	-0.0173	0.522	0.140	
05:18:15.6	-69:50:55	0.111	0.0589	0.0939	0.538	0.152	
05:19:31.0	-69:20:39	0.067	-0.0451	0.0497	0.471	0.140	
05:20:35.7	-68:12:18	0.149	-0.1490	-0.0077	0.405	0.120	
05:21:05.8	-68:20:12	0.083	0.0826	0.0074	0.553	0.116	
05:21:11.6	-68:43:36	0.110	-0.0645	0.0890	0.458	0.160	
05:21:12.9	-69:50:50	0.041	-0.0233	0.0341	0.485	0.148	
05:21:34.9	-69:25:36	0.091	0.0659	0.0629	0.543	0.124	
05:21:43.5	-69:24:43a	0.123	-0.0068	0.1233	0.496	0.156	*
05:21:43.5	-69:24:43b	0.127	-0.0067	0.1270	0.496	0.156	*
05:22:07.4	-69:48:22	0.074	0.0569	0.0475	0.537	0.128	
05:22:12.8	-70:03:29a	0.036	-0.0192	0.0299	0.488	0.132	*
05:22:12.8	-70:03:29b	0.034	-0.0272	0.0197	0.482	0.136	*
05:23:38.5	-68:36:20	0.038	0.0225	-0.0300	0.514	0.140	
05:23:48.8	-69:21:34	0.018	-0.0183	0.0001	0.488	0.120	
05:23:56.3	-70:35:23	0.046	-0.0063	-0.0461	0.496	0.080	
05:24:09.2	-68:52:27	0.057	-0.0276	0.0494	0.482	0.136	
05:25:03.4	-70:31:57	0.142	-0.0214	0.1409	0.486	0.148	
05:27:05.5	-70:34:07	0.226	-0.1109	0.1970	0.427	0.116	
05:30:01.8	-70:21:22	0.266	-0.1914	-0.1850	0.376	0.088	
05:30:07.2	-68:50:35	0.159	-0.0249	0.1568	0.484	0.124	
05:30:20.1	-68:59:08	0.020	0.0141	-0.0145	0.509	0.156	
05:30:35.2	-68:42:46	0.130	0.1202	-0.0489	0.577	0.124	
05:31:02.0	-70:49:22	0.081	0.0122	-0.0804	0.508	0.140	
05:31:15.3	-69:20:24	0.210	0.2094	0.0140	0.633	0.112	
05:32:41.8	-69:51:10	0.386	0.0552	0.3816	0.538	0.132	
05:34:36.8	-70:45:17	0.160	0.0517	0.1513	0.533	0.172	
05:34:45.7	-69:16:53	0.042	-0.0138	0.0394	0.491	0.124	
05:35:00.3	-70:18:42	0.024	-0.0224	0.0082	0.485	0.148	
05:35:02.0	-69:44:18	0.149	0.0556	-0.1381	0.536	0.116	
05:35:28.5	-69:54:42	0.133	0.1032	0.0835	0.568	0.128	
05:35:28.7	-69:58:50	0.161	0.0918	0.1326	0.560	0.152	
05:35:49.1	-69:37:56	0.025	0.0203	0.0149	0.513	0.136	
05:36:20.3	-69:06:16	0.194	-0.0518	0.1869	0.466	0.136	
05:36:20.4	-70:59:45	0.061	0.0496	-0.0357	0.532	0.144	
05:36:35.1	-69:10:29	0.060	-0.0131	-0.0581	0.492	0.140	
05:36:43.3	-69:06:08	0.050	0.0371	-0.0335	0.524	0.144	
05:36:48.7	-69:17:00	0.199	-0.1972	0.0300	0.374	0.120	

Notes to Table 2.

* An asterisk indicates that there are multiple sets of observations of this star. The line of data above or below the asterisk refers to independent observations of the same star.

It should be noted that Min I is defined as the deeper eclipse. The results of the fitting are given in Tables 1 and 2, and the fitted quantities themselves are listed in a large table, Table 4. This table is presented in its complete form in the AAS CD-ROM Series, Vol. 9, 1997. The first page of this table is presented here for guidance regarding its form and content. The fitting results are displayed in 1274 light curve plots (637 postscript figures in the AAS CD-ROM Series, Vol. 9, 1997).

Table 4 contains the fitted orbital elements and their uncertainties. J_s is the secondary surface brightness ($J_p = 1$), r_p is the radius of the primary, k is the ratio of radii, x is the limb-darkening coefficient, i is the orbital inclination in degrees, $e \cos \omega$ and $e \sin \omega$ are the components of the eccentricity, q is the assumed mass ratio, N is the number of observations, and σ is the standard deviation of the residuals from the fit. The quantities $\sigma(...)$ are the estimates of the standard deviations of the fitted quantities. If a value of $\sigma(...)$ is exactly 0, then the corresponding variable was fixed at the given value for the fitting. The quantities k, x, and q were always fixed at reasonable values.

TABLE 3. Statistics of orbital period determinations.

Period Range Min. (days)	Period Range Max. (days)	Number of Stars	Standard Deviation of Differences (days)	σ (days)
0.0	1.0	40	0.000021	0.000011
1.0	2.0	137	0.000108	0.000054
2.0	3.0	89	0.000149	0.000075
3.0	4.0	44	0.000572	0.000286
4.0	5.0	22	0.000786	0.000393
5.0	15.0	21	0.001664	0.000832
15.0	30.0	10	0.014105	0.007053
30.0	156.0	15	0.063039	0.031520

Notes to Table 3.

σ is the standard deviation of the averaged periods listed in Table 1.

Although only 64 of our binaries have eccentric orbits, we have made a preliminary analysis to look for an effect similar to the "Barr effect" (Howarth 1993; Fracastoro 1979), an apparent preference for the orbital orientation of Milky Way binary stars. We find no significant preference for the longitude of periastron to lay in any particular quadrant for LMC eclipsing binaries.

The statistics of occurrence of each decimal classification type is given in Table 5. The most common type is EA/2 (22%). In terms of the traditional types, 77% are EA and 23% are EB. The EBs are mainly the geometrically largest types: 3, 6, and 9.

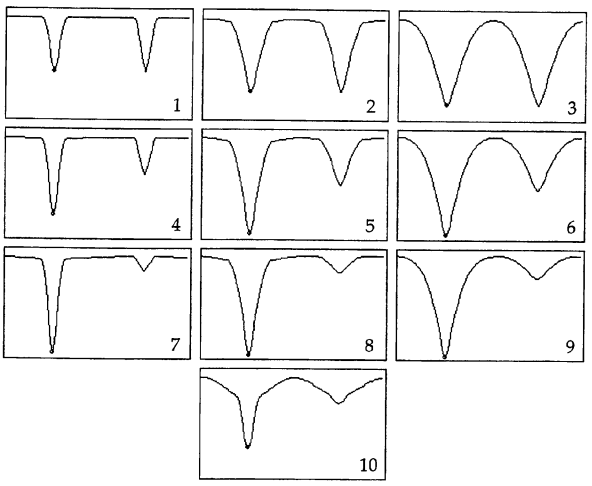

FIG. 2. The decimal classification scheme for eclipsing binary light curves. The sum-of-radii axis runs horizontally across the types. The secondary's surface-brightness axis runs vertically across the types. Type 10 binaries are "Algol-like."

TABLE 4. Photometric orbital parameters.*

α (J2000.0)	δ (J2000.0)	Color	J_s	$\sigma(J_s)$	r_p	$\sigma(r_p)$	k	x	i	σ(i)	e cos ω	σ(e cos ω)	e sin ω	σ(e sin ω)	q	N	σ	Notes
04:49:51.9	-67:41:38	V	0.964	0.064	0.448	0.008	1.00	0.46	51.8	1.3	0.0000	0.0000	0.0000	0.0000	0.95	120	0.023	
		R	1.007	0.064	0.442	0.008	1.00	0.33	53.6	1.3	0.0000	0.0000	0.0000	0.0000	0.95	126	0.027	
04:49:52.1	-67:42:10	V	0.985	0.017	0.298	0.002	1.00	0.38	83.5	0.3	0.0000	0.0000	0.0000	0.0000	0.95	117	0.018	
		R	0.993	0.012	0.299	0.002	1.00	0.28	83.6	0.2	0.0000	0.0000	0.0000	0.0000	0.95	127	0.014	
04:53:45.9	-67:40:00	V	0.981	0.080	0.328	0.010	1.00	0.49	71.6	1.2	0.0000	0.0000	0.0000	0.0000	0.95	122	0.059	
		R	0.943	0.073	0.330	0.009	1.00	0.35	70.3	1.1	0.0000	0.0000	0.0000	0.0000	0.95	121	0.060	
04:53:46.5	-68:21:54	V	0.941	0.051	0.471	0.008	1.00	0.49	60.4	1.3	0.0000	0.0000	0.0000	0.0000	0.95	118	0.035	
		R	0.933	0.046	0.485	0.009	1.00	0.36	59.9	1.3	0.0000	0.0000	0.0000	0.0000	0.95	112	0.031	
04:53:48.7	-68:10:53	V	0.105	0.008	0.210	0.006	1.21	0.49	90.0	0.0	0.0000	0.0000	0.0000	0.0000	0.75	117	0.032	
		R	0.115	0.022	0.254	0.006	0.94	0.36	90.0	0.0	0.0000	0.0000	0.0000	0.0000	0.75	117	0.059	
04:53:50.7	-68:08:40	V	1.131	0.110	0.212	0.008	1.00	0.50	79.9	0.9	0.0000	0.0000	0.0000	0.0000	0.95	122	0.042	
		R	0.997	0.119	0.203	0.009	1.00	0.36	79.8	1.0	0.0000	0.0000	0.0000	0.0000	0.95	121	0.050	
04:54:05.9	-67:43:49	V	1.046	0.079	0.190	0.009	1.00	0.48	80.7	0.7	0.0000	0.0000	0.0000	0.0000	0.95	124	0.055	
		R	0.945	0.072	0.208	0.009	1.00	0.37	79.2	0.8	0.0000	0.0000	0.0000	0.0000	0.95	109	0.044	
04:54:24.5	-69:06:49	V	0.306	0.018	0.198	0.003	1.50	0.49	78.1	0.7	0.0000	0.0000	0.0000	0.0000	0.25	119	0.024	
		R	0.317	0.018	0.203	0.004	1.50	0.36	80.8	1.3	0.0000	0.0000	0.0000	0.0000	0.25	44	0.020	
04:54:25.7	-69:12:59	V	0.803	0.050	0.429	0.008	1.00	0.50	64.8	1.2	0.0000	0.0000	0.0000	0.0000	0.95	125	0.044	
		R	0.842	0.067	0.430	0.011	1.00	0.36	65.6	1.6	0.0000	0.0000	0.0000	0.0000	0.95	66	0.052	
04:54:41.6	-68:46:58	V	0.953	0.031	0.391	0.004	1.00	0.47	73.8	0.6	0.0000	0.0000	0.0000	0.0000	0.95	122	0.035	
		R	0.920	0.036	0.393	0.005	1.00	0.37	74.0	0.7	0.0000	0.0000	0.0000	0.0000	0.95	133	0.035	
04:54:50.3	-68:58:52	V	0.742	0.029	0.293	0.004	1.00	0.42	75.2	0.5	0.0000	0.0000	0.0000	0.0000	0.95	132	0.038	
		R	0.736	0.038	0.283	0.006	1.00	0.31	76.4	0.6	0.0000	0.0000	0.0000	0.0000	0.95	69	0.030	
04:54:59.0	-68:51:29	V	0.080	0.033	0.221	0.018	1.50	0.61	66.8	2.8	0.0000	0.0000	0.0000	0.0000	0.25	104	0.054	
		R	0.090	0.000	0.242	0.010	1.50	0.48	60.5	2.2	0.0000	0.0000	0.0000	0.0000	0.25	121	0.048	
04:55:12.8	-68:52:25	V	0.949	0.073	0.205	0.009	1.00	0.42	77.7	0.8	0.0000	0.0000	0.0000	0.0000	0.95	127	0.031	
		R	0.877	0.066	0.215	0.009	1.00	0.31	76.9	0.9	0.0000	0.0000	0.0000	0.0000	0.95	134	0.032	
04:55:20.8	-68:51:10	V	0.988	0.051	0.184	0.005	1.00	0.50	81.9	0.5	0.0688	0.0028	0.1518	0.0337	0.95	122	0.035	
		R	0.960	0.086	0.190	0.008	1.00	0.35	80.7	0.7	0.0622	0.0041	0.1247	0.0493	0.95	129	0.043	
04:55:32.8	-68:53:38	V	0.920	0.044	0.381	0.005	1.00	0.49	72.1	0.8	0.0000	0.0000	0.0000	0.0000	0.95	119	0.028	
		R	0.892	0.042	0.391	0.005	1.00	0.35	71.1	0.8	0.0000	0.0000	0.0000	0.0000	0.95	131	0.029	
04:55:33.1	-69:15:42	V	0.799	0.015	0.340	0.003	1.00	0.36	77.6	0.3	0.0000	0.0000	0.0000	0.0000	0.95	109	0.017	
		R	0.825	0.021	0.343	0.004	1.00	0.27	77.7	0.5	0.0000	0.0000	0.0000	0.0000	0.95	70	0.020	
04:55:34.3	-68:05:07	V	0.839	0.043	0.285	0.006	1.00	0.47	73.5	0.7	0.0000	0.0000	0.0000	0.0000	0.95	95	0.033	
		R	0.852	0.057	0.294	0.008	1.00	0.38	71.7	1.0	0.0000	0.0000	0.0000	0.0000	0.95	117	0.045	
04:55:44.0	-68:53:48	V	0.998	0.035	0.297	0.005	1.00	0.49	78.4	0.6	0.0000	0.0000	0.0000	0.0000	0.95	63	0.027	
		R	0.976	0.024	0.293	0.004	1.00	0.35	79.8	0.4	0.0000	0.0000	0.0000	0.0000	0.95	126	0.030	
04:55:58.6	-69:13:49	V	0.227	0.021	0.221	0.006	0.85	0.51	87.6	0.8	0.0000	0.0000	0.0000	0.0000	0.75	127	0.058	
		R	0.294	0.024	0.294	0.009	0.85	0.40	81.4	0.7	0.0000	0.0000	0.0000	0.0000	0.75	131	0.057	

*Table 4 can be found in the AAS CD-ROM Series, Vol. 9, 1997.

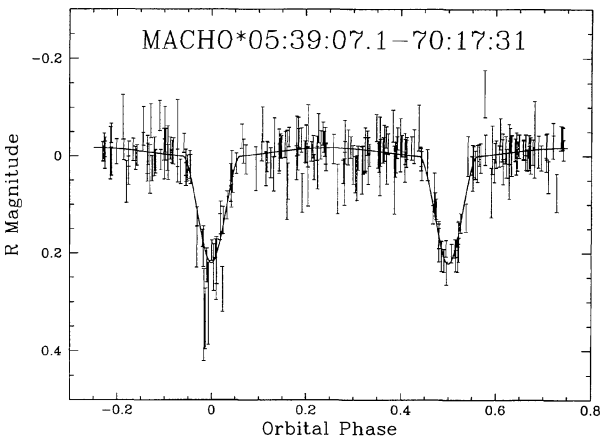

FIG. 3. A light curve classified as EA/1.

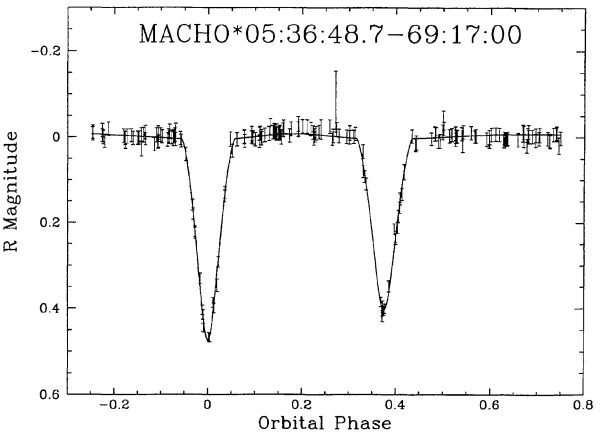

FIG. 4. A light curve classified as EA/1. This binary is eccentric—note that the secondary eclipse does not fall at the phase of 0.5.

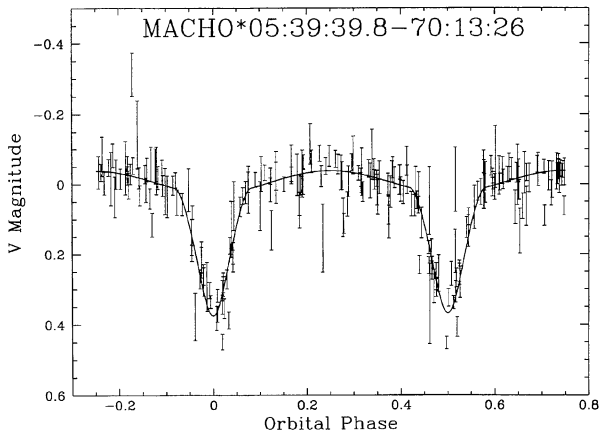

FIG. 5. A light curve classified as EA/2.

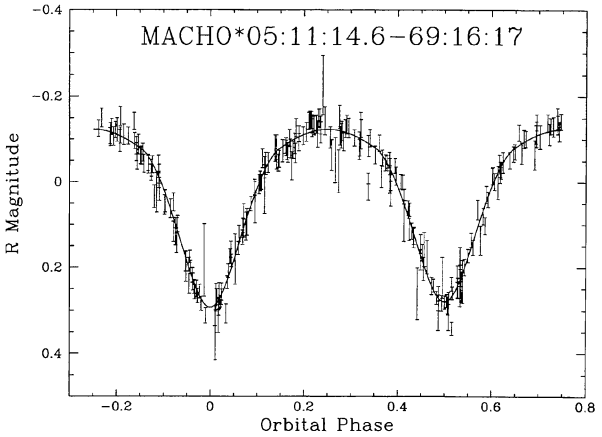

FIG. 6. A light curve classified as EB/3.

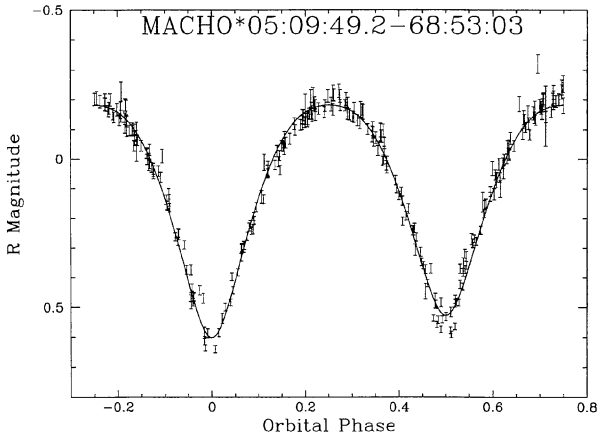

FIG. 7. Another light curve classified as EB/3.

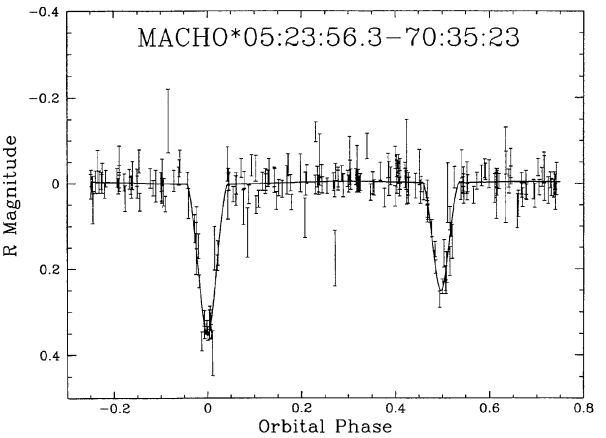

FIG. 8. A light curve classified as EA/4.

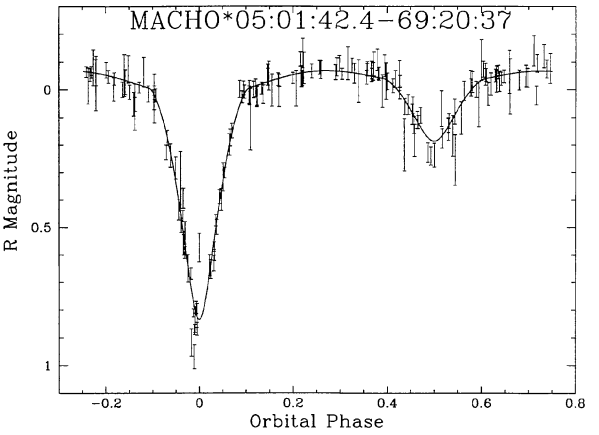

FIG. 9. A light curve classified as EA/5.

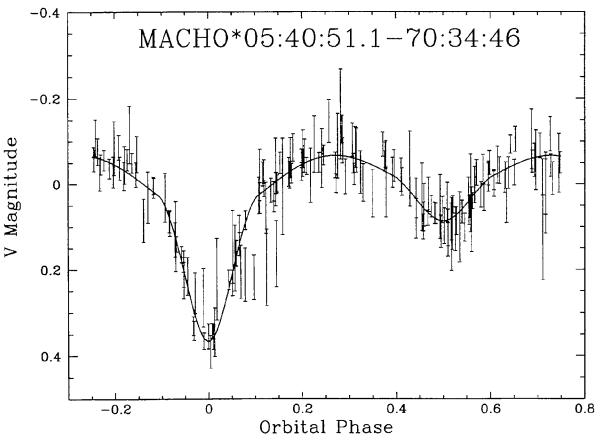

FIG. 10. A light curve classified as EB/6.

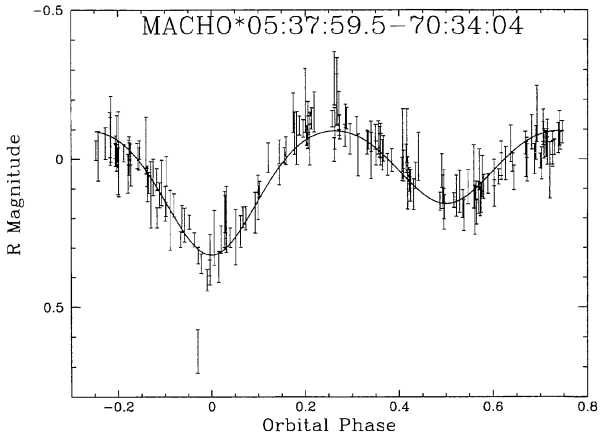

FIG. 11. Another light curve classified as EB/6. Note the lack of fit in the maximum after primary minimum.

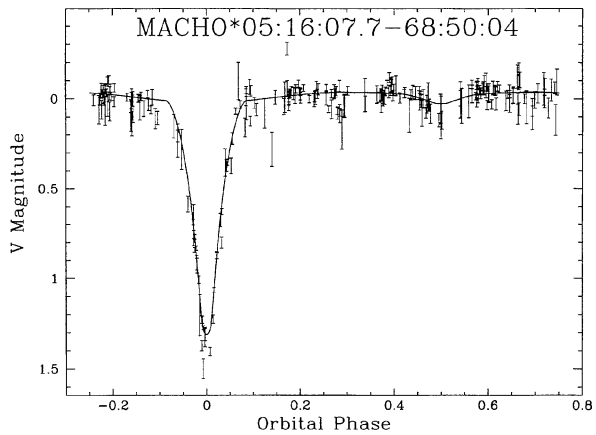

FIG. 12. A light curve classified as EA/7.

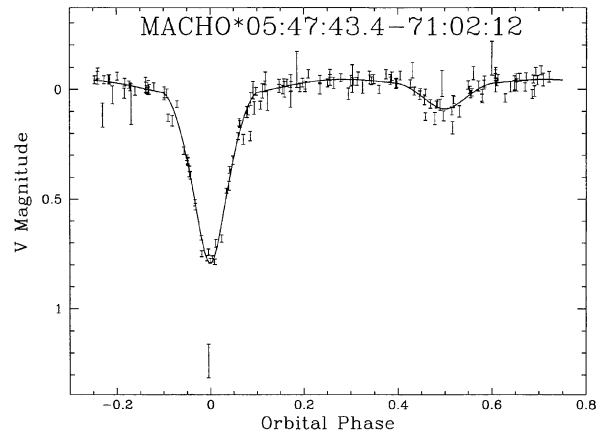

FIG. 13. A light curve classified as EA/8.

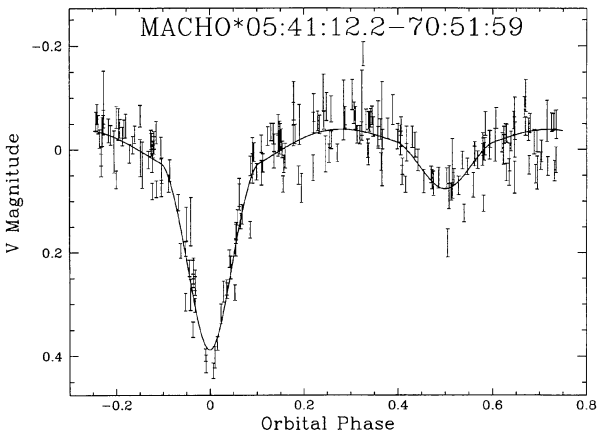

FIG. 14. A light curve classified as EA/9.

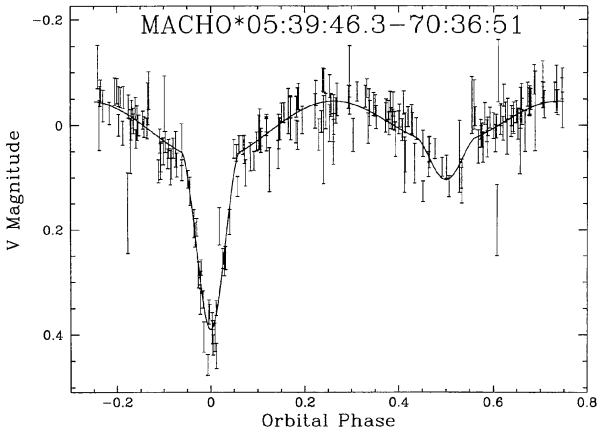

FIG. 15. A light curve classified as EA/10. Note the broad and deep "wings" on primary eclipse. These are due to the secondary star being larger, fainter, and much less massive than the primary star.

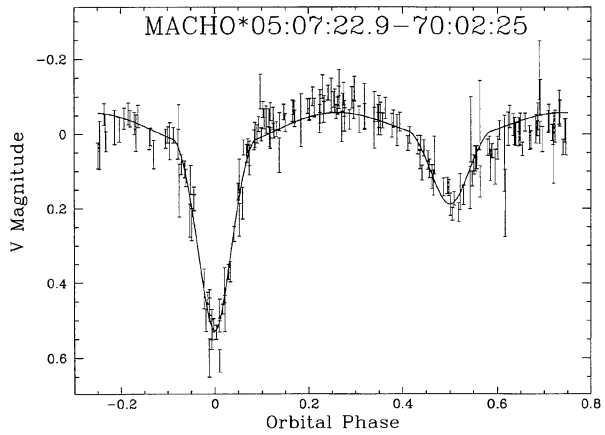

FIG. 16. A light curve classified as EA/10 with the note "Asymmetric LC." Note that observations after secondary eclipse are systematically fainter than those prior to the eclipse.

TABLE 5. Statistics of the classification types.

Type	Frequency (%)
1	20.2
2	21.8
3	16.6
4	1.6
5	4.6
6	7.0
7	4.2
8	13.8
9	1.3
10	8.9

This paper is not the first to provide photometric orbits of LMC eclipsing binaries—see for instance Bell *et al.* (1993), Pritchard *et al.* (1994), Tobin *et al.* (1993), and West *et al.* (1992). It does, however, give a large number of orbits that may be useful in planning, for example, spectroscopic observations to measure radial velocities. In fact, such programs have already begun (Niemela & Bassino 1994). This kind of work will result in distance determinations with an accuracy of 10% or so, through stellar surface brightness methods (Lacy 1977; Popper 1980). Ultimately these results will lead to a new estimate of the distance modulus to the LMC independent of other methods.

We are very grateful for the skilled support given our project by the technical staff at the Mt. Stromlo Observatory. Work performed at LLNL is supported by the DOE under contract W7405-ENG-48. Work performed by the Center for Particle Astrophysics on the UC campuses is supported in part by the Office of Science and Technology Centers of NSF under cooperative agreement AST-8809616. Work performed at MSSSO is supported by the Bilateral Science and Technology Program of the Australian Department of Industry, Technology and Regional Development. K.G. acknowledges a DOE OJI grant, and C.W.S. and K.G. thank the Sloan Foundation for their support. D.L.W. was a Natural Sciences and Engineering Research Council (NSERC) University Research Fellow during this work. C.H.S.L. acknowledges support from the American Astronomical Society through the Edith J. Woodward Award.

REFERENCES

Bell, S. A., Hill, G., Hilditch, R. W., Clausen, J. V., & Reynolds, A. P. 1993, MNRAS, 265, 1047
Bessell, M. S. 1979, PASP, 91, 589
Etzel, P. B. 1981, in Photometric and Spectroscopic Binary Systems, edited by E. B. Carling and Z. Kopal (Reidel, Dordrecht), pp. 111–120
Farinella, P., & Paolicchi, P. 1978 Ap&SS, 54, 389
Fracastoro, M. G. 1979, A&A, 78, 112
Gaposchkin, S. I. 1972, SAO Special Report No. 310
Grison, P., *et al.* 1995, A&AS, 109, 447
Howarth, I. D. 1993, Observatory, 113, 75
Kholopov, P. N. 1985, General Catalogue of Variable Stars (Nayka, Moscow)
Lacy, C. H. 1977, ApJ, 213, 458
Lacy, C. H. S. 1993, BAAS, 25, 809
Martynov, D. Ya. 1973, in Eclipsing Variable Stars, edited by V. P. Tsesevich (Halsted, New York)
Niemela, V. S., & Bassino, L. P. 1994, ApJ, 437, 332
Payne-Gaposchkin, C. H. 1971, Smithsonian Contr. Ap., No. 13
Popper, D. M. 1980, ARA&A, 18, 115
Popper, D. M., & Etzel, P. B. 1981, AJ, 86, 102
Pritchard, J. D., Tobin, W., & Clark, M. 1994, Experimental Astron., 5, 43
Reimann, J. 1994, Ph.D. thesis, University of California at Berkeley, Department of Statistics, "Frequency Estimation Using Unequally-Spaced Astronomical Data"
Tobin, W., Duncan, S. P. R., West, S. R. D., & Gilmore, A. C. 1993 MNRAS, 260, 777
Wade, R. A., & Rucinski, S. M. 1985, A&AS, 60, 471
West, S. R. D., Tobin, W., & Gilmore, A. C. 1992, MNRAS, 254, 419
Wilson, R. E. 1979 ApJ, 234, 1054