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ICCD SPECKLE OBSERVATIONS OF BINARY STARS. XIII. MEASUREMENTS DURING 1989–1994 FROM THE CERRO TOLOLO 4 M TELESCOPE

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ABSTRACT

Nine hundred eighty-nine observations of 694 binary star systems, observed by means of speckle interferometry with the 4 m telescope on Cerro Tololo, are presented. Included in these observations are three new interferometric binaries and new interferometric companions to four visual binaries. These measurements, made during the period 1989–1994, comprise the 13th installment of digital results stemming from our speckle program at several major observatories, and the 23rd list since the program's inception in 1975. © *1996 American Astronomical Society.*

1. INTRODUCTION

This paper is the 13th in a current series of reports on our continuing effort to provide high-accuracy, high-angular-resolution measurements of binary star systems by speckle methods. We here present measurements from the CTIO 4 m telescope, obtained mainly during runs in 1989 December, 1990 November/December, 1991 September, 1992 June, 1993 February, and 1994 April. These observations represent a continuation of our goal, expressed in paper 5 of this series (McAlister *et al.* 1990), to extend to southern binaries a recurring inspection by speckle interferometry.

The nine CTIO 4 m runs made by CHARA to date have yielded a total of 3144 observations (including 457 negative results) of 1880 stars. The number of interferometric measures of "far-southern" binaries (i.e., binaries with $\delta < -25°$, so not observable from northern telescopes) has increased by more than a factor of 5 in as many years. Some 21 new interferometric binaries have been discovered, as well.

2. NEW MEASUREMENTS

Data gathered before 1991.717 (i.e., those obtained through the first part of the 1991 September run) were taken using an intensified RCA CCD camera, as described by McAlister *et al.* (1987); later data were collected using an ITT ICCD speckle camera (see Mason *et al.* 1993). Virtually all data were reduced utilizing the "directed vector autocorrelation" algorithm described by Bagnuolo *et al.* (1992). Scale calibration of data obtained during this period at Kitt Peak National Observatory was made using a double-slit pupil mask, as described by McAlister *et al.* (1987). Such a mask was not available at CTIO; however, our CTIO data were tied to the KPNO results by observing numerous equatorial-region binaries from both locations. An independent θ calibration for each run was determined by trailing a star across our acquisition field with the telescope drive off.

The GSU speckle camera was scheduled for a total of 28 nights during these six CTIO runs. Only four nights were lost to weather, although observing on several other nights was slowed by high extinction and/or poor seeing. During these 24 nights we were able to obtain over 3750 observations. Most of the 1989, 1992, and 1993 observations have already been published in papers 8 and 10 of this series (Hartkopf *et al.* 1993; McAlister *et al.* 1993), although a few 1993 observations were published in a study of the O star 15 Monocerotis by Gies *et al.* (1993). After removing these stars, as well as observations of calibration objects and unresolved stars and data of poor quality, and after averaging observations of stars observed using more than one filter, we are left with 989 observations of 694 stars.

Seven newly discovered companions, including four additional components to known binary systems, are included in these totals. Table 1 gives a brief description of these

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TABLE 1. New interferometric components.

α, δ (2000)	DM Number	HD Number	CHARA Number	V	ΔV_{est} (mag)	Spectral Type	Discovery Epoch	Discovery Separation	P_{est} (yrs)
04049−3527	CD−35° 1544	25926	224 AC	7.7	0.2	G2 V	1990.9188	1″.275	450
05162−1121	BD−11 1117	34318	225	6.5	0.6	G8 III + A0 V	1989.9387	0.061	15
08250−4246	CD−42 4219	71302	226 Aa	6.0	1.1	B3 V	1989.3110	0.049	50
10445−7051	CP−70 1185	93359	227 Ba	6.5	2.0	A6 IV	1990.3489	0.612	550
13031−7129	CP−70 1553	113120	228	6.0	1.5	B1.5 III	1990.3464	0.557	3600
17316−2616	CD−26 12152	158704	229	6.1	1.3	B9 II/III	1992.4550	0.352	500
22116−3428	CD−35 15193	210525	230 Aa	6.7	1.5	K1-2 III	1990.9211	0.141	100

TABLE 2. Binary star speckle measurements.[a]

WDS α, δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (°)	ρ (″)	$\lambda/\Delta\lambda$ (nm)	WDS α, δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (°)	ρ (″)	$\lambda/\Delta\lambda$ (nm)
00003−4417	I 1477	224750	91.7128	316.4	0.456	549/22	01089−2937	I 262	6868	90.9213	104.3	0.510	549/22
00039−5750	I 700	225158	89.9409	297.7:	0.453:	538/76				91.7130	103.0	0.513	549/22
00090−5400	HdO 181	469	90.9155	89.2	0.254	549/22	01150−6849	I 27 CD	7693	91.7130	229.9	0.900	549/22
			91.7128	84.1	0.256	549/22	01193−3429	Bu 1229	8040	91.7129	279.5	0.878	549/22
00093−2759	Bu 391 AB	493	91.7128	260.9	1.433	549/22				91.7186	280.3	0.868	538/76
			91.7184	261.0	1.429	549/22	01196−0520	A 313	8032	89.9410	7.9:	0.262:	538/76
00102−4909	Hu 1328	577	90.9211	264.8	0.965	549/22				90.9185	6.1	0.260	549/22
00106−7314	I 43 AB	661-2	89.9326	46.6	0.285	549/22				91.7157	4.0	0.254	549/22
			90.9155	43.3	0.290	549/22	01198−0029	StF 113 A,BC	8036	91.7129	16.6	1.553	549/22
00126−1142	Rst 3343	821	89.9410	225.7:	0.265:	538/76				91.7185	16.9	1.568	549/22
00173+0852	A 1803 AB	1317	91.7156	126.0	0.174	549/22	01198−0029	Fin 337 BC	8036	90.9156	309.9	0.096	549/22
00183−2108	Bu 393	1431	91.7129	24.5	0.619	549/22				90.9240	309.6	0.098	549/22
			91.7184	24.1	0.623	549/22				91.7129	330.9	0.092	549/22
00202−3554	I 701	1611	91.7129	58.0	0.627	549/22	01199−1548	HJ 2036	8071	91.7129	343.8	2.171	549/22
00283−2020	B 1909	2475	90.9155	286.1	0.172	549/22	01218−2408	See 13	8281	91.7157	173.3	1.135	549/22
			91.7129	296.1	0.198	549/22	01220−6943	I 263	8519	90.9131	256.1	0.555	549/22
			91.7184	296.5	0.197	549/22				91.7130	255.7	0.548	549/22
00286−4820	Rst 9	2513	90.9213	48.0	0.153	549/22	01245−2519	B 18	8603	90.9213	316.5	0.171	549/22
00321−1813	B 1910	2894	89.9410	13.1	0.050	549/22	01259−4754	Rst 33	8821	90.9213	306.3	1.039	549/22
			90.9155	31.3	0.055	549/22				91.7130	305.9	1.033	549/22
00321−0511	A 111 AB	2880	90.9185	70.7	0.158	549/22	01262−6751	Don 17	8944	90.9213	281.1	0.982	549/22
00335−5520	I 45 AB	3075	91.7211	212.1	0.634	538/76	01262−3828	I 711	8806	90.9213	221.7	0.586	549/22
00345−0433	D 2 AB	3125	90.9156	265.3	0.367	549/22	01276−2520	I 444	8933	90.9213	104.0	0.558	549/22
			91.7129	265.2	0.355	549/22				91.7157	103.7	0.559	549/22
			91.7185	265.4:	0.350:	549/22	01284−1554	Rst 3355	8999	90.9186	340.7	0.608	549/22
00352−0336	Ho 212 AB	3196	90.9156	264.1	0.294	549/22				91.7240	340.4:	0.602:	538/76
			91.7129	275.4	0.290	549/22	01296−5230	Rst 5494	9221	90.9213	130.1	0.419	549/22
			91.7156	275.6	0.290	549/22				90.9240	129.9	0.416	538/76
			91.7185	276.0	0.287	549/22	01316−5322	I 264 AB	9438	90.9213	42.4	0.812	549/22
			91.7267	275.2	0.286	549/22				91.7130	42.3	0.813	549/22
00372−2446	Bu 395	3443	90.9155	113.0	0.749	549/22				91.7212	42.1:	0.813:	538/76
			91.7129	114.6	0.707	549/22	01331−6137	Rst 2263	9664	90.9213	180.3	0.697	549/22
			91.7184	115.0	0.707	549/22	01350−2955	Daw 31 AB	9770	90.9156	353.9	0.167	538/76
00427−6537	I 440	4125	90.9155	281.3	0.339	549/22				91.7129	74.0	0.140	549/22
00427−3828	HdO 182	4065	91.7129	14.3	0.732	549/22	01361−2954	HJ 3447	9906	91.7129	154.1	0.810	549/22
00479−2921	I 261	4623	90.9155	51.5	0.097	549/22				91.7212	154.4:	0.820:	549/22
00517−5009	B 1414	5043	89.9409	37.7:	0.648:	538/76	01376−0924	Kui 7	10009	91.7267	158.3:	0.201:	549/22 *
			90.9211	37.9	0.657	549/22	01408−2022	Rst 2265	10369	90.9186	109.0	0.240	538/76
00519−4343	I 47	5042	91.7156	19.4	0.858	549/22				91.7240	108.8:	0.239:	538/76
00532+0406	A 2307	5143	90.9156	48.0	0.301	549/22	01421−1808	Smw 1	10520	90.9186	11.0	0.326	549/22
			91.7129	47.9	0.295	549/22				91.7240	10.5:	0.319:	538/76
00533−4530	B 644	5218	89.9355	334.2	0.278	538/76	01424−0646	A 1	10508	90.9185	244.2	0.785	549/22
			90.9131	334.1	0.279	549/22				91.7130	244.2	0.787	549/22
00569−5153	B 1418	5578	90.9213	101.4	0.248	549/22	01425−1219	Hu 10	10535	90.9186	318.1	0.806	549/22
00569−1507	Hu 1208	5522	90.9186	214.7	0.905	549/22				91.7240	318.3:	0.801:	538/76
00574−3957	B 1419	5626	89.9355	243.4	0.457	538/76	01430−5451	Slr 3	10687	90.9213	211.8	0.586	549/22
			90.9213	243.0	0.450	549/22				91.7130	212.4	0.581	549/22
00579−6634	I 48	5756	90.9131	10.6	0.405	549/22	01477−4358	I 52	11057	90.9156	42.2	0.319	538/76
			90.9156	11.0	0.408	549/22				91.7130	41.1	0.326	549/22
			91.7157	10.6	0.404	549/22	01497−1414	Hu 422	11182	90.9186	236.2	0.206	549/22
00593−0040	A 1902	5781	89.9355	184.5	0.329	538/76				91.7130	234.4	0.212	549/22
			90.9156	186.6	0.325	549/22	01497−1022	Bu 1168	11181	90.9185	216.7	0.189	549/22
			91.7157	186.7	0.324	549/22				91.7157	216.7	0.195	549/22
			91.7185	188.3	0.322	549/22	01519−2309	I 450	11435	90.9131	220.5	0.493	549/22
00596−0112	A 1903 AB	5805	89.9410	334.1:	0.355:	538/76				91.7130	221.1	0.491	549/22
			90.9185	337.1	0.371	549/22				91.7186	220.2:	0.492:	538/76
01007−5235	I 49	6013	90.9131	29.9	0.278	549/22	01528−0447	Rst 4188	11488	89.9410	18.9:	0.462:	538/76
			91.7130	29.3	0.267	549/22				90.9185	17.5	0.492	549/22
01036−4415	B 1421	6317	90.9213	170.4	0.185	549/22	01541−7730	Jsp 31	12121	90.9131	123.3	0.117	549/22
01037−3024	B 649	6307	90.9213	240.1	0.788	549/22				90.9240	122.9	0.117	549/22
			91.7240	239.4	0.787	538/76	01558+0151	StF 186	11803	91.7185	58.7	1.146	549/22
01039−4039	HJ 3415	6354	91.7130	137.6	0.966	549/22	01559−2150	Don 27	11840	90.9186	43.2	0.340	549/22
			91.7186	137.8:	0.976:	549/22				91.7130	42.2	0.336	549/22
01048+0135	A 2310	6387	90.9240	322.0	0.294	549/22	01596−0623	Rst 4190	12188	90.9159	313.7:	0.175:	538/76
01061−4643	Slr 1 AB	6595	90.9131	305.8	0.633	549/22				91.7240	316.1:	0.182:	538/76
			91.7130	303.4	0.601	549/22	01598−5034	Rst 45	12361	90.9159	262.5	0.405	549/22
			91.7240	304.1	0.607	549/22				91.7130	262.6	0.393	549/22
01078−4129	Rst 3352	6767	90.9131	301.1	0.265	549/22	02009−4350	I 265	12439	90.9158	209.3	0.327	549/22
			91.7130	303.9	0.279	549/22				90.9240	209.3	0.326	549/22
			91.7186	304.8	0.283	549/22				91.7130	211.1	0.345	549/22
			91.7240	304.9:	0.282:	549/22	02026+0905	McA 4	12483	91.7157	145.6	0.232	549/22

TABLE 2. (continued)

WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (o)	ρ (″)	λ/Δλ (nm)
02029−2804	Rst 1229	12598	89.9330	286.4:	0.325:	538/76
			90.9159	286.5	0.329	538/76
02052−0058	Bu 516	12774	90.9187	310.3	0.684	549/22
			91.7130	311.2	0.691	549/22
02076−7434	Jsp 36	13529	90.9214	104.7	0.899	549/22
			91.7158	103.4	0.899	549/22
02097+0048	A 2325	+00 358	90.9159	119.5	0.248	538/76
02151−3948	Rst 2276	14005	89.9330	120.5:	0.328:	538/76
02232−2952	Bu 738	14882	90.9131	214.1	1.286	549/22
			91.7131	213.7	1.311	549/22
			91.7186	213.6	1.318	549/22
02243−0155	Rst 4204	14904	90.9159	330.4:	0.289:	538/76
			91.7158	329.3	0.290	549/22
02277+0426	A 2329	15285	91.7157	87.0	0.328	549/22
02278−3642	B 671	15402	90.9213	251.6	0.647	549/22
			91.7131	251.8	0.650	549/22
02280−5808	Daw 1 AB	15546	90.9131	212.1	1.142	549/22
			91.7131	212.1	1.145	549/22
02280+0158	Kui 8	15328	90.9132	35.1	0.510	549/22
			91.7157	34.7	0.509	549/22
			91.7188	34.9:	0.514:	549/22
02297−0216	Bu 519	15513	90.9158	77.7:	0.510:	549/22
			91.7158	78.0	0.502	549/22
02299−2606	Rst 1241	15601	90.9159	340.2	0.271	538/76
02317+0244	A 2333	15719	91.7131	30.3	0.327	549/22
02327−0145	A 316	15822	90.9187	96.9	0.608	549/22
			91.7131	96.1	0.595	549/22
02330−3711	B 673	15976	90.9213	222.6	0.751	549/22
02331−6945	B 1921	16292	90.9214	190.6	0.683	549/22
02336−3911	B 674	16056	90.9159	10.5	0.206	538/76
02366+1226	McA 7	16234	89.9331	337.7	0.059	549/22 *
02384−0125	A 450	16453	90.9158	194.3	0.362	538/76
			91.7158	194.3	0.368	549/22
02396−5425	Hu 1350	16795	90.9214	62.2	0.690	549/22
02396−1153	Fin 312	16620	90.9132	274.8	0.085	549/22
			90.9241	277.1	0.085	549/22
			91.7213	63.8:	0.109:	467/16
			91.7241	64.4	0.104	549/22
02397−5934	I 386 BC	16853	89.9329	8.1:	0.444:	538/76
			90.9131	8.9	0.438	549/22
			91.7158	9.2	0.438	549/22
02405−2408	See 19	16753	90.9132	287.8	0.279	549/22
			91.7131	286.9	0.269	549/22
			91.7158	286.9	0.272	549/22
			91.7186	287.5:	0.271:	549/22
02415−7128	B 1923	17215	90.9214	65.2	0.422	549/22
			91.7158	63.9	0.435	549/22
02434−6643	Fin 333	17326	90.9131	213.6	0.345	549/22
			91.7131	214.3	0.317	549/22
			91.7241	213.2:	0.322:	549/22
02437−2240	Rst 2286	17050	90.9159	10.2	0.124	538/76
02442−2530	Fin 379 Aa	17134	90.9131	172.5	0.134	549/22
			90.9240	172.8	0.134	549/22
			91.7212	184.2:	0.146:	538/76
			91.7241	186.1	0.149	549/22
02469−6009	I 268 AB	17600	90.9214	252.9	0.526	549/22
02477+0142	A 2411	17417	90.9158	279.4	0.341	549/22
			91.7131	278.6	0.340	549/22
02492+0040	A 2412	+00 466	90.9187	101.9	0.344	538/76
			91.7159	99.6	0.345	549/22
02513+0141	Vou 36	17780	90.9158	9.0	0.396	549/22
			91.7157	9.6	0.396	549/22
02518−2117	See 21	17881	90.9158	52.9	0.086	549/22
02521−6401	B 1438	−64 204	90.9214	356.2	0.502	549/22
			91.7158	355.8	0.502	549/22
02539−4436	I 1480	18198	90.9159	139.2	0.444	538/76
			91.7131	140.0	0.427	549/22
02562+0031	Rst 4753	18286	90.9187	66.7	0.319	549/22
02563−2857	Daw 77	18387	90.9158	72.8	0.226	549/22
			91.7131	73.3	0.236	549/22
02572−2458	Bu 741 AB	18455	90.9132	332.5	0.908	549/22
02572−2458	(continued)		91.7131	333.0	0.916	549/22
			91.7186	333.2:	0.927:	549/22
02572+0153	A 2413	18368	90.9158	121.2	0.341	549/22
			91.7131	122.9	0.344	549/22
02594−1016	A 2610	18628	89.9331	7.0:	0.422:	538/76
			90.9187	8.0	0.413	549/22
03003−1118	A 2611	18740	89.9330	188.5	0.214	538/76
			90.9159	192.8	0.209	538/76
03038−0542	Rst 4220	−06 595	89.9331	339.5	0.429	538/76
			90.9187	340.6	0.413	549/22
03040−4006	I 1144	19201	90.9159	276.2	0.163	549/22
			91.7159	284.0	0.178	549/22
03059−2509	B 44	19351	90.9159	54.2	0.344	538/76
03066+0046	A 2416	19333	90.9187	7.9	0.570	549/22
			91.7131	8.6	0.568	549/22
03084−0335	Bu 528 AB	19542	89.9412	184.0:	0.377:	538/76
			90.9187	184.2	0.352	549/22
			91.7159	183.1	0.342	549/22
03101−6355	Fin 361 Aa	20060	90.9160	285.6	0.128	538/76
			90.9241	286.2	0.128	549/22
			91.7241	287.5:	0.123:	549/22
03136−4712	Slr 4	20252	90.9188	258.3	0.723	549/22
			91.7131	258.5	0.715	549/22
03140+0044	StF 367	20115	91.7158	140.1	1.131	549/22
			91.7213	139.3:	1.127:	538/76
03161−0555	Bu 84	20319	91.7188	9.7:	0.973:	549/22
03163−6317	I 388	20658	90.9214	251.2	0.450	549/22
			91.7158	251.1	0.446	549/22
03178−6349	B 1446	20821	90.9214	215.8	0.709	549/22
03184−2231	See 23	20610	90.9132	76.8	0.300	549/22
			90.9242	76.8	0.299	549/22
			91.7158	77.8	0.303	549/22
			91.7186	77.9	0.300	549/22
03187−2931	Daw 78	20668	90.9188	299.8	0.259	549/22
03193−5053	Rst 70	20841	90.9188	100.0	0.211	549/22
			90.9241	97.2	0.209	549/22
			91.7133	102.1	0.204	549/22
03223−4119	I 151	21058	91.7133	179.6	1.011	549/22
03246−4651	I 1485	21326	90.9188	248.9	0.740	549/22
03260−3558	B 1449	21434	90.9133	21.3	0.172	538/76
			90.9241	21.4	0.172	549/22
			91.7161	21.8	0.177	549/22
			91.7214	21.7:	0.174:	538/76
03284−0434	Bu 1180 AB	21529	90.9187	23.8	0.473	549/22
			91.7133	23.6	0.468	549/22
03289−3554	B 1453	21720	90.9160	61.5	0.389	538/76
03299−5554	B 50	21982	90.9188	186.7	0.700	538/76
			91.7268	186.3:	0.701:	538/76
03327−6035	Jsp 48	22359	90.9214	84.8	0.744	549/22
			91.7133	84.4	0.741	549/22
03329−1915	See 27	22079	90.9187	351.5	0.584	538/76
			91.7133	352.1	0.575	549/22
03358−2001	Rst 5200	22423	90.9160	105.0:	0.098:	538/76
			90.9242	105.5	0.099	538/76
03372+0121	A 2419	22511	89.9412	99.8:	0.792:	538/76
			91.7133	99.3	0.797	549/22
			91.7159	99.3	0.801	549/22
03379−1133	Hu 22	22606	90.9187	111.3	0.691	538/76
03431+0158	Rst 5201 AB	23173	89.9412	342.0:	0.544:	538/76
03433−2217	Rst 4759	23305	90.9160	225.9	0.106	538/76
			90.9242	223.7	0.109	549/22
03450+0504	A 1828	23403	90.9159	8.9	0.149	538/76
			90.9241	9.3	0.150	549/22
03462−2424	Rst 2321	23686	90.9187	7.1	0.317	549/22
			91.7133	7.2	0.311	549/22
03494−1956	Rst 2324	−20 716	90.9160	57.0	0.117	538/76
			90.9242	57.7	0.120	538/76
03519+0633	Kui 15	24263	91.7159	207.6	0.700	549/22
03526−0829	Rst 4762 AB	24402	90.9242	113.0:	0.097:	538/76
03541−4152	B 1461	24732	90.9188	119.3	0.227	549/22
			90.9242	119.1	0.227	549/22

TABLE 2. (continued)

WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (°)	ρ ($''$)	$\lambda/\Delta\lambda$ (nm)	WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (°)	ρ ($''$)	$\lambda/\Delta\lambda$ (nm)
03544−4021	Fin 344 AB	24744	90.9133	155.8	0.062	538/76	04431−2219	B 689	30022	90.9215	289.2	0.577	549/22
			90.9241	156.5	0.064	549/22				91.7134	288.7	0.574	549/22
			91.7242	173.2:	0.053:	549/22	04431−0725	A 476	29972	89.9332	153.8:	0.784:	538/76
03549−6627	Don 57	25106	90.9214	173.7	0.629	549/22				90.9215	154.1	0.770	549/22
03562−0657	A 462 AB	24781	90.9241	74.5:	0.102:	549/22	04451−6801	Don 81	30759	90.9188	295.0	0.172	549/22
03594−2846	B 61	25243	90.9188	204.1	0.406	549/22				90.9243	295.6	0.165	549/22
			91.7161	204.3	0.412	549/22				91.7268	295.5:	0.156:	549/22
03596−1019	Hu 29	25164	90.9187	309.0	0.425	538/76	04476−7948	I 474	31908	90.9215	88.3	0.572	549/22
			91.7159	308.8	0.426	549/22				91.7268	89.9:	0.579:	549/22
04008+0505	A 1937	25248	90.9159	211.2:	0.138:	538/76	04495−3306	B 1473	30829	90.9215	58.7	0.902	549/22
			90.9187	209.9	0.158	549/22				91.7134	58.7	0.902	549/22
			90.9241	211.1	0.152	549/22	04496−5353	I 342	31027	90.9188	137.3	2.866	549/22
04024−2832	Daw 79	25546	90.9133	11.3	0.285	538/76	04505+0103	A 2622	30763	89.9332	88.0:	0.239:	538/76
			91.7133	7.0	0.272	549/22				90.9216	84.1	0.240	549/22
			91.7188	6.9:	0.269:	549/22				90.9242	85.2:	0.243:	538/76
04037−1545	A 2913	25660	90.9160	343.1	0.088	538/76				93.0924	83.4:	0.248:	538/76
			90.9242	345.0	0.089	538/76	04515−3454	Fin 320	31093	90.9133	230.4	0.236	549/22
04049−3527	I 152 AB	25926	90.9188	72.4	0.823	549/22				90.9243	230.3	0.237	549/22
			91.7133	72.5	0.828	549/22				91.7134	228.8	0.237	549/22
04049−3527	CHARA 224 AC	25926	90.9188	81.7	1.275	549/22 *	04528−0517	Bu 316	31088	90.9215	182.4	0.885	549/22
			91.7133	80.8	1.261	549/22				91.7269	182.3:	0.895:	549/22
04059−4158	Rst 3394	26073	90.9160	299.8	0.182	538/76	04545−0313	Rst 5501	31297	90.9161	33.7	0.229	549/22
			90.9188	295.6	0.183	549/22				91.7216	30.5:	0.224:	549/22
			91.7161	295.6	0.185	549/22	04551−0033	A 1019 AB	31356	90.9161	122.3	0.151	549/22
04067−8044	Rst 2341	27358	90.9215	39.0	0.225	549/22	04553−0352	Rst 4257 AB	31375	89.9332	329.0:	0.261:	nofilter
04069−2200	Hu 1363	26087	90.9132	115.6	0.440	549/22				90.9215	326.8	0.257	549/22
			91.7133	115.4	0.440	549/22				90.9242	326.1:	0.254:	538/76
			91.7188	115.8	0.440	549/22	04562+0311	Stt 91	31466	90.9216	227.3	0.385	549/22
04083−3251	I 153	26301	91.7124	346.1	1.106	549/22	04568−1057	Hu 215	31596	90.9215	299.0	0.689	549/22
			91.7214	346.3	1.116	538/76	04573+0100	A 2624	31622	90.9216	305.7	0.327	549/22
04093−2025	Rst 2333	26347	90.9160	137.7	0.086	538/76	04580−5035	B 1476	32064	89.9358	284.5	0.503	549/22
			90.9242	135.0	0.084	538/76				91.7134	284.1	0.502	549/22
04094−0756	A 469	26294	90.9132	119.6	0.181	549/22	04580−2248	I 473	31837	90.9215	242.0	0.852	549/22
			90.9241	119.9	0.182	549/22	04582−4033	Rst 5210	31986	90.9215	34.8	0.222	549/22
			91.7159	120.7	0.185	549/22				90.9243	33.7:	0.230:	538/76
04164−6057	Gle 1	27463	90.9133	122.4	0.317	549/22	04589+0210	A 2628	+01 873	90.9216	156.6	0.850	538/76
04188−3407	I 724	27470	90.9188	194.6	0.126	549/22	04592−1622	Bu 314 AB	31925	90.9161	329.5	0.617	549/22
04205−0119	Rst 4769	27516	90.9132	202.8	0.183	549/22				90.9243	329.6	0.617	549/22
			91.7159	201.6	0.190	549/22				91.7216	329.0	0.644	538/76
04209−5103	Rst 1271	27826	90.9133	177.0	0.447	538/76	05010−1112	A 2629	32222	90.9161	31.5	0.106	549/22
			91.7161	176.7	0.448	549/22				90.9242	30.8	0.106	549/22
04215−2544	Bu 744 AB	27710	90.9133	339.2	0.500	549/22	05012−7420	Hrg 2	33244	90.9215	169.6	0.783	549/22
			91.7133	341.3	0.484	549/22	05030−1226	Bu 884	32470	90.9218	189.7	0.624	549/22
			91.7188	341.7:	0.488:	549/22	05041+0257	A 2632	32541	90.9189	124.6	0.942	549/22
04243−4856	Rst 103	28174	90.9215	264.9	0.583	549/22	05043−0602	A 481	32622	90.9216	299.3	0.457	549/22
04258−2845	Hu 1369	28195	90.9215	312.0	0.353	549/22	05089+0313	A 2636	33236	90.9161	160.4	0.293	549/22
04269−2405	Bu 311	28312	90.9135	128.2	0.482	549/22	05103−0735	A 484	33507	90.9216	129.5	0.189	549/22
			91.7133	128.9	0.480	549/22				90.9243	129.0	0.190	549/22
			91.7188	129.4:	0.483:	549/22	05109−0146	Bu 885	33546	90.9216	196.9	0.614	549/22
04275−2427	I 413	28368	90.9215	305.0	0.514	549/22	05117+0031	Hu 33	33647	90.9161	359.7	0.119	549/22
04279−2130	Bu 184	28396	90.9215	249.8	1.779	549/22				90.9244	359.5	0.120	549/22
			91.7159	249.6	1.783	549/22	05126−3429	Daw 116	33999	90.9243	110.8	0.680	538/76
04302−1747	B 1937	28637	90.9161	55.8	0.217	549/22	05134+0158	Stt 517 AB	33883-4	89.9333	237.1	0.565	549/22
04308+0427	A 1838	+04 702	90.9216	154.2	0.938	549/22				90.9189	236.9	0.566	549/22
04313−3546	I 154	28849	90.9133	135.3	0.485	538/76				91.7271	236.6:	0.572:	549/22
			91.7134	135.2	0.486	549/22	05159+0345	A 2638	34211	90.9189	93.2	1.009	549/22
04326−2512	Rst 2348	28936	90.9215	348.3	0.327	549/22	05161−2945	Daw 84	34434	90.9243	100.5	0.592	538/76
			91.7134	347.6	0.329	549/22	05162−1121	CHARA 225	34318	89.9387	51.6	0.061	549/22 *
04350−5243	I 728	29398	90.9189	65.8	0.563	549/22				93.0923	55.7	0.051	549/22
04371−5452	Rst 110	29640	90.9188	326.9	0.641	549/22	05162−0329	Bu 318	34280	90.9216	260.4	0.619	549/22
			91.7134	321.6	0.640	549/22	05164−0139	A 844	34307	90.9216	159.8	0.170	549/22
04374−0951	Rst 3401	29392	90.9215	295.0	0.317	549/22	05165−2106	Don 97	34432	90.9243	229.5	0.293	549/22
04385−0524	Rst 4249	29491	90.9215	47.6	0.511	549/22	05181+0342	A 2639	34501	90.9189	286.3	0.811	549/22
04407−0112	Rst 4772	29708	90.9215	294.9	0.604	549/22	05190−2159	Rst 2375	34779	90.9243	328.7	0.285	549/22
04417−5219	B 1469	30082	90.9188	259.1	0.449	549/22	05204−0802	Bu 190 AB	34892	90.9216	331.9	0.618	549/22
			91.7134	258.5	0.446	549/22	05221−8102	Rst 2387	37134	90.9136	298.1	0.617	549/22
04422+0259	A 2424	29839	90.9161	38.5	0.083	538/76	05227+0008	A 2642	35135	89.9414	53.2	0.523	538/76
04425−2059	Don 75	29961-2	90.9135	85.8	0.167	538/76				90.9189	52.5	0.531	549/22
			90.9243	85.9	0.168	549/22	05231−0806	A 486	35261	90.9216	72.4	0.598	549/22
04426−5210	B 1470	30186	90.9188	96.8	0.481	549/22	05248−5219	I 345 AB	35860	90.9135	48.8	0.117	549/22
04429−4859	Rst 2356	30184	90.9215	60.3	0.361	549/22				91.7271	41.5:	0.114:	549/22

TABLE 2. (continued)

WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (o)	ρ ($''$)	$\lambda/\Delta\lambda$ (nm)	WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (o)	ρ ($''$)	$\lambda/\Delta\lambda$ (nm)
05249−5810	I 390	35977	90.9163	344.0	0.143	538/76	06133−0624	A 666 AB	42924	90.9191	35.3	0.502	549/22
			90.9243	344.2:	0.148:	549/22				91.7161	35.3	0.501	549/22
05255−0033	A 848	35548	90.9161	166.0	0.242	549/22	06143−1729	A 3025	43218	90.9218	112.4	0.571	549/22
05268−6436	I 1150	36401	90.9163	108.0	0.188	538/76				91.7162	111.6	0.562	549/22
05270−6837	I 276	36584	91.7134	163.5	1.314	549/22	06147−3657	Rst 4803	43490	90.9219	93.2	0.416	549/22
05276−2055	See 53	35973	90.9161	304.2	0.119	549/22	06155−0925	A 2923	43363	90.9191	128.4	1.063	538/76
			90.9243	303.7	0.115	549/22	06157−2212	I 752 AB	43517	90.9218	82.1	0.369	549/22
05290−0318	Da 6	36058	90.9135	221.6	0.139	549/22	06158−1050	Hu 107	43427	90.9218	308.4	0.259	549/22
			90.9243	221.6	0.140	549/22				91.7161	307.9	0.255	549/22
05296+0309	Bu 557 BC	36133	90.9189	195.2	0.335	538/76	06159+0110	Rst 5225	43358	90.9164	288.8	0.143	549/22
05301−3228	B 1946	36399	90.9161	179.7	0.203	538/76	06194−4229	Hu 1408	44361	90.9191	196.7	0.334	549/22
			90.9243	180.0	0.204	538/76	06197−0749	CHARA 22	44112	90.9136	63.3	0.063	549/22
05301−0145	Rst 4781	36219	90.9216	201.0	0.420	549/22	06199−0715	Bu 1296	44140	90.9191	184.4	0.269	549/22
05307+0556	StF 728	36267	91.7189	47.1	1.067	549/22	06200−1038	Red Rectangle	44179	90.3488	112.3	0.213	549/22
05310+0440	A 2646 AB	36310	90.9189	128.3	0.182	549/22	06202−4102	B 1506	44507	90.9191	94.1	0.447	538/76
05312+0317	StF 729 AB	36351	91.7189	27.1	1.878	549/22	06214+0216	A 2667	44333	90.9164	197.4	0.264	549/22
05323+0217	A 2509	36511	90.9189	141.5	0.429	549/22				91.7189	199.3	0.264	549/22
05331−0143	Bu 1049 CD	36646	90.9216	296.7	0.665	549/22	06217−1424	Hu 1241 AB	44521	90.9218	83.2	0.805	549/22
05353−0425	Fin 345	37016	90.9189	94.5	0.369	549/22	06227−2751	B 697	44802	90.9218	50.8	0.230	549/22
05366−3443	Daw 118	37376	91.7189	200.3	0.457	538/76	06238−5013	B 1508	45290	90.9192	109.6	0.402	549/22
05378−0643	A 491	37357	90.9191	49.0	0.186	549/22	06238−0921	A 669	44857	90.9191	28.5	0.226	538/76
05380−6130	Hu 1567	37953	91.7134	56.1	1.046	549/22	06238−1947	Bu 568	44953	90.9218	156.4	0.823	549/22
05413−3515	I 740 AB	38057	90.9244	219.5	0.592	538/76	06252+0130	Fin 343	45050	90.9164	350.7	0.168	549/22
05417−0254	Bu 1052	37904	90.9189	15.0	0.453	549/22				91.7189	352.1:	0.186:	549/22
			91.7189	14.0:	0.459:	549/22	06253+0300	A 2669	45049	90.9191	256.8	0.316	549/22
05428−1822	B 1949	38146	90.9244	153.9	0.234	538/76	06259+0431	A 2724	45136	90.9191	197.5	0.834	549/22
05428−0649	A 494 AB	38089	90.9189	233.5	0.122	549/22	06267−5813	Fin 98	45924	90.9192	327.0	0.263	549/22
			90.9244	233.9	0.122	549/22	06274−2544	B 114	45609	90.9218	318.8	0.509	549/22
05435−0753	A 495	38167	89.9415	250.0:	0.324:	538/76	06284−5821	Hu 1576	46213	90.9192	224.5	0.305	549/22
			90.9189	246.6	0.337	549/22	06307−4027	I 4	46288	90.9219	305.4	0.801	549/22
			91.7161	245.1	0.349	549/22	06325−1946	B 1959	−19 1478	90.9218	143.7	0.295	549/22
05438+0103	A 2653	38155	90.9244	103.2:	0.273:	549/22	06327−0520	Bu 98	46340	90.9191	154.0	0.653	549/22
			93.0951	105.7:	0.269:	538/76				91.7161	154.0	0.652	549/22
05457−1446	A 3018	38497	91.7161	288.8	0.809	549/22	06337−2853	B 700	46723	90.9218	147.1	0.183	549/22
05467−2101	B 1951	38679	91.7162	61.0	0.651	549/22	06345−1114	Ho 234	46716	90.9136	343.7	0.466	549/22
05474−1032	McA 22	38735	90.9244	293.7	0.178	549/22				91.7161	344.3	0.473	549/22
			91.7161	294.5	0.179	549/22	06347−0837	A 508	46738	90.9191	131.8	0.290	549/22
05480+0627	StF 795	38710	91.7189	216.1:	1.151:	549/22	06347−3401	Bu 754	46973	90.9218	48.1	0.956	549/22
05482+0137	A 2657	38769	90.9244	181.2	0.198	549/22	06372−3659	Rst 4819	47500	90.9219	3.3	0.528	549/22
05505−5246	B 1493	39547	90.9136	211.9	0.132	549/22	06375−4536	Rst 5242	47657	90.9191	352.9:	0.116:	549/22
			91.7162	208.5	0.131	549/22	06377−0341	A 2930	47275	90.9191	357.2	0.193	549/22
05508−3945	I 1494 AB	39445	90.9163	280.2	0.349	538/76	06378−2146	B 1960	47460	90.9218	279.2	0.204	549/22
05532−3248	B 1495	39763	90.9163	79.5	0.313	549/22	06385−2302	I 756 AB	47597	90.9218	27.3	0.448	549/22
			91.7162	79.6	0.310	549/22	06396−2342	Fin 321	47827	90.9137	143.8	0.058	549/22
05532−6150	Slr 15	40201	90.9136	132.8	0.347	549/22	06404−1551	A 3032	47940	90.9246	308.2	0.495	538/76
05534−0333	A 2919 AB	39558	90.9189	340.9	0.243	549/22	06404−2123	B 1961	47993	90.9246	338.3	0.444	549/22
05536−5640	Fin 93	40129	90.9136	274.5:	0.156:	538/76	06412−0759	StF 955 AB	48061	91.7161	269.4	1.188	549/22
05542−2909	Fin 382	39891	90.9163	175.9	0.157	549/22	06418−1758	A 3033	48259	90.9246	188.2	0.346	538/76
05548−5335	Rst 5503	40274	90.9136	73.2	0.121	538/76	06433−4012	Rst 1320	48798	90.9244	20.8	0.334	538/76
05565−2631	B 94	40247	90.9244	205.5	0.094	538/76	06478+0020	Stt 157	49294	91.7189	192.3:	0.374:	549/22
05568−0304	A 321	40134	90.9189	135.5	0.662	549/22	06485−1226	A 2935	49572	90.9246	73.1:	0.126:	538/76
05577−2032	Rst 4793	40401	90.9244	78.4	0.273	538/76	06508−1041	Rst 3471	50009	90.9246	11.1	0.401	538/76
06017−5659	Fin 95	41441	90.9136	102.2	0.465	538/76	06511−2844	I 431 AB	50234	90.9246	323.5	0.428	538/76
06017−3503	B 1954	41150	90.9136	224.7	0.260	549/22	06574−1706	Rst 3477	51628	90.9246	273.0	0.300	538/76
06024+0939	A 2715 AB	40932	91.7189	201.6:	0.384:	549/22 *	06580+0218	CHARA 25	51566	90.9219	38.6	0.911	549/22
06081−2525	B 99 AB	42163	90.9163	176.4	0.156	549/22	06581−2710	B 707	51925	90.9137	19.5	0.244	549/22
06081−2525	B 99 AB,C	42163	90.9163	207.4	1.063	549/22	06586−3650	B 1051	52195	90.9246	145.1	0.380	538/76
			91.7162	207.0	1.071	549/22	06592−2123	I 765	52165	90.9246	317.3	0.582	538/76
06083−4945	Rst 176	42488	90.9244	333.2	0.494	549/22	07003−2207	Fin 334 Aa	52437	90.9137	13.8	0.065	549/22
06088−52 8	Hu 1573	42627	90.9163	147.6	0.338	549/22	07031−1611	Rst 3484	53089	89.9335	39.5	0.242	549/22
06095−0620	Bu 1242 AB	42261	90.9189	135.4	0.511	538/76	07034−2234	Rst 3486	53246	89.9336	330.6	0.256	538/76
06103−0037	Rst 4798	−00 1196	89.9415	316.4:	0.569:	538/76	07044−0303	A 519	53299	89.9335	274.7:	0.413:	538/76
06114−1650	A 3022	42692	90.9218	2.3	1.077	549/22	07051+0020	A 2841	53451	90.9219	220.2	0.329	549/22
			91.7161	1.9	1.077	549/22	07061−1843	Rst 2453	53911	89.9336	262.6	0.115	538/76
06122−3645	Rst 4800	43011	90.9191	14.5	0.179	538/76	07064−4046	I 1162	54286	89.9336	59.6	0.436	538/76
06123−2515	B 104	42899	90.9218	185.0	1.058	549/22	07079−1542	A 3043	54336	90.9137	304.1	0.234	549/22
			91.7162	184.4	1.057	549/22	07080−3130	I 1164	−31 1416	89.9336	41.2	0.405	538/76
06125−6128	I 3	43519	90.9192	4.8	1.009	549/22	07093−3319	B 1530	54915	90.9246	347.7	0.154	549/22
			91.7271	4.6	1.022	549/22	07094−6023	HJ 3941	55527	90.9137	274.9	0.469	549/22
06125−0257	Bu 1017	42774	90.9191	186.2	0.471	549/22	07113−1033	A 2122	55118	90.9246	72.1	0.121	549/22
06130−0238	Rst 4295	42878	90.9191	291.9	0.341	549/22	07114−0025	A 1961	55058	90.9219	101.9	0.218	549/22

TABLE 2. (continued)

WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (o)	ρ (″)	λ/Δλ (nm)	WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (o)	ρ (″)	λ/Δλ (nm)
07117−5118	I 1504	55788	90.9246	102.8	0.110	549/22	08250−4246	(continued)		89.9391	0.2	0.041	549/22
07120−6311	HdO 199	56239	90.9137	111.7	0.364	549/22				90.9138	0.1	0.048	549/22
07139−0112	A 1962	55682	90.9219	100.6	0.415	549/22	08252−5528	Rst 3593	71491	90.9165	76.9	0.333	549/22
07143−2621	Fin 323	56014	90.9137	142.6	0.132	549/22	08275−5501	Fin 116	71919	90.9165	33.0	0.103	549/22
07148−0123	Rst 4843	55899	89.9333	86.4	0.211	549/22	08276−2051	B 2179	71581	90.9220	214.6	0.418	549/22
			90.9219	140.8	0.388	549/22	08278−0425	A 550	71499	90.9138	173.8	0.160	549/22
07150−1857	B 2524	56112	89.9336	163.0	0.345	538/76				94.3132	164.6	0.154	549/22
07168+0059	A 2855	56361	89.9333	267.6:	0.396:	538/76	08280−3507	Fin 314 Aa	−34 2507	90.9138	62.8	0.110	549/22
			90.9219	261.5	0.402	549/22	08291−4756	Fin 315 Aa	72108	90.9138	152.7	0.118	549/22
07171−1201	A 2123 AB	56593	90.9137	157.3	0.368	549/22	08296−3836	I 394	72106	90.9193	199.8	0.800	549/22
			94.3104	160.7	0.393	549/22	08307−4311	Rst 4889	72370	90.9193	246.7	0.711	549/22
07184−0337	A 526	56765	89.9335	172.0:	0.399:	538/76	08311−3734	B 1104	72383	90.9193	106.5	0.660	549/22
			90.9219	171.7	0.386	549/22	08315−1934	I 489	72310	90.9138	336.7	0.230	549/22
07200+0347	A 2862	57132	90.9219	64.8	0.738	549/22	08358−4345	B 1617	73270	90.9193	115.9	0.201	549/22
07202−4329	B 718	57664	89.9336	243.0	0.504	538/76	08388−3352	B 1621	73754	90.9193	346.1	0.531	549/22
07235−1032	A 2682	58030	89.9391	6.7:	0.301:	538/76	08407−3604	B 1986	74103	90.9193	338.1	0.149	549/22
07322+1404	Hu 1244	+14 1690	90.9219	111.0	0.482	538/76	08441−0412	A 552	74469	90.9247	25.2	0.180	549/22
07334−2843	B 1066	60463	90.9164	62.7	0.184	538/76	08453−0018	Hei 147	74657	90.9247	9.7	0.083	549/22
07364−5411	Rst 2493	61435	90.9137	304.1	0.286	549/22	08464−5251	Hu 1590	75202	90.9247	335.8	0.093	549/22
07365−2520	B 729	61071	90.9137	158.8	0.090	549/22	08485−4201	I 1512	75425	90.9193	279.2	0.501	538/76
07371−2725	B 730	61209	90.9137	85.9	0.238	549/22	08486+0057	A 2552	75207	90.9247	101.1	0.160	549/22
07374−3458	Fin 324 AB,C	61330	90.9137	31.4	0.461	549/22	08496−3757	Jsp 306	75585	90.9193	213.0	0.750	549/22
			90.9247	31.3	0.461	549/22	08518−2036	Rst 2586	75832	90.9220	197.6	0.155	549/22
07377−0715	A 3050	−06 2206	89.9391	255.2:	0.716:	538/76	08526−3633	Fin 296	76072	90.9166	75.9	0.075	549/22
07379−0636	A 3051	61201	89.9391	171.3:	0.284:	538/76	08538−4731	Fin 316	76360	94.3132	299.1	0.074	549/22
07389−1421	A 3093 AB	61464	89.9391	40.1	0.579	538/76	08542−0229	A 1754	76119	89.3085	94.3	0.263	538/76
07397+0117	A 2532	61526	90.9247	266.4:	0.413:	538/76	09001−1228	Hu 225	77126	90.9220	237.1	0.424	549/22
07430−1704	Hu 710	62351	90.9220	81.7	0.426	549/22	09082−2829	B 177 AB	78590	90.9220	197.4	0.153	549/22
07441−1656	Hu 844	62589	90.9220	130.1	0.274	549/22	09111−6057	Fin 129	79388	89.3030	185.3	0.340	549/22
07452−1017	Rst 1364	62725	90.9219	157.8	0.250	549/22				90.9165	185.3	0.340	549/22
07453−1813	A 3096	62840	90.9220	234.4	0.393	549/22	09123+1459	Fin 347 Aa	79096	90.9166	301.6:	0.073:	549/22 *
07478−0332	Rst 4375	63263	90.9247	315.3	0.116	549/22	09125−4337	Fin 317 AB	79416	89.9446	180.5	0.144	549/22
07494−4740	Rst 280	63968	90.9192	349.5	0.449	538/76	09128−6055	HdO 207 AB	79699	90.9165	240.0	0.238	549/22
07513−0925	Bu 1195	63976	90.9219	94.0	0.163	549/22				94.3132	245.4	0.217	549/22
07518−1352	Bu 101	64096	90.9220	292.8	0.562	549/22	09174−7454	I 12 AB	80951	89.3058	270.8:	0.270:	549/22
			94.3132	300.1	0.494	549/22	09207−2913	I 198	80752	90.9247	258.2	0.110	549/22
07523−1139	Hu 53	64196	90.9219	146.0	0.491	549/22	09229−0951	A 1342 AB	81009	90.9247	40.5	0.142	549/22
07524−4714	Rst 288	64597	90.9192	119.3	1.127	538/76				94.3132	57.0	0.097	549/22
07536−6346	Rst 293	65192	90.9192	228.7	0.278	549/22	09243−3926	Fin 348	81411	90.9248	175.7	0.117	549/22
07561−0626	A 538	64919	90.9219	200.8	1.016	549/22	09264−4215	B 1122	81782	90.9248	208.4	0.164	549/22
07573−4753	I 26	65598	90.9165	70.3	0.359	549/22	09267−2847	Jc 5	81753	89.3031	275.3	0.551	549/22
07573+0108	Stt 185	65123	90.9247	122.1	0.131	549/22	09278−0604	B 2530	81809	90.9247	328.5	0.475	549/22
07599−4718	I 1070 AB	66079	90.9165	4.0	0.261	549/22				94.3132	330.3	0.545	549/22
08014−4855	Rst 5279	66463	90.9192	207.8	0.351	538/76	09285−2426	B 181	81982	90.9247	277.0	0.185	538/76
08017−0836	A 1580	66094	90.9219	267.3	0.247	549/22	09320−0111	CHARA 174	82446	94.3132	205.9	0.052	549/22
08018−6225	Fin 112	66897	90.9192	258.4	0.614	538/76	09326+0151	Fin 349	82543	90.9220	191.8	0.139	549/22
08031−0625	A 1581	−06 2423	90.9219	295.1	1.253	549/22	09366−2442	Fin 383	83261	90.9247	129.1	0.095	549/22
08036−1204	Rst 3565	66535	90.9220	88.2	0.319	538/76	09385−6233	I 203	83833	89.3031	316.8:	0.404:	538/76
08041−4955	Rst 301	67106	90.9192	288.8	0.418	549/22	09442−2746	Fin 326	84367	90.9247	221.8	0.109	549/22
08049−0820	A 1582	66804	90.9219	48.8	1.449	538/76				94.3052	197.8	0.142	549/22
08053−0724	Rst 4384	66882	90.9219	248.7	0.472	538/76	09455−2824	B 188	84566	90.9247	118.4	0.097	538/76
08097−2654	B 758	68022	90.9220	185.3	0.229	549/22	10052−2812	I 293	87556	90.9248	323.0	0.147	549/22
08125−4616	See 96 AB	68895	90.9138	273.1	0.552	549/22	10120−2836	B 194	88522	90.9248	163.0	0.086	549/22
			94.3052	272.5	0.562	549/22	10343−4629	B 1164	91693	89.3113	82.0	0.672	538/76
			94.3131	272.3	0.559	549/22	10373−4814	See 119	92139-0	94.3132	280.1	0.414	549/22 *
08125−4616	CHARA 143 Aa	68895	90.9138	170.9	0.069	549/22	10445−7051	CHARA 227 Ba	93359	90.3489	225.9	0.612	549/22
			94.3052	182.5	0.073	549/22	10447−3809	B 794	93122	94.3134	176.6	0.260	549/22
			94.3131	182.4	0.075	549/22	11009−4030	Fin 365	95506	94.3134	124.3	0.064	549/22
08135−1851	B 1979	68818	90.9220	68.9	0.213	549/22	11053−2718	Fin 47	96202	94.3134	228.2	0.152	549/22 *
08144−4550	Fin 113 AB	69302	90.9138	311.5	0.089	549/22	11151−3929	See 128	97881	94.3107	136.1	0.076	549/22
08158−1027	Rst 3578	69247	90.9220	233.9	0.124	538/76	11210−5429	I 879	98718	94.3134	133.8	0.410	700/40
08184−2535	B 765	69946	90.9220	265.5	0.417	549/22				94.3134	133.6	0.411	549/22
08189−4554	Rst 4883	70219	89.9391	331.2:	0.273:	538/76	11362−6136	I 887	−60 3128	89.3114	91.1	0.642	538/76
08199+0357	Fin 346	70013	90.9138	68.3	0.268	549/22	11495−4604	Fin 366	102703	94.3136	179.1	0.195	549/22
08208−2508	B 153	70393	90.9220	335.3	0.443	549/22	11578−4343	B 1203 AB	103910	94.3136	217.6:	0.237:	538/76
08214−0136	StF 1216	70340	90.9138	286.3	0.527	549/22	12178−3606	R 193	106922	93.0931	171.7	0.042	549/22
08218−0825	A 1077	70437	90.9220	78.4	0.485	549/22				94.3136	353.3	0.065	549/22
08221−1759	A 3057	70552	90.9220	244.3	0.321	549/22	12313−4130	I 82	108934	92.4569	8.6	0.751	549/22
08226−2208	I 797	70711	90.9220	311.6	0.487	549/22	12325−5954	Jsp 539	109091	92.4570	218.4	0.150	538/76
08250−4246	Rst 4888 AB	71302	90.9138	112.3	0.439	549/22	12357−1650	Fin 368 Aa	109557	92.4569	108.2	0.115	549/22
08250−4246	CHARA 226 Aa	71302	89.3110	0.3	0.049	549/22 *	12361−3549	See 156	109589	92.4569	121.9	0.899	538/76

TABLE 2. (continued)

WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (o)	ρ (″)	λ/Δλ (nm)	WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (o)	ρ (″)	λ/Δλ (nm)
12369−3211	I 1222 AB	109696	92.4569	221.6	0.346	549/22	17227−3812	I 1317	157040	92.4495	233.6	0.312	549/22
12392−4022	B 1215	109961	92.4569	104.8	0.099	538/76	17248−5913	I 385 AB	157081	90.3497	129.0	0.384	549/22
12397−3717	Daw 63	110035	92.4569	16.8	0.489	538/76	17286−2531	Bu 129	158140	92.4493	127.9	0.452	549/22
12421−5446	Fin 200	110372	92.4570	265.2	0.410	549/22	17294−3831	B 342	158156	92.4493	101.2	0.495	549/22
12477−5826	Rst 2815	111104	91.3922	250.2	0.131	538/76	17316−2616	CHARA 229	158704	92.4550	11.3	0.352	549/22 *
13031−7129	CHARA 228	113120	90.3464	165.0	0.557	549/22 *	17339−5150	Rst 940	158782	90.3497	298.8	0.169	538/76
			91.3922	163.5	0.557	549/22	17399−0039	Bu 631	160438	91.7260	107.3	0.155	549/22
			93.0984	163.3	0.558	549/22				92.4550	106.5	0.161	549/22
13461+0507	StF 1781	119931	92.4572	165.8	0.584	549/22	17450−1646	Vou 42	161227	90.3414	344.8	0.226	538/76
14310−0548	Rst 4529	127352	92.4572	68.3	0.102	549/22	18103−2913	Ho 428	166080	89.3094	89.1	0.556	538/76
14358+0015	Bu 941 AB	128233	92.4572	145.0	0.297	538/76	18160−3703	B 1355	167253	89.3068	295.0	0.200	549/22
14373−4608	Fin 318 Aa	128266	90.3464	339.3:	0.161:	538/76	18167−2032	McA 51	167570	91.7261	135.3:	0.248:	538/76
14373+0217	CHARA 42 Aa	128563	92.4572	23.0	0.070	549/22				92.4550	134.6	0.237	549/22
14389−2220	Bu 226	128687	92.4573	115.5	0.821	538/76	18218−1619	CHARA 69	168701	91.7261	307.3	0.059	538/76
14399−2140	Rst 2915	128832	92.4573	311.0	0.532	538/76	18323−1439	CHARA 73	170902	89.3041	29.4	0.044	549/22 *
14411−2237	Rst 2917	129065	92.4573	178.2	0.386	549/22	18384−0312	A 88 AB	172088	92.4550	190.1	0.128	549/22
14418−2942	Bu 345	129160	92.4573	287.9	0.952	549/22	18444+3937	CHARA 77 Ca	173607				*
14419−3056	Bu 414	129161	92.4573	347.2	0.992	549/22	18448−2501	CHARA 78	173117	91.3901	9.1	0.034	549/22
14536−6221	B 2025	130911	90.3411	289.0	0.156	538/76	18541−1352	A 1891	175060	92.4551	258.4	0.362	538/76
15123−1947	B 2351 Aa	134759	92.4546	245.1	0.093	549/22 *	18594−1250	Kui 89	176162	92.4551	3.8	0.106	549/22
15197−2416	HJ 4756	136121	92.4573	263.3	0.644	549/22	19026−2953	HdO 150 AB	176687	91.7151	269.2	0.449	549/22
15227−4441	Cop AB	136504	92.4574	176.3	0.264	549/22				92.4551	265.9	0.499	549/22
15228−6021	Rst 5014 AB	136286	91.3925	342.1	0.312	538/76	19026−0621	A 42 AB	176876	92.4578	60.4	0.892	538/76
15249−2322	I 1269	137094	92.4573	203.0	0.691	538/76	19043−2132	H 126	177166	92.4578	198.8	1.222	549/22
15251−2340	Rst 2957	137153	92.4573	270.1	0.260	538/76	19069−1009	Rst 4616	177882	92.4578	91.6	0.343	538/76
15251−3810	Rst 2955	137015	92.4574	230.5	0.128	549/22	19082−0520	Rst 4618	178286	92.4578	176.7	0.110	538/76
15266−0539	A 18	137512	92.4547	157.9	0.193	549/22	19110−0725	A 95	179002	92.4578	59.0	0.282	549/22
15270−2432	Rst 4541	−24 5511	92.4573	207.1	0.310	538/76	19120+0237	Bu 1204 AB	179343	92.4578	184.5	0.264	538/76
15288−3129	I 239	137728	92.4574	302.6	0.318	538/76	19124−3304	Ol 22	179058	91.7261	23.7	0.396	538/76
15313−3349	B 2036 AB	138138	92.4574	7.6	0.081	549/22				92.4576	25.4	0.404	538/76
			93.0959	6.4	0.094	549/22	19155−3212	B 1380	179860	91.7179	301.1	0.245	538/76
16115+0943	Fin 354	145589	91.7258	78.2	0.089	549/22				92.4576	298.2	0.240	538/76
16168−5344	Rst 3937	146018	89.3065	274.9	0.257	538/76	19155−2515	B 430	179950	91.7261	122.1	0.049	467+549
16229−1701	CHARA 54	147473	91.7258	72.7	0.179	549/22	19172−6640	Gle 3	179366	91.7151	317.9	0.490	549/22
16245−3734	B 868	147628	91.7258	68.5	0.052	549/22	19253−2431	Fin 327	182369	91.7261	80.1	0.099	467+549
16257−3142	I 1292	147872	91.7258	39.8	0.490	538/76				92.4551	79.9	0.112	549/22
16391−3713	Fin 340 AB	149886	91.7258	16.5	0.047	549/22	19275−5458	Rst 1035	182396	91.7262	282.8	0.390	538/76
16596−4117	B 1839 AB	153157	92.4548	185.2	0.190	538/76	19437−5645	Rst 4046	185748	89.3068	228.0	0.133	538/76
17011−4204	B 1841	153382	92.4550	1.6	0.145	549/22	19464−2453	See 394	186613	91.7207	285.2	1.102	538/76
17013−2808	B 326 AB	153533	91.3926	89.1	0.298	538/76	19466−0123	Rst 5143	186778	91.7152	130.9	0.225	549/22
17018−5108	I 1306	153370	92.4550	11.4	0.239	549/22				92.4496	130.7	0.217	549/22
17031−5833	I 997	153447	92.4550	158.7	0.604	549/22	19471−1953	Bu 146	186752	91.7207	28.0	0.626	538/76
17062−3837	See 318	154287	92.4548	347.3	0.962	538/76	19471−0810	A 108	186847	91.7152	94.6	0.287	549/22
17076−3036	B 329	154587	92.4548	182.4	0.215	538/76	19507−5912	I 121	186957	91.7151	147.7	0.743	549/22
17081−4137	I 407	154569	92.4548	163.0	0.154	549/22	19520−1021	Bu 148 AB	187774	91.7151	243.1	0.625	549/22
17082−0105	A 1145	154895	92.4547	4.1	0.550	549/22				92.4496	242.3	0.622	549/22
17093−2954	B 330	154883	92.4548	110.0	0.109	538/76	19531−2528	B 454	187858	91.7207	345.3	0.214	538/76
17103−1926	McA 46	155095	92.4547	116.4	0.142	549/22	20033−4255	I 1490	189719	91.7151	152.4	0.875	549/22
17103−1544	Bu 1118 AB	155125	92.4547	249.5	0.473	549/22	20055−3300	See 404 AB	190306	91.7151	105.8	0.505	549/22
17108−3134	B 1330	155081	92.4548	72.4	0.092	538/76	20067−2822	See 405	190578	91.7207	237.2	0.396	538/76
17112−5156	Rst 3073	154925	92.4574	293.6	0.308	538/76	20111−5731	HdO 295	191095	91.7151	269.0	0.568	549/22
17115−1629	Hu 169	155317	92.4550	326.6	0.079	549/22	20123−0805	Bu 1205	191841	91.7152	248.5	0.176	549/22
17116−2642	Bu 956 AB	155270	92.4576	169.4	0.920	549/22	20239−4225	Bu 763 AB	193807	91.7151	265.7	0.370	549/22
17120−3337	B 898	155273	92.4576	114.0	0.302	538/76				92.4580	268.3	0.351	549/22
17155−3836	Fin 355	155826	91.7260	225.3	0.234	549/22	20247−0846	Rst 4062	194233	91.7151	359.8	0.221	549/22
			92.4575	218.4	0.265	549/22				92.4579	358.7	0.210	538/76
17157−0949	A 2592	156034	91.7260	209.2:	0.320:	549/22	20285−2410	CHARA 98	194810	91.7151	111.8	0.221	549/22
17158−3344	See 322	155889	92.4576	291.9	0.190	538/76	20289−1750	SHJ 323 AB	194943	91.7151	198.8	1.026	549/22
17164−4735	B 1331	155835	92.4575	36.9	1.052	538/76	20309−1503	Fin 336	195330	91.7207	255.2	0.115	549/22
17173−3010	Bu 1119	156184	92.4576	253.5	0.329	549/22				92.4579	261.9	0.112	549/22
17178−3406	B 1333	156200	92.4575	10.8	0.149	538/76	20311+1548	A 1675	195481	91.7262	165.8	0.066	549/22
17184−3224	Vou 27	156324	92.4576	165.4	0.353	538/76	20322−4521	Rst 5470 AB	195286	91.7179	138.9	0.208	538/76
17184−3425	Rst 3084	156327	92.4575	111.5	0.236	538/76	20325−1636	See	195536	92.4579	115.5	0.185	538/76
17185−3848	Rst 1947	156301	90.3497	231.2	0.578	549/22	20386−2540	B 498	196496	92.4552	11.7	0.435	538/76
			92.4575	230.0	0.565	538/76	20393−1457	Hu 200 AB	196662	91.7207	113.9	0.344	549/22
17189−3221	I 590	156424	92.4576	21.5	0.792	538/76	20401−2852	See 423	196718	92.4552	271.4	0.340	538/76
17194−4413	HdO 269	156398	92.4575	33.7	0.088	549/22	20407−6411	Hu 1616	196403	91.7180	67.5	0.700	549/22
17195−5004	Fin 356	156331	92.4575	310.9	0.052	549/22	20440−0557	Rst 4679	197436	91.7152	358.1	0.323	549/22
17200−6207	Rst 5428	156140	92.4574	223.0	0.227	538/76	20450−5029	I 17 AB	197322	91.7179	34.8	0.971	549/22
17206−5926	HJ 4931	156335	92.4574	255.9	0.872	549/22				92.4551	34.8	0.964	549/22
17221−7007	Fin 373	156190	92.4496	290.1	0.077	549/22	20451−2346	I 666	197539	92.4552	52.9	0.097	538/76

TABLE 2. (continued)

WDS α,δ (2000)	Discoverer Designation	HD/DM	Date (1900+)	θ (°)	ρ (″)	λ/Δλ (nm)
20485−2205	Don 994	198043	92.4552	84.9	0.615	538/76
20507−3116	B 997	198340	91.7179	87.4	0.228	538/76
			91.7263	89.6	0.231	538/76
			92.4552	93.6	0.229	549/22
20514−0537	StF 2729 AB	198571	91.7152	16.4	0.981	549/22
20527−0859	McA 64	198743	91.7263	316.4	0.059	467+549
20548−4636	I 1429	198828	91.7179	143.4	0.772	538+549
20587−6234	B 1003	199189	91.7180	142.6	0.404	549/22
20591+0418	StF 2737 AB	199766	91.7152	285.6	0.925	549/22
			92.4497	286.4	0.913	549/22
20597−5210	I 669	199489	91.3931	50.4	0.189	538/76
21002+0731	Kui 102	199942	91.7152	32.3	0.354	549/22
21031+0132	StF 2744 AB	200375	91.7152	122.3	1.334	549/22
21032−2744	See 435	200245	91.7152	297.0	0.278	549/22
			92.4498	297.8	0.282	549/22
21040−1807	Bu 1211	200438	91.7263	337.5	0.849	538/76
21044−1951	Fin 328	200499	91.7152	94.6	0.338	549/22 *
			91.7207	94.7	0.342	549/22
			92.4498	89.8	0.334	549/22
21058−5744	Hu 1625	200424	91.7180	242.0	0.276	549/22
21075−0814	Bu 368 AB	201038	91.7152	271.3	0.213	549/22
			91.7262	274.4	0.206	549/22
21080+0509	Stt 527	201221	91.7152	129.4	0.258	549/22
21114−5220	Hu 1626	201427	91.7180	132.0	1.279	549/22
21146−0050	A 883 AB	202260	90.9240	7.0	0.119	549/22
21171−8021	I 670	201230	91.7181	359.9	0.748	538/76
21214+0254	Stt 435	203323	91.7208	232.0	0.671	538/76
21244−4100	Bu 766 AB	203585	91.7207	232.5	0.303	549/22
			92.4553	231.7	0.297	549/22
21251+0923	Bu 164 AB	203943	91.7153	200.3	0.149	549/22
21273−3218	B 1007	204107	92.4553	255.6	0.097	538/76
21310−3633	B 1008 AB	204635	91.7208	32.6	0.346	538/76
			92.4553	32.8	0.344	549/22
21318−3534	B 1392	204766	92.4553	96.0	0.525	538/76
21323−4851	Rst 5553	204747	92.4553	22.0	0.068	538/76
21364−4041	I 1444	205429	92.4553	187.7	0.338	538/76
21368−3043	Vou 35	205545	92.4553	148.8	0.131	549/22
21377−0751	McA 68	205767	91.7263	63.1:	0.048:	549/22
21395−0003	Bu 1212 AB	206058	91.7126	262.0	0.485	549/22
21423+0554	Hu 280	206512	91.7153	146.1	0.204	549/22
21469+0051	StF 2825	207136	91.7126	140.4	0.584	549/22
21474−1307	Hwe 58 AB	207171	90.9210	78.5	0.619	549/22
			91.7126	79.3	0.623	549/22
			91.7153	78.0	0.606	549/22
21477−3054	Fin 330 AB	207155	90.9183	41.0	0.115	549/22
			91.7125	36.2	0.137	549/22
21502+1718	Cou 14	207652	91.7153	184.7	0.128	549/22
21506−0747	A 301	207656	90.9183	127.4	0.893	538/76
21508−2032	See 460	207629	90.9210	158.4	0.501	549/22
			91.7125	158.5	0.500	549/22
21524−2522	B 541	207820	90.9211	294.9	0.193	538/76
21533−4650	Fin 374	207852	90.9183	308.8	0.144	549/22
21535−1019	Fin 358	208008	90.9183	104.0	0.125	549/22
			91.7263	108.2	0.125	549/22
21579−5500	Fin 307	208450	90.9183	66.0	0.087	549/22
			91.7263	80.0	0.131	549/22
21581−0329	StF 2847	208690	91.7126	305.7	0.853	549/22
22003−2330	I 674	208955	90.9210	345.5	0.161	549/22
22006−1345	Hu 282	209028	90.9210	49.4	0.371	549/22
			91.7126	49.5	0.369	549/22
22018−0952	Rst 4095	209208	90.9183	173.5	0.109	538/76
22116−3428	Bu 769 AB	210525	90.9211	358.7	0.772	549/22
			91.7208	358.4	0.785	549/22
22116−3428	CHARA 230 Aa	210525	90.9211	117.8	0.141	549/22 *
			91.7208	122.1	0.144	549/22
22134−3729	B 2056	210767	90.9211	314.4	0.169	549/22
			91.7208	316.2	0.167	538/76
22150−3210	B 1397	211025	90.9211	343.1	0.241	538/76
22180−6249	I 20	211299	91.7155	202.0	0.549	549/22
			91.7181	201.0	0.558	549/22
			92.4554	202.2	0.533	549/22
22220−6705	Don 1025	211808	91.7155	21.2	0.749	549/22
22220−3431	B 557	212025	90.9211	293.0	0.227	538/76
			91.7153	291.8	0.223	549/22
			91.7181	296.3	0.228	549/22
			92.4554	292.2	0.221	538/76
22226−5609	I 134	212018	91.7155	280.3	0.509	549/22
			91.7181	281.0	0.511	549/22
22241−0451	Bu 172 AB	212404	90.9182	120.6	0.145	549/22
			91.7264	110.4	0.157	549/22
22246−7215	Fin 285	211998	92.4554	4.0:	0.040:	549/22
22265−1645	SHJ 345 AB	212697-8	91.7153	349.3	2.107	549/22
22268−4537	Hu 1334	212648	90.9211	290.3	0.233	549/22
			92.4554	289.4	0.233	538/76
22281−1153	Rst 4105	212948	90.9210	296.9	0.310	549/22
22288−0002	StF 2909 AB	213051-2	91.7126	201.6	1.872	549/22
			91.7208	200.9	1.879	549/22
22299+0425	StF 2912	213235	91.7126	117.5	0.572	549/22
22321−4244	I 1455	213436	92.4554	27.8	0.074	538/76
22343−1841	Hu 389	213766	90.9183	213.9	0.132	538/76
22384−0754	A 2695	214448	90.9210	152.2	0.113	549/22
			91.7208	159.2	0.118	549/22
22385+0218	Ho 479	214494	91.7153	104.8	0.526	549/22
22401−1558	Hu 288	214688	90.9210	62.5	0.416	549/22
22408−0333	Kui 114	214810	90.9183	128.1	0.343	549/22
			91.7126	127.8	0.356	549/22
			92.4580	129.7	0.371	549/22
22442−0057	Rst 5487	215312	91.7153	234.1	0.235	549/22
22550−4056	I 1460	216641	91.7153	5.9	0.232	549/22
22553−4828	I 22 AB	216655	90.9156	173.4	0.457	549/22
			91.7155	173.4	0.449	549/22
			91.7181	173.4	0.453	549/22
22585+0922	Stt 536 AB	217166	91.7126	300.0	0.233	549/22
23099−2227	Rst 3320	218640	91.7156	286.0	0.202	549/22
			91.7184	286.2	0.198	549/22
23119−4444	I 1466	218859	91.7155	188.3	0.851	549/22
23126+0242	A 2298	219018	91.7209	358.8	0.149	538/76
23135−0854	A 418	219102	91.7209	35.0	0.704	538/76
23175−4514	Don 1046	219610	91.7155	81.5	0.276	549/22
23191−1327	McA 74 Aa	219834	89.9326	118.1	0.208	549/22 *
			90.9158	213.0	0.168	549/22
			92.4583	309.6	0.150	549/22
23226−1503	Hu 295	220278	90.9158	131.9	0.141	549/22
			91.7209	150.3	0.112	549/22
			91.7266	149.8	0.112	549/22
23257−4254	I 144	220633	91.7264	178.8	0.445	538/76
23282−5626	I 23	220918	91.7155	348.8	0.817	549/22
23299−2035	Hu 599 AB	221183	91.7266	3.8	0.195	538/76
23322+0705	Hu 298	221445	91.7128	253.7	0.174	549/22
23326−4520	Rst 3325	221465	90.9238	101.2	0.103	549/22
23330−1943	Hu 299	221532	89.9437	285.0	0.735	538/76
23353−5730	I 25	221773	91.7155	28.9	0.790	549/22
23363−0707	Bu 721 AB	221925	91.7183	135.4	0.263	549/22
			91.7209	139.9	0.277	538/76
23370−3648	I 693	221982	91.7208	78.9	1.254	538/76
23415−4135	Hu 1550	222508	91.7155	191.9	0.804	549/22
23449−3820	B 613	222909	90.9238	110.6	0.118	549/22
			91.7208	111.8	0.097	538/76
23456−5817	B 1020	222957	90.9240	219.4	0.207	549/22
			91.7155	217.7	0.215	549/22
23474−7118	Fin 375	223134	90.9238	178.3	0.181	549/22
23502−1723	Hu 698	223510	89.9437	325.1	0.708	538/76
23506−5142	Slr 14	223551	91.7155	132.3	0.621	549/22
23529−0313	Fin 359	223825	90.9238	199.3	0.055	549/22 *
			91.7266	187.0	0.048	549/22
23551−3722	I 146	224096	91.7208	222.4	0.900	538/76
23568+0443	A 2100	224315	90.9238	43.3	0.070	549/22 *
23586−1408	Rst 4136 AB	224512	90.9238	15.9	0.198	549/22
			91.7209	12.4	0.184	538/76

Notes to TABLE 2

[a]This table can also be found in the AAS CD-ROM Series, Vol. 1, 1996

01376−0924=Kui 7: This system has a recently published orbit by Hartkopf *et al.* (1996). This measure agrees well with those elements, yielding residuals ($\Delta\theta = -0.^\circ4$, $\Delta\rho = 0.''000$).

02366+1226=McA 7: This system has a small Δm (~0.1 in the blue, 0.3 in the red) as determined from lunar occultation measures by Africano *et al.* (1978). Orbits of this system have been published by Balega & Balega (1989) and Mason (1994, 1995); a further analysis is in progress.

04049−3527=CHARA 224 AC: Surprisingly, no record of this wide companion to the 0.''8 pair I 152 is listed in the WDS, despite 17 observations spanning 90+ years since Innes' (1897) discovery in 1896. Misidentification appears ruled out, since both the Innes pair and the new component are seen on two separate occasions.

05162−1121=CHARA 225: It in uncertain whether the pair resolved here is the known G8 III+A0 V composite spectrum binary (Hoffleit & Warren 1992). The small apparent change in θ over the 4 yr span between observations does not appear consistent with our estimated period of ~15 or so years; however, the magnitude difference between the components is small, so we are unable to rule out a 180° quadrant flip or perhaps an eccentric orbit.

06024+0939=A 2715 AB: A visual orbit of this system was published by Osvalds (1964); a combined speckle/spectroscopic solution is in progress.

08250−4246=CHARA 226 Aa: This close companion to Rst 4888 has been observed on three occasions, but has shown little movement over a 1.6 yr period.

The 1989 measurements of the Rossiter pair have already been published (McAlister *et al.* 1990; Hartkopf *et al.* 1993). Following discovery of the close pair in the 1990 data, these 1989 data were rereduced, resulting in "preconfirmation" of the new component.

09123+1459=Fin 347 Aa: Residuals (4.°0 in θ, 0.″007 in ρ) to the orbit of Hartkopf *et al.* (1989) are only fair, due to a combination of large zenith distance and close angular separation at the time of this observation. A combined speckle/spectroscopic solution for this double-lined binary is in progress.

10445−7051=CHARA 227 Ba: Charles Worley (private communication) noted that the systematic binary star surveys of Rossiter (1955) and van den Bos missed the declination band −73° to −70°. This probably explains why this half-arcsecond pair remained undiscovered until now. CHARA 227 represents a new component to the wide (63″) common proper motion pair HR 4211−12=Dun 99 AB, discovered by J. Dunlap in 1826 (Dunlap 1829) and last observed nearly 80 years ago (Dawson 1918). A 10th magnitude *C* component also lies some 35″ from *A*, discovered by John Herschel (1847) in 1835, but no closer components are known.

11053−2718=Fin 47: A new orbital analysis of this system is in progress, some three decades after van den Bos (1957) published his solution.

13031−7129=CHARA 228: As was the case with CHARA 227, this star falls within the declination band missed in the surveys of Rossiter and van den Bos. If physical, this 0.″56 pair would presumably have an extremely long period, given the spectral type and large calculated distance of its primary. The small change in θ seen over 2.75 yr is consistent with this, implying a period of order 500–600 yr. The star is noted in Abt & Biggs (1972) as having variable radial velocity; Hoffleit & Warren (1992) also note photometric variability of amplitude ~0.2 mag, as well as variability in the linewidth of Hα emission.

15123−1947=B 2351 Aa: This system has crude Δm estimates from lunar occultation of about 1.3 mag in both red and blue (Eitter & Beavers 1979). Orbits of this system have been published by Heintz (1982) and later by Mason (1994, 1995); a further analysis is in progress.

17316−2616=CHARA 229: Possible confirmation of this pair may be found in Hoffleit & Warren (1992), who note the following: "Duplicity reported from grazing occultation observations of 1991 September 15. Estimated magnitude of comparison 8.6, separation several tenths of an arcsecond in position angle 160° (all rough estimates)".

18323−1439=CHARA 73: Due to a typographical error, this measurement was incorrectly attributed to 18444+3937=CHARA 77 in McAlister *et al.* (1990).

18444+3937=CHARA 77 Ca: See previous note.

21044−1951=Fin 328: This system has a Δm of about 1.7±0.7 mag, as determined from lunar occultation measures by Evans & Edwards (1983). Orbits of this system have been published recently by Zulevic (1993) and Mason (1994, 1995); further analysis is in progress.

22116−3428=CHARA 230 Aa: This new component to the visual pair Bu 769 has moved through more than 4° in about 10 months, implying a period of order 60–70 yr. The wide pair has shown essentially no change since its discovery in 1879 (Burnham 1887), on the other hand.

23191−1327=McA 74 Aa: McAlister & Hartkopf (1982) published the first visual orbit solution of this system; a combined speckle/spectroscopic analysis is in progress.

23529−0313=Fin 359: This system has a near zero Δm as determined by Evans & Edwards (1981) from lunar occultation. Couteau (1989) and Mason (1994, 1995) have published orbital solutions, and a more complete analysis is in progress.

23568+0443=A 2100: This system has a Δm of 0.9±0.4 in the blue, as determined from lunar occultation measures (Africano *et al.* 1975). Orbits of this system have been published by Heintz (1975) and later by Mason (1994, 1995); further analysis is in progress.

systems and an estimate of their orbital periods. These estimations assume circular, face-on orbits with both components of equal brightness and mass (based on spectral type and photometric parallaxes as estimated from tables in Allen 1973).

Also provided in Table 1 are estimates of Δm for the new components. These values are determined in the same manner as that used for HR 1071 (McAlister *et al.* 1992); i.e., the ratios of "peak" to "antipeak" height in the DVAs are compared with those of systems having known Δm values. This procedure is very sensitive to such factors as seeing conditions, stellar brightness, binary separation, and camera magnification; it is further complicated by the lack of photometric standards among close visual binaries. These various factors force us to assume errors bars of about 0.5 mag for our estimates of Δm. New techniques are being investigated which we hope will provide more reliable routine determination of magnitude difference for objects in the CHARA speckle program.

Three of these systems (CHARA 226, 228, and 229) are known or suspected Be stars; spectroscopic observations of these stars are underway in an attempt to determine whether their binarity may influence these stars' emission in any way. This was found to be the case with the speckle companion to the Pleiades star Pleione, discovered in 1987 (McAlister *et al.* 1989; see Gies *et al.* 1990 for a discussion of the possible effect of this speckle companion on Pleione's emission envelope and on shell episodes).

The new measurements of binary stars are presented in Table 2, where we use the same condensed format of previous papers in this series. The coordinates shown in column 1, which also serve as the *Washington Double Star Catalog* (WDS) number, are for equinox 2000.0, but position angles have not been corrected for precession and are thus based upon the equinox for the epoch of observation, shown as the fraction of the Besselian year. Discoverer designations are shown in column 2, while column 3 gives HD or DM numbers (BD numbers for declinations north of −21°, CPD numbers for stars further south). The date is given in column 4 as a fraction of the Besselian year. Angular separations (column 5) are given in seconds of arc, position angles (column 6) in degrees. Accuracies are, of course, a function of stellar magnitude, magnitude difference, separation, and observing conditions; typical values for these observations are 1–3 mas in ρ and 0.°1–0.°2 in θ. Colons following θ or ρ values indicate measurements of somewhat reduced accuracy, usually the result of observing fainter systems or systems of larger magnitude difference. Finally, the filter effective wavelength and FWHM in nanometers are given in column 7. Short notes on some of these stars follow Table 2; stars having notes are flagged by an asterisk in the final column.

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