

Neglected Double Observations for 2006 No. 4: Some 22nd Hour Doubles

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Abstract: I report measures for 64 neglected doubles, many having a single previous observation reported in the WDS as of manuscript submission. In addition, I report measures of 15 recently measured pairs. 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 79 mean and standard deviation measures of theta (PA) and rho (Sep) values of 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 2730mm. It is equipped with a non-antiblooming ST8E CCD camera (9 micron pixels) and the combination has an approximate resolution of 0.6arcseconds/pixel with a field of view of 11.5x17.3 arcminutes. The OTA is mounted on a Bisque Paramount 1100 GEM.

Methods

Methods largely follow Wiley (2007). Observing lists were requested from the USNO (Mason, 2006). The list is processed as detailed in Wiley (2006) 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), GSC2.3.2 (STScI, 2006), 2MASS (Skrutskie et al., 2006), and AC2000.2 (Urban, 1998).

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 as detailed in Wiley (2007). Magnitudes reported are V-magnitudes from the GSC2.3.2 catalog or J-magnitudes from 2MASS catalog. Discoverer code terminology follows 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.

Discussion of Selected Measured Pairs

(Continued on page 18)

Neglected Double Observations for 2006 No. 4: Some 22nd Hour Doubles

WDS	Disc	Primary	Secondary	Primary Mag	Secondary Mag	Delta-M	PA	PAsd	Sep	Dsd	Epoch	No. Obs	Notes
22000+2454	POU5605	N2Y0000936	N2Y0012080	13.18	13.78	0.60	63.9	0.55	6.77	0.10	2006.822	4	1,2
22001+4001	MLB1024	N2WX000912	N2WX000913	11.82	12.06	0.24	222.1	0.09	23.52	0.05	2006.822	4	1,2
22003+2922	MLB 497	2M91040187	2M91040178	8.615	11.984	3.37	184.2	0.48	7.54	0.05	2006.822	4	1,3
22006+2510	POU5610	2M 910152516	2M 910152519	10.842	12.698	1.86	145.7	1.94	4.16	0.14	2006.822	4	1,3
22016+2421	POU5615	N2M9000031	N2M9021441	12.82	12.98	0.16	142.5	0.51	7.79	0.04	2006.822	4	1,2
22042+3507	SEI11554	N2W5000147	N2W5000149	11.25	12.06	0.81	114.6	0.18	16.34	0.01	2006.822	4	1,2,4
22042+3806	SEI11555	2M1103119226	2M1103119230	10.297	10.661	0.36	178.4	0.13	7.15	0.11	2006.822	4	1,3
22043+2401	J 1224AB	N2MB000374	N2MB000373	11.11	12.18	1.07	75.6	0.05	28.57	0.03	2006.822	4	1,2,5
22045+2758	MLB 622	2M1185514702	2M1185514700	12.043	12.92	0.88	280.3	0.71	4.02	0.04	2006.822	4	1,3
22050+1130	HJ 290	2M996699436	2M996699435	10.877	11.661	0.78	88.0	0.17	8.75	0.05	2006.822	4	1,3
22058+3059	ES 2361	2M279833675	2M 279833674	9.049	11.997	2.95	291.0	99.9	4.89	99.90	2006.822	1	1,3
22065+2806	MLB 722AB	2M 117315408	2M 117315406	11.427	11.567	0.14	253.2	1.54	2.18	0.19	2006.822	4	1,3
22065+2806	MLB 722AC	2M 117315408	2m117315422	11.427	12.056	0.63	322.8	0.36	32.34	0.07	2006.822	4	1,3
22077+2521	POU5641	2M 117322539	2M 117322532	9.067	14.993	5.93	237.2	0.93	7.40	0.08	2006.822	4	1,3
22080+0358	BAL2566	NOHD000299	NOHD000301	12.35	11.99	0.36	176.8	0.31	15.76	0.07	2006.822	4	1,2
22084+3919	MLB 793	2M 851976056	2M 851976062	11.656	12.533	0.88	209.4	0.42	6.37	0.12	2006.822	4	1,3
22096+2425	POU5650	N2Y0001074	N2Y0001073	12.96	14.1	1.14	293.8	0.32	15.88	0.07	2006.835	4	1,2
22098+0800	HJ 955	NOGM002945	NOGM002946	11.4	12.26	0.86	139.2	0.18	9.77	0.04	2006.835	4	1,2
22100+0757	STF2867	NOGM000166	NOGM000169	8.31	9.31	1.00	208.4	0.1	10.30	0.08	2006.835	4	1,2
22100+3343	GYL 72	N2WM000023	N2WM000021	11.82	11.96	0.14	344.1	0.09	21.79	0.04	2006.835	4	1,2
22105+2421	POU5655	N2Y0000031	N2Y0000033	13.26	13.48	0.22	223.6	0.2	13.69	0.03	2006.835	4	1,2
22102+2418	POU5653	N2Y0000058	N2Y0000053	11.94	12.54	0.60	310.6	0.29	21.46	0.07	2006.835	4	1,2,5
22107+3322	GYL 73	N2WM000238	N2WM000278	11.22	12.52	1.30	339.2	0.08	18.03	0.04	2006.835	4	1,2,4
22109+1159	CHE 330	N0JL000116	N0JL000117	11.05	13.03	1.98	113.3	0.05	15.64	0.03	2006.835	4	1,2
22111+4032	MLB 963	2M 350955569	2M 350955576	12.035	13.081	1.05	9.7	0.66	6.57	0.11	2006.835	4	1,3
22114+0057	BAL1240	N0G8000159	N0G8000158	11.89	12.38	0.49	274.5	0.07	10.18	0.02	2006.838	4	1,2,4
22122+0553	HJ 3097AB	2M1165327003	2M1165327018	7.797	11.432	3.64	38.1	0.09	20.41	0.03	2006.838	4	1,3,5
22122+0553	HJ 3097AC	2M1165327003	2M1165327029	7.797	12.903	5.11	334.0	0.22	26.71	0.02	2006.838	4	1,3,5

Neglected Double Observations for 2006 No. 4: Some 22nd Hour Doubles

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22122+0553	HJ 3097Bb	2M1165327018	2M1165327025	11.432	12.657	1.23	324.3	0.27	7.20	0.16	2006.838	4	1,3
22123+3952	MLB1100	N2X3000831	N2X3029267	11.31	12.97	1.66	301.3	0.59	8.54	0.07	2006.838	4	1,2
22127+1134	HJ 3099	N0JL000204	N0JL000203	11.89	13.01	1.12	57.7	0.39	11.25	0.09	2006.838	4	1,2
22145+2452	POU5673	2M118180014	2M118180022	12.898	12.765	0.13	226.5	0.7	7.21	0.05	2006.838	4	1,3
22156+2500	POU5678	N2V4000764	N2V4000766	13.38	13.95	0.57	175.0	0.16	15.58	0.07	2006.838	4	1,2
22156+3811	ES 2530	2M 351076399	2M 351076396	10.347	10.304	0.04	307.0	0.84	4.69	0.19	2006.838	4	1,3
22172+2502	POU5681	N08W000264	N08W000263	13.21	13.48	0.27	85.5	0.5	8.44	0.12	2006.838	4	1,2
22178+3857	MLB 795	2M 351140792	2M 351140791	11.533	11.853	0.32	80.5	0.37	6.53	0.10	2006.838	4	1,3
22183+0442	HJ 3103	N0HN000096	N0HN000099	12.58	13.08	0.50	111.6	0.36	14.58	0.05	2006.838	4	1,2
22183+2529	POU5683	N2V4000365	N2V4000372	12.43	13.16	0.73	168.4	0.14	12.84	0.04	2006.838	4	1,2
22189+3807	ALI 701	N2W8000865	N2W8000869	11.38	11.03	0.35	193.9	0.09	14.13	0.02	2006.857	4	1,2
22190+3912	MLB 994	2M 351173167	2M 351173168	12.883	13.914	1.03	253.7	0.32	3.86	0.22	2006.857	4	1,2
22199+1553	HJ 1750	N0M1015466	N0M101000312	9.01	11.61	2.60	247.7	0.1	22.29	0.02	2006.857	4	1,2
22211+3544	ES 2389	2M1306284260	2M1306284266	10.048	11.417	1.37	30.1	0.58	6.04	0.08	2006.857	4	1,3
22234+2300	ROE 129AB	N0LP000434	N0LP000452	9.69	11.36	1.67	206.5	0.04	89.98	0.04	2006.857	4	1,2,5
22234+2300	ROE 129BC	2M1112443147	2M1112443146	10.425	12.008	1.58	301.2	1.73	5.13	0.13	2006.857	4	1,3
22239+3226	ES 2390	2M 280742413	2M 280742407	8.749	8.821	0.07	323.9	0.4	7.30	0.09	2006.857	5	1,3
22244+3648	J 3166AB	2M1125008057	2M1125008053	10.737	11.59	0.85	176.1	0.35	3.42	0.18	2006.857	4	1,3,5
22244+3648	J 3166AC	2M1125008057	2M1125008045	10.737	12.982	2.25	144.4	0.21	23.39	0.08	2006.857	4	1,3
22248+2233	HO 183AC	N0LR000634	N0LR000618	9.02	12.9	3.88	51.7	0.02	72.99	0.02	2006.857	4	1,2
22248+2833	MLB 583AB	2M 936245849	2M 936245851	9.769	11.577	1.81	97.3	0.36	5.73	0.12	2006.857	4	1,3,5
22248+2833	MLB 583AC	2M 936245849	2M 936245867	9.769	12.473	2.70	211.6	0.15	20.96	0.06	2006.857	4	1,3
22264+2355	POU5705	N0LP000016	N0LP000015	11.27	12.6	1.33	9.4	0.2	11.98	0.02	2006.857	4	1,2
22292+2621	J 3168AB	2M 366337398	2M 366337403	10.409	10.7	0.29	149.4	0.15	7.91	0.04	2006.857	4	1,3,5
22292+2621	J 3168AC	2M 366337398	2M 366337400	10.409	11.105	0.70	260.8	0.09	26.18	0.01	2006.857	4	1,3
22293+3008	MLB 581AC	N2V8000818	N2V8000815	11.19	12.71	1.52	8.9	0.25	27.94	0.07	2006.857	4	1,2,5
22306+1309	HJ 296	N0RN000191	N0RN000195	11.09	13.63	2.54	209.0	0.15	23.50	0.05	2006.874	4	1,2
22306+3706	HJ 1774AB	N2V0000936	N2V0000934	10.51	12.67	2.16	53.3	0.24	16.25	0.02	2006.874	4	1,2

Neglected Double Observations for 2006 No. 4: Some 22nd Hour Doubles

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22306+3706	HJ 1774AC	N2Y0000936	N2Y0000930	10.51	13.55	3.04	322.7	0.05	29.01	0.03	2006.874	4	1,2
22308+3708	ALI 456	N2Y0000923	N2Y0000924	12.28	12.87	0.59	212.0	0.18	14.44	0.02	2006.874	4	1,2,5
22316+2331	POU5712	N0LN000135	N0LN000134	12.36	13.16	0.80	271.8	0.26	11.05	0.07	2006.874	4	1,2
22329+3021	ES 391AB	2M1164342489	2M1164342486	9.17	11.94	2.77	347.5	1.06	5.18	0.19	2006.874	4	1,3
22340+2417	POU5720	N093000010	N093000012	13.04	13.37	0.33	143.7	0.06	24.73	0.08	2006.874	4	1,2
22362+0010	STF2921AB	N03N000345	N03N000346	8.422	9.89	1.47	236.1	0.05	29.08	0.03	2006.874	4	1,3,5
22362+0010	STF2921AC	N03N000345	N03N0003185	9.95	11.24	1.29	175.2	0.03	84.90	0.07	2006.874	4	1,2,5
22368+2732	MLB 584AB	2M366620718	2M3666520720	11.91	11.797	0.11	311.1	1.22	4.76	0.18	2006.874	4	1,3,5
22368+2732	MLB 584BC	2M366520720	2M366520717	11.797	13.452	1.66	231.3	0.39	12.19	0.04	2006.874	4	1,3
22377+2443	POU5725	N090000397	N090000396	13.27	13.32	0.05	43.6	0.05	16.71	0.04	2006.874	4	1,2
22389+3010	CHE 331	N09W000455	N09W000454	13.81	13.95	0.14	15.0	0.29	12.44	0.05	2006.874	4	1,2
22391+2336	POU5727	N0MS000127	N0MS010225	-10.90	-7.3	3.60	342.9	0.44	8.52	0.05	2006.874	4	1,6
22394+3926	MLB 798	N2X0000408	N2X0000409	12.72	14.26	1.54	266.4	0.46	8.37	0.11	2006.874	4	1,2
22396+3040	CHE 332	N09W000281	N09W000280	12.98	12.89	0.09	83.2	0.1	27.86	0.05	2006.901	4	1,2
22407+3222	CHE 346	N2VT000653	N2VT000648	11.70	11.97	0.27	336.5	0.09	17.75	0.01	2006.901	4	1,2,5
22412+3223	CHE 355	N2VT000637	N2VT000627	13.97	14.25	0.28	24.4	0.09	32.46	0.05	2006.901	4	1,2
22416+3224	CHE 364	N2VT000616	N2VT000614	13.42	13.79	0.37	83.8	0.13	31.56	0.04	2006.901	4	1,2,5
22417+3047	CHE 369AB	N09W000249	N09W000250	11.86	12.95	1.09	148.8	0.19	17.54	0.05	2006.901	4	1,2,5
22417+3047	CHE 369AC	N09W000249	N09W000248	11.86	12.76	0.90	279.7	0.12	23.56	0.07	2006.901	4	1,2,5
22417+3059	CHE 368	N09Z000149	N09Z000147	13.28	13.53	0.25	345.1	0.11	9.45	0.04	2006.901	4	1,2
22418+2355	POU5733	N0MC000087	N0MC000089	13.54	14	0.46	255.5	0.43	8.35	0.20	2006.901	4	1,2
22418+3041	CHE 370AB	N09W000284	N09W000288	12.76	13.11	0.35	205.6	0.23	10.85	0.09	2006.901	4	1,2
22418+3041	CHE 370AC	N09W000284	N09W000293	12.76	13.21	0.45	156.4	0.08	28.80	0.11	2006.901	4	1,2

Table Footnotes

1. Measures taken with a Takahashi Mewlon 300 Dall-Kirkham, F9.1, focal length 2730mm. equipped with ST8E CCD camera (9 micron pixels): approximate resolution is 0.6arcseconds/pixel.
2. V-magnitudes from GSC2.3.2
3. J-magnitudes from 2MASS
4. PA reversed based on obvious magnitude difference
5. Recently measured
6. Raw instrument magnitude, clear filter

Neglected Double Observations for 2006 No. 4: Some 22nd Hour Doubles

(Continued from page 14)

22001+4001 MLB1024. Although the measures reported here are very different from the originals measures, I believe this is the pair based on the large proper motion of the primary (ca. +163 mas/year RA (*cosDec) and 147 mas/year DEC). Proper motion of the secondary indicates that this is an optical pair that is diverging (USNOB1.0: -36 mas/year RA, -24 mas/yr DEC relative to YS4.0).

22016+2421 POU5615. The primary has a significant proper motion (UCAC2.0 pmRA (*cos(Dec)) = 21.8 mas/yr; pmDec = 41.1 mas/yr). Unfortunately the secondary is not associated with proper motion values to test the difference between the original measure (PA = 197°, Sep = 14.6") and the reported measure.

22042+3806 SEI1555. The proper motion of the primary is relatively large (UCAC2.0 45258708; pmRA (*cos(Dec)) = 12.8±3.4, pm Dec = 170.8±1.7. There are three other pairings in the immediate vicinity, but all are fainter.

22065+2806 MLB 722AC. Proper motions fail to explain the discrepancy between the original separation (Sep = 24") and the reported separation of 32.3"; the angles agree.

22077+2521 POU5641. The primary has a large proper motion (+108 mas.yr. RA, -20 mas/yr Dec, relative to YS4.0; from USNO B1.0). No catalog measure of the secondary proper motion is available, but the secondary appears also to have a large proper motion and is closing on the primary (approximations based on 1899 theta and rho plus AC2002.2 catalog position of primary in 1894).

22102+2418 POU5653. This is probably a common proper motion pair. UCAC catalog numbers and proper motions are as follows. A is UCAC2.0 4044476, pmRA(*cos(dec) = 13.3±0.7, pmDec = 14.1±0.6. B is UCAC 4044473, pmRA(*cos(dec) = 12.3±1.6, pmDec = 11.7±1.0.

22107+3322 GYL 73 This is probably the pair. AC2002.2 shows this cataloged pair in the correct positions for the measure reported by Goyal and Khandelwal (1968), but there is no star in the position of the secondary in the POSS II or POSS I plates. Perhaps there is a mistake in position of the secondary in the catalog used? UCAC proper motions of the primary and secondary do not address the discrepancy.

22109+1159 CHE330 and CHE 329. The measure reported here is CHE330. The 2006 entry for this pair

in the WDS (theta=129°, rho = 33.1") is, I suspect, a measure of the A component of CHE 329 and a star of equal magnitude lying SE of this pair. The USNO catalog numbers for this 2006 entry are A = 36218156 and "B" = 36218159. Although of similar magnitude, they do not share similar motions.

22135+3336 GLY 75. Goyal and Kahandelwal (1968) reported measures of theta = 186.3° and rho of 29.19" suggesting a problem with the original measure or identity of the pair.

22183+0442 HJ 3103. Proper motion values overlap, but this is due to large errors. A is UCAC2.033498870; pmRA = -11.9±5.6mas/year (*cos(Dec)),. pmDec = -18.2±5.6 mas/year. B is UCAC2.0 33498871; pmRA = -7.4±5.6 mas/year (*cos(Dec)), pmDec = -13.4±5.6 mas/year.

22189+3807 ALI 701. There is a 14-15th magnitude star at PA = 281, SEP = 8.6 from the B component. No proper motions are large enough to evaluate the relationships among these stars.

22234+2300 ROE129BC. Proper motions of component of Roe129BC are highly similar, suggesting either a true binary or a common proper motion pair. Component B is UCAC 2.0 39947606: pmRA (*cos(Dec) = -6.6 ± 2.0 mas/yr; pmDec = 15.5 ± 2.1 mas/yr. C is UCAC2.0 39947604: pmDec (cos*(Dec) = -6.9 ± 2.0 mas/yr; pmDec = 16.1 ± 2.1 mas/yr.

22239+3226 ES 2390 Lies in a field bracketed by NGC 7275, NGC 7270, and MCG +05-52-0.8.

22292+2621 J 3168AB. Proper motions of component of J 3168AB are highly similar, suggesting either a true binary or a common proper motion pair. Component A is UCAC 2.0 41123972: pmRA (*cos(Dec) = -9.1 ± 1.0 mas/yr; pmDec = 10.3 ± 0.7 mas/yr. C is UCAC2.0 41123974: pmDec (cos*(Dec) = 8.3 ± 0.7 mas/yr; pmDec = 12.7 ± 1.1 mas/yr.

22329+3021 ES 391. The proper motion of the primary and relative positions of the secondary since 1906 suggests astrometric study. A third faint component is present on the POSS II (J) plate (Epoch 1992.801) that is not recorded on the POSS I (O) plate (epoch 1954.604). It is 2M1164342478

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Neglected Double Observations for 2006 No. 4: Some 22nd Hour Doubles

database of astronomical catalogs and associated catalogs (UCAC2.0, USNOB1.0, GSC 2.3.2, Tycho-2, 2MASS and AC2000.2), all maintained at the Centre de Données astronomiques de Strasbourg, France.. Special thanks to Arnie Rosner and Brad Moore, Global Rent-A-Scope (<http://www.global-rent-a-scope.com/>) for their support of research to the Remote Astronomical Society Observatory and to Mike and Lynne Rice of New Mexico Skies (<http://www.nmskies.com/>) for ground support for the observatory.

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