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Abstract: This report contains theta/rho measurements from 82 different double star systems. The time period spans from 2010.022 to 2010.310. Measurements were obtained using a 20-cm Schmidt-Cassegrain telescope and an illuminated reticle micrometer. This report represents a portion of the work that is currently being conducted in double star astronomy at Divinus Lux Observatory in Flagstaff, Arizona.

This article contains a listing of double star measurements that are part of a series, which have been continuously reported at Divinus Lux Observatory, since the spring of 2001. As has been done in previous articles, the selected double star systems, which appear in this report, have been taken from the 2001.0 version of the *Washington Double Star Catalog* (WDS) published measurements that are no more recent than ten years ago. Several systems are included from the 2006.5 version of the WDS as well. There are also some noteworthy items that are discussed pertaining to the following table.

To begin with, the Castor star system (STF 1110 AB/AC/AD) has displayed some significant theta/rho shifts over the past several years. AB is a common proper motion visual binary star that currently displays a decreasing theta value and an increasing rho value because of orbital motion. The theta/rho values that appear in this report very closely agree with parameters obtained from using the orbital elements, which are rated at grade 3, as reported in *Sky Catalog ue 2000.0 Vol. 2*. Since 2005, the theta value for AB has decreased by one degree and the rho value has increased by almost 15%. AC and AD are optical components. Because of the high proper motion being displayed by AB, the theta/rho shifts for AC and AD are caused by proper motion alone. Most noticeably, a rho value decrease of 7.5" appears to have occurred for AD since the 1998 value was recorded in the WDS. Because the proper motion velocity doesn't appear to support this large of a shift, one might question if the 1998 rho value in the catalog is accurate. In any case, this system warrants additional measurements by other researchers in order to bring additional accuracy to all of these parameters.

Another visual binary system that is worthy of mention, which was measured for this report, is STF 1196 AB-C (Zeta Cancri). During this past decade, the theta value appears to have decreased by 4 degrees because of orbital motion. A comparison of the theta/rho values that appear in the table below with the parameters obtained from using the orbital elements, as listed in *Sky Catalogue 2000.0 Vol. 2*, yields a close agreement. Because the calculated orbit carries a grade 5 rating, it is significant that these two sets of theta/rho values display this type of consistency.

A final visual binary star that deserves some comments pertains to STF 1785 in Bootes. During the past 10 years, the theta value appears to have increased by approximately 8.5 degrees, along with a slight decrease in the rho value. These measured values are consistent with what would be obtained when calculating the theta/rho values using the orbital elements, as listed in *Sky Catalogue 2000.0 Vol. 2*. Such a consistency might be expected since the listed orbital elements have been given a grade 2 reliability rating.

Also appearing in this article is one additional double star that has displayed noticeable theta/rho shifts, during the past 10 years, because of proper motion alone. In this regard, PWS 4 AB-C has shown a 4% rho value increase, since 2000, because of proper

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motion by the "C" component.

Listed in the table is one possible common proper motion double star, bearing the "ARN" prefix, that doesn't appear to have been previously cataloged. Labeled as ARN 111 (11387+3238), this pair appears near ES 2285 in Ursa Major.

A possible correction to the WDS catalog is being suggested because of measurements that were made for the STF 1113 (07350+2416) star system. The theta/rho parameters obtained for this report more closely match measurements for the AC components, rather than AB components that appear in the WDS catalog. Hence, the table below lists the measurements as "AC" rather than "AB." This is another system that merits additional measurements by other researchers, in order to determine the accuracy of the parameters listed in this report.

An addition to the WDS catalog is also being proposed. It appears that the BGH 46 Aa-B system (13164+1948) is not listed in either the 2001.0 or the 2006.5 versions. While measurements for "Aa-B" are included in the table below, measurements for "Aa" have not been submitted because the combination of a small rho value and component magnitude difference exceeds the limitations of my instrumentation. Measurements for "Aa" are encouraged for those researchers who have access to larger telescopes.

Finally, the WDS CATALOG 2001.0 version and the 2006.5 version list optical components for the STF 1830 (14157+5640) and the STF 1831 (14161+5643) star systems that are shared in common by both, probably as a consequence of the proximity of these systems to each other. Because of the potential for confusion that could result from this situation, measurements are only being submitted for STF 1830 AB and STF 1831 AB.

NAME	RA+DEC	MAGS	PA	SEP	DATE	NOTES
H 91AC	06003+4436	6.2 10.2	344.5	35.55	2010.022	1
STF 840A-BC	06065+1045	7.2 8.9	248.1	21.73	2010.022	2
STF 889AB	06199+2501	7.4 9.9	242.5	21.23	2010.022	3
STF 928AB	06347+3832	7.8 8.6	132.0	3.46	2010.022	4
BRT1233	07295+1023	10.6 10.7	77.8	4.94	2010.041	5
STF1110AB	07346+3153	1.9 3.0	60.0	4.94	2010.041	6
STF1110AC	07346+3153	1.9 9.8	164.2	70.11	2010.041	6
STF1110AD	07346+3153	1.9 10.0	223.4	177.75	2010.041	6
STF1113AC*	07350+2416	7.7 10.1	179.1	92.33	2010.041	7
HJ 425BC	07350+2416	10.1 10.7	48.0	8.39	2010.041	7
STF1196AB-C	08122+1739	5.2 5.8	68.2	5.93	2010.118	8
STF1196AB-D	08122+1739	5.2 8.8	108.2	277.49	2010.118	8
ENH 1EF	08122+1739	10.0 10.1	106.1	219.23	2010.118	8
STF1209	08157+0738	9.5 10.6	197.8	33.08	2010.118	9
STF1270	08453-0236	6.8 7.6	265.0	4.44	2010.041	10
STF1295	08555-0758	6.7 6.9	4.0	3.95	2010.118	11
PWS 4AB-C	09408+0102	10.2 10.5	211.5	74.06	2010.118	12
GRV 809	10041+3756	10.5 10.7	55.8	78.01	2010.121	13
GRV 812	10092+3320	9.8 9.8	214.2	28.64	2010.121	14
STF1425	10216+4609	9.8 10.7	355.0	4.94	2010.121	15
CHE 148	10284+0310	10.0 10.3	64.3	4.94	2010.121	16
MLB 167	10473+5815	10.0 10.6	321.6	5.43	2010.121	17

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NAME	RA+DEC	MAGS	PA	SEP	DATE	NOTES
STF1526	11187+0250	10.2 10.3	180.6	30.12	2010.121	18
KR 39Aa-B	11333+5748	9.7 10.7	152.0	10.37	2010.123	19
ARN 111*	11387+3238	9.9 10.0	59.8	113.56	2010.214	20
GRV 841	11424+3934	10.0 10.6	202.6	64.68	2010.123	21
STF1568	11433+0046	10.3 10.4	42.6	9.38	2010.123	22
BRT2412	11438+1831	10.0 10.1	292.4	4.94	2010.123	23
GRV 842	11500+3612	10.6 10.7	357.2	31.60	2010.123	24
KU 41	11556+1654	10.1 10.2	68.6	5.43	2010.123	25
GRV 847	11595+1808	9.2 9.9	350.2	32.59	2010.123	26
AG 177AB	12247+0225	9.2 10.6	220.2	7.90	2010.214	27
H 81	12416+1026	6.2 10.5	279.8	77.52	2010.137	28
GRV 857AC	12440+0356	9.0 10.7	205.3	59.25	2010.123	29
ENG 49AB	12489+1206	7.1 10.7	348.5	175.78	2010.137	30
ENG 49BC	12489+1206	10.7 10.2#	328.3	131.34	2010.137	30
HJ 523	12519+3447	10.3 10.7	182.9	14.32	2010.137	31
STF 23AB	12522+1704	6.3 6.9	50.9	196.51	2010.137	32
STF1712	13035+0928	10.2 10.5	332.0	8.89	2010.140	33
STT 122AB	13136+5643	6.8 8.0	216.1	121.46	2010.142	34
STT 122BC	13136+5643	8.0 10.4	246.0	62.21	2010.142	34
H 55AC	13137+2949	7.3 10.7	153.6	71.10	2010.140	35
BU 342	13152-1855	8.6 9.0	35.0	4.30	2010.140	36
BGH 46Aa-B*	13164+1948	6.4 7.6	58.0	203.43	2010.140	37
HJ 227AB	13253+1033	9.0 10.6	314.9	39.99	2010.140	38
HJ 1232	13276+0655	10.0 10.5	306.5	12.84	2010.140	39
STF1755	13324+3649	7.2 8.1	131.5	4.44	2010.214	40
HJ 2662	13349+3314	9.6 10.4	280.4	23.21	2010.140	41
STF1765	13379+0221	10.4 10.6	161.5	38.02	2010.140	42
KU 104	13384+4306	10.1 10.5	54.5	59.25	2010.142	43
STF1772AD	13407+1957	5.8 7.4	1.4	208.36	2010.142	44
STF1785	13491+2659	7.2 8.0	182.5	2.96	2010.214	45
HJ 233	13572+1151	10.6 10.7	133.7	19.75	2010.142	46
STF1793	13591+2549	7.4 8.4	243.0	4.94	2010.142	47
LDS2700AB	14068+5946	9.7 9.2#	150.6	48.39	2010.142	48
STF1830AB	14157+5640	9.2 10.3	311.5	10.37	2010.156	49

Table concludes on next page.

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NAME	RA+DEC	MAGS	PA	SEP	DATE	NOTES
STF1831AB	14161+5643	7.1 9.5	138.8	5.93	2010.156	50
STF1838	14241+1115	7.4 7.7	334.7	9.38	2010.156	51
STF1854AB	14298+3147	6.1 10.5	255.6	25.68	2010.156	52
BU 1443	14308+0446	6.0 10.6	195.4	55.30	2010.156	53
HJ 554AB	14325+3442	10.3 10.6	291.8	11.85	2010.156	54
LDS 968AB-C	14426+1929	9.1 10.1	309.4	135.29	2010.156	55
HJ 241	14485+1203	10.2 10.7	140.7	17.28	2010.156	56
HJ 1267	15032+0740	9.5 10.5	8.5	13.83	2010.271	57
STF1923AB	15138+1427	9.0 10.1	10.1	4.94	2010.271	58
HJ 252AB	15249+1359	9.8 10.7	97.0	11.36	2010.271	59
STF1953	15329+0531	9.6 10.5	252.2	6.56	2010.271	60
STT 141AB	15389+5728	7.4 9.7	204.3	88.38	2010.271	61
STT 141AC	15389+5728	7.4 7.9	335.1	234.04	2010.271	61
GRV 919	16001+1317	10.3 10.3	354.6	45.43	2010.271	62
STF2006AC	16003+5856	8.4 9.6	211.0	47.40	2010.290	63
ARG 29	16058+5637	9.3 10.6	136.2	24.69	2010.290	64
STF3103	16207-0356	9.0 10.7	304.3	24.13	2010.290	65
BAL2414	16260+0312	10.7 10.7	129.0	3.95	2010.290	66
GRV 929	16291+0015	8.2 9.9	70.3	69.62	2010.290	67
KU 113	16405+0937	9.4 10.7	50.5	66.66	2010.290	68
GRV 944	16583+3117	10.7 10.7	217.8	59.74	2010.290	69
BU 45	17179+3229	9.9 10.5	291.3	4.94	2010.290	70
LDS 994	17257+2719	7.5 9.7	299.0	88.88	2010.310	71
GRV 958	17301+1019	9.4 10.1	211.3	49.87	2010.310	72
GRV 959	17302+2901	10.2 10.7	355.4	24.19	2010.310	73
AG 355	17318+1040	9.4 10.7	333.1	22.71	2010.310	74
STF2188	17362+0637	9.2 9.9	202.5	5.43	2010.310	75
BAL2445	17387+0349	10.2 10.6	139.2	4.94	2010.310	76
GRV 964	17495+0911	10.5 10.7	105.1	19.26	2010.310	77
ROE 17	17514+5938	9.7 10.4	53.9	8.89	2010.310	78
BRT2439	17527+1940	10.3 10.7	180.8	4.94	2010.310	79
STF2261AB	17581+5213	7.5 10.0	262.0	9.38	2010.310	80
STF2259	17590+3003	7.2 8.4	277.3	19.75	2010.310	81
ES 79AC	18027+5552	10.7 10.7	92.8	24.69	2010.310	82

* - Not in the Washington Double Star Catalog.
\# - Companion star is the brighter component.

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Table Notes

1. In Auriga. Sep. & p.a. increasing. Spect. G5, K0III.
2. In Orion. Relatively fixed. Common proper motion. Spect. A0V, F0.
3. In Gemini. Position angle increasing. Spect. K2.
4. In Auriga. Relatively fixed. Common proper motion. Spect. F5, F5.
5. In Canis Minor. Position angle slightly decreasing.
6. Castor or Alpha Geminorum. AB = sep. inc; p.a. dec; cpm. Spect. A1V, A2V.
7. AC = relatively fixed. BC = p.a. increasing. Spect. M0.
8. Zeta Cancri. AB-C = p.a. dec.; cpm. AB-D = sep. dec. Spect. G0V, G0V, G5.
9. In Cancer. Sep. & p.a. increasing. Spect. A2.
10. In Hydra. Sep. decreasing; p.a. increasing. Spect. F2IV.
11. In Hydra. Position angle increasing. Spect. A2, A2.
12. In Hydra. Sep. increasing; p.a. decreasing. Spect. F5.
13. In Leo Minor. Relatively fixed. Common proper motion.
14. In Leo Minor. Relatively fixed. Common proper motion. Spect. G0, G0.
15. In Ursa Major. Position angle decreasing. Spect. F5, F5.
16. In Sextans. Common proper motion; sep. dec.; p.a. inc. Spect. K2.
17. In Ursa Major. Common proper motion; sep. decreasing.
18. In Leo. Relatively fixed. Common proper motion. Spect. G0, G0.
19. In Ursa Major. Common proper motion; p.a. decreasing. Spect. G5.
20. In Ursa Major. Common proper motion. Near ES 2285 system.
21. In Ursa Major. Relatively fixed. Common proper motion. Spect. K0.
22. In Virgo. Relatively fixed. Common proper motion. Spect. F5, F8.
23. In Leo. Common proper motion; p.a. decreasing. Spect. K5, K5.
24. In Ursa Major. Relatively fixed. Common proper motion. Spect. G, G.
25. In Leo, Sep. increasing; p.a. decreasing. Spect. G0, G0.
26. In Coma Berenices. Relatively fixed. Common proper motion. Spect. G, G.
27. In Virgo. Common proper motion; p.a. increasing. Spect. G5.
28. 27 Virginis. Separation decreasing. Spect. A7V.
29. In Virgo. Relatively fixed. Common proper motion. Spect. F5.
30. In Virgo. AB = sep. inc.; p.a. dec. BC = sep. dec. Spect. AC = G5V, A0.
31. In Canes Venatici. Relatively fixed. Common proper motion. Spect. G0, G0.
32. 32 Comae Berenicis. Sep. & p.a. slightly increasing. Spect. M0III, F8.
33. In Virgo. Common proper motion; p.a. decreasing. Spect. G0, G0.
34. In Ursa Major. AB = sep. & p.a. inc. BC = p.a. slightly inc. Spect. G1, G5.
35. In Coma Berenices. Separation decreasing. Spect. G9III.
36. In Virgo. Relatively fixed. Common proper motion. Spect. F2V, F2V.
37. In Coma Berenices. Relatively fixed. Common proper motion. Spect. A3, A2.
38. In Virgo. Position angle slightly decreasing. Spect. F2, F0.
39. In Virgo. Common proper motion; sep. increasing. Spect. F5, G.
40. In Canes Venatici. Slight decrease in p.a. Spect. G5III, G8III.
41. In Canes Venatici. Sep. increasing; p.a. decreasing. Spect. G8III.
42. In Virgo. Sep. & p.a. slightly decreasing.
43. In Canes Venatici. Sep. & p.a. increasing. Spect. F8.
44. 1 Bootis. Relatively fixed. Common proper motion. Spect. A1V, A2.
45. In Bootes. Common proper motion; p.a. increasing. Spect. K4V, K6V.
46. In Bootes. Position angle decreasing. Spect. G0, G0.
47. In Bootes. Common proper motion; p.a. slightly increasing. Spect. A5V, A5.
48. In Ursa Major. Relfixed. Possible common proper motion. Spect. F5, F5.
49. In Ursa Major. Sep. & p.a. increasing. Spect. G5, F8.
50. In Ursa Major. Common proper motion; p.a.

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decreasing. Spect. A7IV, F0.

51. In Bootes. Relatively fixed. Common proper motion. Spect. F0V, G1V.
52. In Bootes. Sep. & p.a. slightly decreasing. Spect. A0V.
53. In Virgo. Relatively fixed. Spect. K4.
54. In Bootes. Relatively fixed. Common proper motion. Spect. K0, K0.
55. In Bootes. Relatively fixed. Common proper motion. Spect. M0.
56. In Bootes. Separation slightly decreasing. Spect. K0.
57. In Bootes. Relatively fixed. Common proper motion. Spect. G5.
58. In Serpens. Common proper motion; p.a. decreasing. Spect. G0V, G0V.
59. In Serpens. Relatively fixed. Common proper motion. Spect. G9V.
60. In Serpens. Common proper motion; p.a. decreasing. Spect. F5, F5.
61. In Draco. AB = sep. decreasing. AC = relatively fixed. Spect. M3, G5, K0.
62. In Serpens. Relatively fixed. Common proper motion. Spect. K, G5.
63. In Draco. Sep. increasing; p.a. decreasing. Spect. A3, K.
64. In Draco. Sep. & p.a. decreasing. Spect. F8, F8.
65. In Ophiuchus. Relatively fixed. Common proper motion. Spect. K5.
66. In Ophiuchus. Relatively fixed. Common proper motion. Spect. F5.
67. In Ophiuchus. Relatively fixed. Spect. G0, K2.
68. In Hercules. Sep. & p.a. increasing. Spect. K0, F8.
69. In Hercules. Relatively fixed. Common proper motion. Spect. G5.
70. In Hercules. Common proper motion; p.a. increasing.
71. In Hercules. Separation increasing. Spect. K2II, F5.
72. In Ophiuchus. Relatively fixed. Common proper motion. Spect. K2.
73. In Hercules. Relatively fixed. Common proper motion.
74. In Ophiuchus. Relatively fixed. Common proper motion. Spect. F2.
75. In Ophiuchus. Position angle decreasing. Spect. A5, F0.
76. In Ophiuchus. Sep. & p.a. decreasing. Spect. G0.
77. In Ophiuchus. Relatively fixed. Common proper motion. Spect. F8, G0.
78. In Draco. Common proper motion; p.a. increasing. Spect. F5, F5.
79. In Hercules. Common proper motion; p.a. decreasing. Spect. F2, F2.
80. In Draco. Relatively fixed. Common proper motion. Spect. A2, A2.
81. In Hercules. Common proper motion; sep. & p.a. increasing. Spect. A1V, A1V.
82. In Draco. Relatively fixed. Spect. F5, G5.