

Observations of 4th and 5th Hour Doubles

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Abstract: I report measures for 100 visual doubles, many of which are neglected. Three new pairs are reported. Observations were made with the GRAS002 robotic telescope located at the Remote Astronomical Society Observatory, Mayhill, NM, USA (<http://www.remote-astronomical-society.org/>). In addition to theta and rho values (and standard deviations), I report catalog numbers and magnitude differences of pairs, some of which lack precise positional information, and delta-M values.

In this paper, I report a total of 100 mean and standard deviation measures of theta (PA) and rho (Sep) values of visual double stars imaged using a Takahashi Mewlon 300 Dall-Kirkham cassegrainian reflector located at the Remote Astronomical Society Observatory in Mayhill, New Mexico. The instrument, with a focal reducer, works at F9.1, with an approximate focal length of 2730 mm. It is equipped with a non-antiblooming ST8E CCD camera (9 micron pixels) and the combination has an approximate resolution of 0.68 arcseconds/pixel with a field of view of 11.5 x 17.3 arcminutes. The OTA is mounted on a Bisque Paramount 1100 GEM.

Methods

Methods largely follow previous methods (Wiley 2008). Observing lists were requested from the USNO (Mason, 2006). The list is processed as detailed in Wiley (2007) using the Aladin interactive sky atlas (Bonnarel et al., 2000), the Washington Double Star Catalog (Mason et al., 2006) and a number of catalogs; minimally UCAC2.0 (Zacharias et al., 2004), USNO-B.1 (GSC2.3.2 (STScI, 2006), 2MASS (Skrutskie et al., 2006), and AC2000.2 (Urban, 1998). Note was taken of the published proper motions of each pair. In most cases the proper motion estimates were too low or errors too high to evaluate the system. In some cases,

noted in the discussion, the proper motion of one component was much different than the other and these are noted as probable optical pairs.

Exposures are carried out with a clear filter and the initial image was checked by downloading a JPEG of the FITS image to insure that the correct field was imaged. Exposures ranged from 20-40 seconds. MPO Canopus (Warner, 2006) is used to reduce the images. Magnitudes reported are V-magnitudes from the GSC2.3.2 catalog or J-magnitudes from 2MASS catalog, except as noted. Delta-M was computed from catalog values. New doubles are named using recommendations in Hartkopf and Mason (2004).

Results

Measures for all pairs, neglected and recently measured are presented in Table 1. This is followed by a discussion of selected pairs.

Table 1. Measures of 100 double stars bounded by from 4hr to 5hr RA and +0° to +40°DEC. Primary and secondary catalog numbers are GSC2.3.2 catalog numbers or 2MASS unique identifiers (no prefix). Magnitudes are catalog magnitudes (V for GSC, J for 2MASS). DM is difference in magnitude computed from catalog values. PA and sdPA refer to angle (theta) and standard deviation of N measures in

(Continued on page 124)

Observations of 4th and 5th Hour Doubles

WDS/Disc. Code	Primary	Secondary	Primary	Secondary	dMag	PA	sdPA	Sep	sdSep	Date	N	Notes
04015+2443 POU 345	NCG2000717	NCG2000721	12.74	13.26	0.52	214.2	0.37	14.3	0.09	2007.117	4	1
04038+2402 POU 364	NC3N000220	NC3N000221	13.31	13.91	0.6	217.3	0.16	17.72	0.04	2007.117	5	1, 2
04041+2358 POU 368	NC3N000241	NC3N000238	12.87	15.12	2.25	21.6	0.18	10.69	0.13	2007.117	5	1
04041+2401 POU 367	879714556	879714552	12.682	13.519	0.837	222.6	0.62	6.07	0.22	2007.117	5	1
04042+2510 POU 370	NCG3000806	NCG3004862	12.84	15.14	2.3	254.6	0.1	13.94	0.06	2007.117	4	1
04045+2510 POU 375?	NCG3000796	NCG3005012	13.89	14.9	1.01	337.7	0.09	36.4	0.05	2007.117	4	1
04049+2323 POU 380	NC3N000443	NC3N012963	13.56	16.05	2.49	141.4	0.11	20.17	0.09	2007.117	4	1, 2
04051+2324 POU 382	NC3N000439	NC3N013172	14.35	15.74	1.39	345.8	0.61	7.56	0.16	2007.117	5	1
04051+2510 POU 383	837141520	837141518	11.382	12.637	1.255	117.3	1.1	6.6	0.15	2007.117	7	1
04053+2328 POU 384	NC3N013996	NC3N000412	15.88	15.81	0.07	123.6	0.85	7.95	0.14	2007.117	4	1
04056+2330 POU 387	NC3N000398	NC3N014433	12.55	12.87	0.32	214.3	0.2	8.22	0.09	2007.117	4	1
04063+2424 POU 393	NCG0000550	NCG0000548	13.07	14.8	1.73	75.8	0.22	11.98	0.12	2007.117	6	1
04068+2336 POU 396	NC3K007353	NC3K000383	15.16	15.15	0.01	135	0.17	18.89	0.11	2007.117	5	1
04068+2342 POU 398AC	NC3K000319	NC3K000318	12.63	12.83	0.2	278.6	0.07	14.78	0.04	2007.117	5	1
04068+2342 POU 399AB	NC3K000319	NC3K000321	12.63	15.34	2.71	109.5	0.31	11.92	0.09	2007.117	5	1, 2
04101+2423 POU 416	NCG0000001	NCG0003767	14.98	15.27	0.29	79.6	0.19	15.71	0.06	2007.117	4	1
04125+3538 HJ 341	NCDM001299	NCDM001298	11.3	11.45	0.15	333.5	0.17	13.73	0.05	2007.117	8	1, 2
04147+2356 POU 427	NA20000086	NA20000088	13.08	14.36	1.28	231.3	0.38	8.18	0.07	2007.126	5	1
04237+2450 POU 445	138271241	138271243	10.412	11.264	0.852	225.7	1.65	4.06	0.24	2007.126	4	1
04243+2414 POU 448	138274215	138274211	11.041	11.794	0.753	206.1	2.03	4.8	0.19	2007.126	6	1
04244+3419 STF 533AB	NCDU038705	NCDU001010	7.3	8.49	1.19	61.6	0.11	19.58	0.05	2007.126	5	1, 2
04246+3421 MLB1036	1197763692	1197763697	11.012	13.177	2.165	216.6	NA	5.14	99.9	2007.126	1	1
04251+2341 POU 451	NA2Q000271	NA2Q000269	14.47	14.12	0.35	78.7	0.87	10.9	0.04	2007.126	4	1
04268+0843 HJ 678AB	NA5I000091	NA5I000089	10.84	12.18	1.34	294.2	0.27	19.92	0.02	2007.126	4	1, 2
04268+0843 OPI 2AC	NA5I000091	NA5I000088	10.84	15.18	4.34	266.5	0.06	167.34	0.06	2007.126	4	1
04285+2401 POU 457	NA2X000079	NA2X000080	13.24	14.36	1.12	128.5	0.76	8.73	0.14	2007.126	4	1

Table 1. Measures of 100 double stars bounded by from 4hr to 5hr RA and +0° to +40°DEC. Primary and secondary catalog numbers are GSC2.3.2 catalog numbers or 2MASS unique identifiers (no prefix). Magnitudes are catalog magnitudes (V for GSC, J for 2MASS). DM is difference in magnitude computed from catalog values. PA and sdPA refer to angle (theta) and standard deviation of N measures in degrees; Sep and sdSep refer to separation (rho) in seconds and standard deviation of N measures. Date is date of observation.

Table continued on next page.

Observations of 4th and 5th Hour Doubles

WDS/Disc. Code	Primary	Secondary	Primary	Sec- ondary	dMag	PA	sdPA	Sep	sdSep	Date	N	Notes
04286+0128 BAL1271	N9XF000023	N9XF000024	11.99	12.36	0.37	254.2	0.18	12.21	0.07	2007.126	4	1
04400+3428 ES 2464	880247314	880247321	9.445	11.512	2.067	186	1.73	7.07	0.13	2007.126	4	1
04423+2345 POU 474	NA30000229	NA30000232	12.09	14.39	2.3	193.8	0.86	11.36	0.24	2007.126	5	1
04454+0359 BAL2124	N9L5000510	N9L5000508	11.37	12.29	0.92	326.9	0.17	38.69	0.25	2007.139	4	1
04455+0424 BAL2617	NA4N000636	NA4N000635	12.77	12.91	0.14	6.3	0.48	12.39	0.03	2007.139	4	1, 2
04456+0420 BAL2618	786448304	786448308	10.224	12.481	2.257	13.2	0.38	7.74	0.07	2007.139	4	1, 2
04476+2350 POU 490	NA3Q000131	NA3Q000132	12.1	14.4	2.3	98.1	0.25	13.12	0.09	2007.139	5	1
04493-0020 BAL 664	197552759	197552767	10.344	10.445	0.101	130.5	0.09	19.13	0.05	2007.139	4	1, 2
04495+3914 STF 594	386803172	386803163	9.355	10.617	1.262	333	0.51	9.07	0.07	2007.139	4	1
04497+3920 WLY 19	NCF2000019	NCF2000021	10.86	11.4	0.54	222.7	0.05	30.15	0.05	2007.139	4	1
04508+3607 ALI 66	NCEQ000756	NCEQ000757	12.01	11.42	0.59	13.5	0.29	11.72	0.13	2007.139	4	1
04508+3926 MLB1003	386845966	386845965	12.418	12.179	0.239	274.6	99.9	5.73	99.9	2007.139	1	1
04522+4244 ES 1525	407173884	407173883	9.676	11.454	1.778	85.3	1.43	5.69	0.38	2007.142	4	1
04543+0722 STF 612AB	NA57000074	NA57000079	8.33	8.41	0.08	200	0.1	16.14	0.04	2007.142	4	1, 2
04543+0722 STF 612BC	NA57000079	NA57000076	8.41	13.19	4.78	276.8	0.13	53.3	0.19	2007.142	4	1
04555+0503 BAL2620	N9MF000234	N9MF000236	11.48	12.4	0.92	112.6	0.22	23.13	0.05	2007.142	4	1
04562+0304 BAL1654	802609130	802609131	8.565	10.318	1.753	249.4	1.6	5.44	0.22	2007.142	5	1, 2
04596+3908 ALI 781	351762913	351762925	9.402	5.319	4.083	335.1	0.7	7.22	0.08	2007.142	4	1
05007+2343 POU 510	NA3K000055	NA3K000056	11.93	13.2	1.27	117	0.11	18.77	0.05	2007.156	4	1
05013+3851 ALI 782?	NC9U001182	NC9U001180	12.96	13.06	0.1	70.8	0.33	12.73	0.04	2007.156	4	1
05033+2409 POU 515	N9Q0000284	N9Q0000286	12.31	13.42	1.11	150.9	0.19	17.2	0.11	2007.156	4	1
05038+3921 ALI1046	NCA5000091	NCA5000095	12.66	12.82	0.16	160.8	0.15	13.61	0.03	2007.156	4	1
05046+2401 POU 525	932291410	932291408	10.152	12.128	1.976	117.8	0.37	6.72	0.11	2007.156	4	1
05049+2329 POU 532	NA3K000849	NA3K000854	13.21	13.67	0.46	167.2	0.2	14.65	0.09	2007.156	5	1
05052+0914 HJ 691	N9LT000072	N9LT000080	10.28	12.09	1.81	157.6	0.07	27.57	0.1	2007.156	4	1, 2
05063+3722 SEI 60	NC9T000060	NC9T000058	11.22	12	0.78	74.6	0.04	19.94	0.03	2007.156	4	1
05066+2321 POU 543	NA8G000343	NA8G000346	13.29	12.64	0.65	248.3	0.25	14.84	0.08	2007.156	4	1, 2
05079+1103 J 322	1310946410	1310946407	10.595	11.547	0.952	329.9	3.72	3.5	0.13	2007.156	3	1
05079+2425 POU 554	N9TS000993	N9TS000994	14.28	14.38	0.1	106	0.49	10.72	0.09	2007.156	4	1

Table 1 continued on next page.

Observations of 4th and 5th Hour Doubles

WDS/Disc. Code	Primary	Secondary	Primary	Sec- ondary	dMag	PA	sdPA	Sep	sdSep	Date	N	Notes
05084+2357 POU 557	N9SW000168	N9SW000170	12.01	12.88	0.87	122.8	0.08	16.73	0.02	2007.156	4	1
05095+0325 BAL2136	N9LJ000200	N9LJ000199	12.5	13.11	0.61	289.6	0.12	17.25	0.03	2007.164	4	1, 2
05104+3910 ALI1049	UC45473848	UC45473850	9.05	12.78	3.73	61.4	0.32	9.34	0.11	2007.164	4	1
05107+2452 POU 570	N9TS001304	N9TS001307	12.53	13.36	0.83	185.7	0.08	15.58	0.07	2007.164	4	1
05124+1632 BU 1391	NA7C000273	NA7C000271	12.04	12.1	0.06	73.2	0.16	23.48	0.01	2007.164	4	1
05126+3657 SEI 99	N90Y000167	N90Y017236	11.8	12.95	1.15	102.5	0.21	19.52	0.03	2007.164	4	1
05130+3753 SEI 103	NC9T000704	NC9T032034	13.02	13.81	0.79	13.5	0.22	21.56	0.09	2007.164	5	1
05133+2502 POU 585	N9SZ000188	N9SW000745	11.31	12.62	1.31	295.5	0.12	18	0.02	2007.164	3	1
05135+2451 POU 587AB	139924515	139924522	11.495	9.269	2.226	4.3	NA	9.4	NA	1997.93	1	1, 3
05135+2451 WLY 17AC	139924515	139924516	11.495	11.536	0.041	79	NA	3.2	NA	1997.93	1	1, 3
05153+2342 POU 606	NA6Q000045	NA6Q000047	14.06	13.35	0.71	337.7	0.19	12.94	0.07	2007.167	4	1, 2
05156+2340 POU 611	NA6Q000062	NA6Q000063	12.46	14.74	2.28	133.7	0.34	12.09	0.06	2007.167	4	1
05157+3738 SEI 125AB	459453452	459453471	12.242	13.103	0.861	311.8	0.37	19.61	0.23	2007.167	5	1, 2
05157+3738 WLY 18AC	459453452	459453478	12.242	12.316	0.074	318.1	0.27	23.46	0.08	2007.167	5	1
05161+3632 SEI 132	N9PB000393	N9PB000395	13.04	13.1	0.06	259.5	0.15	25.73	0.04	2007.167	4	1
05164+3651 SEI 134	N9PB017600	N9P9000267	12.83	11.95	0.88	6.8	0.03	25.23	0.02	2007.167	4	1
05165+3650 SEI 135	N9PB000224	N9PB017182	11.09	12.65	1.56	144.1	0.06	18.26	0.02	2007.167	4	1, 2
05166+3646 SEI 140	N9PB000261	N9PB014555	12.71	13.08	0.37	152.9	0.04	25.71	0.03	2007.167	4	1
05170+3811 SEI 146AB	1207035003	1207035013	11.395	11.385	0.01	157	0.49	4.01	0.02	2007.167	5	1, 2
05170+3811 SEI 146AC	1207035003	1207035014	11.395	12.03	0.635	250	0.52	11.56	0.07	2007.167	5	1, 2
05170+3811 SEI 146AD	1207035003	1207034994	11.395	12.861	1.466	5	0.78	5.24	0.03	2007.167	5	1
05174+3753 SEI 151	N9P5000439	N9P5003701	12.4	13.67	1.27	291.6	0.14	12.79	0.06	2007.18	4	1, 2
05175+2446 POU 637	140092729	140092733	9.773	11.276	1.503	200.6	0.26	4.51	0.04	2007.167	4	1, 2
05176+2446 POU 640	N9SZ009721	N9SZ009761	15.39	15.35	0.04	57.2	0.33	16.5	0.14	2007.168	4	
05175+3630 SEI 153	N9PB000421	N9PB000419	12.99	11.88	1.11	54.9	0.08	27.86	0.04	2007.167	4	1
05175+3710 SEI 152	N9P9000204	N9P9008811	13.54	14.07	0.53	173.6	0.05	15.77	0.04	2007.167	4	1
05176+3629 SEI 157	880428002	880427996	10.251	11.515	1.264	322.6	0.25	7.34	0.03	2007.167	4	1, 2
05176+3731 SEI 154	N9P9020399	N9P9000460	13.64	13.66	0.02	81.7	0.12	21.09	0.06	2007.18	8	1

Table 1 continued on next page.

Observations of 4th and 5th Hour Doubles

WDS/Disc. Code	Primary	Secondary	Primary	Sec- ondary	dMag	PA	sdPA	Sep	sdSep	Date	N	Notes
05177+3757 SEI 156	N9P5006979	N9P5000383	13.08	12.24	0.84	244.1	0.05	24.81	0.06	2007.18	7	1, 2
05177+3801 SEI 158	N9P5009995	N9P5000331	12.67	13.27	0.6	148.3	0.09	23.9	0.03	2007.18	7	1, 2
05179+3736 SEI 163	N9P9000419	N9P9034906	13.17	12.53	0.64	258.8	0.41	7.15	0.12	2007.18	6	1, 2
05179+3758 SEI 161	N9P5000359	N9P5000356	12.14	13.43	1.29	310.3	0.14	13.16	0.02	2007.18	7	1, 2
05180+3646 SEI 165	N9PB000256	N9PB015536	12.86	13.57	0.71	121	0.05	25.94	0.07	2007.18	4	1
05180+3733 SEI 164	N9P9000440	N9P9000436	12.02	12.23	0.21	164	0.1	27.83	0.02	2007.18	8	1, 2
05183+3650 SEI 167AB	880435060	880435072	12.292	13.219	0.927	143.2	0.89	6.05	0.19	2007.18	4	1
05183+3650 SEI 167AC	880435060	880435103	12.292	12.472	0.18	9.9	0.2	19.77	0.14	2007.18	4	1
05184+3644 SEI 170	N9PB000279	N9PB000280	12.1	12.69	0.59	123.8	0.21	10.75	0.04	2007.18	7	1, 2
05184+3645 SEI 169	N9PB000267	N9PB014792	12.77	13.19	0.42	104.9	0.24	10.77	0.05	2007.18	7	1, 2
05186+3745 SEI 172	880478156	880478149	9.449	12.443	2.994	2.4	0.77	5.51	0.22	2007.18	4	1, 2
05186+3745 SEI 173	N9P9000319	N9P9037820	11.89	14.33	2.44	101.4	0.6	8.94	0.07	2007.18	4	1, 2
05187+3722 SEI 174	N9P9000136	N9P9015605	12.43	13.93	1.5	12.9	0.15	28.69	0.05	2007.18	5	1
05197+3722 SEI 183	N9PB000030	N9PB031195	11.5	13.49	1.99	27.6	0.27	16.75	0.07	2007.18	4	1
05197+3755 SEI 184	N9P5000386	N9P5006653	12.89	13.68	0.79	113.2	0.19	17.1	0.09	2007.18	4	1
05198+3755 SEI 188	N9P5000396	N9P5000399	12.27	12.75	0.48	157.3	0.21	15.06	0.05	2007.18	4	1, 2

Notes

1. Measures from CCD images taken with a F9.1 300mm cassegrainian telescope (0.68 arcseconds/pixel resolution) and measured using the program MPO Canopus.
2. Recently measured
3. Measures from 2MASS catalog data retrieved via Aladin

Observations of 4th and 5th Hour Doubles

(Continued from page 119)

degrees; Sep and sdSep refer to separation (ρ) in seconds and standard deviation of N measures. Date is date of observation

Discussion

Several pairs are shown to have fainter stars in the immediate neighborhood. However, in all cases the proper motions of the original pair are too small to determine their possible nature and the same is true of additional possible components. These stars are noted but not designated. Brief note of proper motion is made in the following format: catalog number, proper motions in RA and Dec in mas/yr; as in: USNO-B1.01151-0049804, +132-216 where +130 mas/yr and +034 mas/yr are the proper motions in RA(*cos(Dec)); and Dec respectively, rounded to the nearest 1 mas/yr.

04045+2510POU 375.

High proper motion of primary (USNO-B1.01151-0049804, +132-216) and low proper motion of the secondary (2UCAC 40640459, -002-002) probably explains discrepancy of this measure to original. An optical pair.

04051+2324POU 382.

Relatively high proper motion of the secondary (USNO-B1.01134-0054389, -086+380) compared to the primary (USNO-B1.001134-0054390, +014-026) probably explains the difference between original and reported measure. An optical pair.

04056+2330POU 387.

The primary (UCAC2.0 40136864, +29-26) has a measurable proper motion.

04454+0359BAL2124.

Proper motions are very different (A, UCAC2.0 32992677, +85, -215; B, UCAC2.0 32992674, -016, -010) and this pair is optical.

04559+0347BAL2130 and 04565_0427BAL2622.

Both of these entries have B components entered into the AC2002.2 catalog that agree with the original measures. However, there are not stars at either B positions.

04268+0842.

All components of this system have very different proper motions (A, UCAC2.0, +113+015; B USN-BOB1.0, -034 +022; C UCAC2.0, -002-004) and the two pairs (HJ 678AB and OPI 2AC) are optical.

04497+3920WLY 19.

Although the proper motions in RA are small, so

are the errors, and this pair may be a common proper motion pair. A = UCAC 45469359: pmRA 7.9 ± 0.7 mas/yr (*cos(Dec)); pmDE -13.4 ± 0.9 mas/yr. B = UCAC 45469354: pmRA 6.7 ± 1.9 mas/yr (*cos(Dec)); pmDE -13.9 ± 3.4 mas/yr.

04543+0722STF 612.

STF 612 AB is a physical pair of KO stars with a relatively high proper motions, similar radial velocities (Kharchenko et al., 2007), and parallax (0.0340 arcsec; 29.4 parsecs distance; Lepine, 2005) and is designated a physical association in the WDS (tagged "V"). In contrast, component C has a small proper motion (UCAC2.034226405, +002-009) and thus STF 612BC is optical. Precessing to 1906 gives a measure of BC comparable to the last measure in the WDS.

04555+0503BAL2620.

Proper motion are very different, an optical pair (A, UCAC2.033516872, +002+006; B, UCAC2.033516879, +061-041).

04596+3908ALI 781.

POSSII plates and 2MASS show three point sources, two corresponding to ALI 781 and another (MASS 351762903) approximately 242 and 7.5" from the primary. Proper motions are too small to evaluate.

05007+2343POU 510.

Proper motion are very different, an optical pair (A, UCAC2.0 40142499, -003-003; B, UCAC2.040142504, +037-051).

05013+3851ALI 782?

It is very doubtful that this is the same pair measured by Ali, or, alternately, there was a mistake in transcribing measures. Nothing in the field matches the original theta and rho.

05038+3921ALI1046

Proper motions are not similar, probably optical (A, UCAC2.0 54572216, -015-010; B UCAC2.0 50082905, -031-014).

05063+3722SEI 60.

The A component has a significant proper motion (UCAC 2.0 44800268, -121, -080. Although no proper motion estimates were found for B, it is virtually the same position on POSSII plates as cataloged in the AC20002 catalog (Urban et al. 2001: mean epoch of position, 1912.978), implying a very different (and small) proper motion. Probably an optical pair.

05124+1632BU 1391.

The 2007 measure reported in the WDS of PA = 56° , Sep = 30.8" may refer to another pair. The measure reported here agrees closely with the initial meas-

Observations of 4th and 5th Hour Doubles

ure of 1910 (PA = 73° Sep = 23.5")

05049+2329POU 532.

The 2MASS catalog shows a faint "companion" of B: Unique Identifier = 144751528; 185°, 4.6" from B. Proper motion of A is too small to evaluate; B lacks proper motion measure.

05052+0914HJ 691.

Proper motions are not similar, probably optical (A, UCAC2.0 34965343, +041-048; B UCAC2.0 34965346, +015-014).

05063+3722SEI 60.

Primary has a relatively large proper motion (UCAC 4480268 -121-080) and secondary lacks a measure. AC2002 position is close to 1895 measure and indicates that the B component has not moved significantly since 1912. Probably optical.

05135+2451POU 587AB and WLY17AC.

The primary is resolved into two stars on 2MASS plates and my CCD images. The brighter star of these two stars was taken as the A component and the pair is reported as 05135+2451WLY 17AC. Unfortunately A and C were not well separated and PA and Sep are determined from positions reported in the 2MASS catalog. The B component is actually the brightest of the three. Note that the original measure of POU587AB is approximately between the two resolved stars.

05157+3738SEI 125AB, 05157+3738WLY 18AC.

WLY 18AC is probably optical. However, the two different measures reported to SEI 125 are explained by the fact that "B" is actually two stars, each correlated separately with the two different 1895 measures; prompting the naming of the third component.

05170+3811SEI 146.

In addition to the B, C, and D components, there is another star at 59.4°, 8.8" in the 2MASS catalog (1207034995; Jmag 14.667). No proper motions are not large enough to evaluate this collection of stars.

05175+2446POU 637.

Although the B component lack a proper motion measure, the discovery measure can be duplicated by precessing A to 1898 (first report) and assuming B has no measurable proper motion. Since A has a relatively large proper motion (UCAC2.0 40476260, -069-064) and B apparently does not, this is probably an optical pair.

05176+2446POU 640.

This pair's position corresponds to the WDS precise coordinates. Theta and rho are a good match,

but the pair is much fainter than that reported in the WDS.

05177+3757SEI 156.

The apparent brightness of B may be due to the proximity of a star (GSC2.3 N9P5038947) at 45° 4.97" from B on the POSSII image.

05179+3724SEI 162.

AC2000 has a catalog position for B that corresponds fairly closely to the original position, but no plate examined shows a star in this position and no star in the field has a large enough proper motion to explain the discrepancy. The star GSC2.3 N9P9016265 is approximately the same angle, but is much fainter than the magnitude difference of 0.7 reported. The star GSC2.3 N9P9015942 is about the right difference in magnitude but both separation and angle are completely different; a dubious double.

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