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Abstract: This report contains theta/rho measurements from 97 different double star systems. The time period spans from 2008.432 to 2008.721. 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.

Occasionally, when the researcher is making rho measurements of known visual binary stars, the desire may emerge to convert the arc second measurements into astronomical units, so that the apparent separation of the binary can be visualized. Fortunately, if the distance to the binary is known with a fair amount of certainty, some algebraic equations exist that can serve as conversion tools, thereby allowing one to obtain a good approximation. As an example of this process, the apparent separation in astronomical units, for STF 1321 AB (09144+5241), will be calculated using a 20.32 cm aperture telescope.

To begin with, the formula Aau ≈ 15r/D (Couteau 1981) is applied, in which r = the distance to the system in parsecs and D = the aperture of the telescope in centimeters. Performing the calculation using the value of 6.19 parsecs from the Hipparcos catalog, and 20.32 centimeters for the aperture, a value of 4.57 astronomical units is obtained. This value represents an approximation of the resolving power of the telescope at the distance of 6.19 parsecs.

Tanguay (1998) states that the true resolving power of a telescope is actually represented when the edges of the two Airy disks are in contact, which yields a resolving power value of .75" for a 20 cm telescope. Hence, if one applies the formula AU = ρ/R x Aau to the current WDS catalog rho value of 17.1" for STF 1321 AB, a value of 104.2 au will be obtained. In this formula, ρ = the rho value (17.1"), R = the resolving power of the telescope (.75"), and Aau = 4.57.

If the researcher substitutes the semi major axis value of 16.73" as presented in Sky Catalog 2000.0 in place of the listed 17.1" rho value, the calculation yields a value of 101.9 au. By utilizing this semi major axis value, along with the listed period of 975 years, and inserting these into the well known formula $M_1 + M_2 = a^3/p^2$ (Newton's form of Kepler's third law), the combined masses of STF 1321 AB can be calculated as 1.11 solar masses. For the sake of comparison, www.solstation.com lists a mass range for this pair at 1.03 to 1.33 solar masses.

In essence, by making some basic calculations like those presented above, the researcher is able to add depth to the data that is being worked with. Even though the researcher could probably locate this information in a publication without having to make the above calculations, this could be one way for making binary star research more fun and interesting. By working through such calculations as these for oneself, a greater appreciation can be gained for some of the methodology that is employed when this type of information does appear in published form.

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 (WDS) Catalog, with published measure-

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ments that are no more recent than ten years ago. Several systems are included from the 2006.5 version of the WDS Catalog as well. While almost all of the theta/rho measurements, in this report, were right in line with catalog values, there were 2 double stars that displayed noteworthy shifts, which appear in the following table.

First of all, disparate proper motions, by both components of HJ 931, are responsible for decreases of 4% in the rho value and almost 2 degrees for the theta

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NAME	RA DEC	MAGS	PA	SEP	DATE	NOTES
STF2336	18328+1349	9.1 10.2	8.1	6.91	2008.432	1
STF 37 AB-CD	18443+3940	5.0 5.2	173.5	209.35	2008.432	2
STF 37 AI	18443+3940	5.0 10.4	137.9	150.10	2008.432	2
STF 39 AB	18501+3322	3.6 6.7	149.9	45.43	2008.432	3
BU 293 AE	18501+3322	3.6 10.1	317.4	67.15	2008.432	3
BU 293 AF	18501+3322	3.6 10.6	18.3	85.91	2008.432	3
BU 52 AB	19038+2602	7.8 10.2	297.8	51.35	2008.432	4
STF2522	19258+2846	7.7 8.8	339.0	4.44	2008.432	5
AG 231	19296+1800	9.9 10.0	242.0	4.44	2008.489	6
STF2619 AB	20011+4816	8.8 8.8	239.0	3.95	2008.432	7
STF 50 Aa-C	20136+4644	3.8 7.0	174.1	106.65	2008.432	8
STF 50 Aa-D	20136+4644	3.8 4.8	324.6	333.78	2008.432	8
AG 255	20263+3728	10.0 10.5	286.0	4.94	2008.489	9
STF2697	20344-0029	7.6 9.8	356.8	29.63	2008.489	10
STF2705 AB	20377+3322	7.4 8.0	262.0	2.96	2008.432	11
HJ 1601	20596+3703	10.0 10.4	143.2	6.42	2008.489	12
STF2753	21050+3526	7.4 10.7	335.6	29.63	2008.454	13
HJ 275	21072+1524	8.2 10.5	337.4	22.22	2008.454	14
H 47	21124-1500	8.2 8.2	309.5	3.95	2008.587	15
HJ 931	21174+3203	9.4 10.6	358.3	9.88	2008.587	16
STF 433 AC	21179+3454	4.4 10.0	183.8	21.73	2008.454	17
FOX 259	21195+4253	9.9 10.5	305.9	12.34	2008.587	18
S 786	21197+5303	6.8 9.1	299.5	47.89	2008.454	19
STF2789 AB	21200+5259	7.6 7.9	113.9	6.42	2008.587	20

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NAME	RA DEC	MAGS	PA	SEP	DATE	NOTES
STF2793 AB-C	21251+0923	7.4 9.0	241.7	26.66	2005.454	21
WAL 139 AC	21290+3224	9.5 10.3	250.9	41.48	2008.454	22
A 770 AB-E	21308+4827	8.7 10.6	14.4	98.26	2008.454	23
KU 132 Aa-B	21334+3058	10.1 10.6	256.7	53.82	2008.454	24
HO 164 AB	21410+3504	9.4 9.7	70.0	4.44	2008.587	25
SCA 92 AC	21464-0505	10.7 10.7	252.8	82.46	2008.454	26
STT 455	21567+1607	8.5 10.2	270.9	9.88	2008.454	27
STF2872 A-BC	22086+5917	7.2 8.0	315.5	21.73	2008.508	28
STF2867 AB	22100+0757	8.2 9.3	208.6	10.37	2008.508	29
HJ 1741 AB	22112+5049	5.4 10.4	285.6	36.04	2008.587	30
HJ 1741 AD	22112+5049	5.4 9.9	270.9	73.57	2008.587	30
SCA 125	22206-0031	9.4 10.7	70.9	103.43	2008.495	31
SCA 126	22218-0150	9.7 10.6	331.3	83.44	2008.495	32
HJ 965	22290+3432	8.9 10.1	146.2	34.07	2008.587	33
FRK 11	22301+4921	6.4 10.6	90.1	66.66	2008.495	34
STF2917 AB	22306+5332	8.2 8.5	70.0	4.44	2008.508	35
ES 1468	22342+4341	9.2 10.5	327.6	5.93	2008.495	36
AG 284	22387+3718	9.8 9.9	230.1	26.17	2008.495	37
CHE 366	22416+2947	10.0 10.2	6.9	21.73	2008.495	38
HJ 1806	22451+4449	9.2 10.3	334.7	6.91	2008.495	39
HDS3229	22451+3841	8.6 10.6	330.3	20.24	2008.495	40
HJ 969	22459+3358	9.7 10.6	25.6	5.93	2008.508	41
STT 480	22461+5804	7.6 8.6	116.5	30.61	2008.508	42
BU 1518	22496-1059	10.3 10.4	204.0	6.42	2008.587	43
STT 597 AB	22514+1358	8.3 10.6	327.7	201.45	2008.508	44
STF2949	22519+3002	9.6 10.6	182.9	11.36	2008.508	45
HJ 972	22530+3140	9.6 10.7	207.0	28.14	2008.508	46
STF2696	23010+2646	8.4 9.7	36.0	3.95	2008.585	47
HDS3286	23035+4123	9.2 10.4	353.0	17.78	2008.585	48

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NAME	RA DEC	MAGS	PA	SEP	DATE	NOTES
STT 242	23065+4655	7.8 8.6	31.0	79.99	2008.585	49
HJ 979	23083+2207	8.8 10.7	217.3	18.27	2008.585	50
BU 717 AC	23177+4901	4.8 10.7	131.4	217.25	2008.585	51
STT 498 AB	23313+5225	7.6 10.2	244.1	17.28	2008.587	52
STF3024	23320+4349	8.6 9.3	309.0	4.94	2008.587	53
BGH 72	23323-1337	8.6 9.1	154.5	120.97	2008.585	54
HJ 1892	23341+5947	9.6 10.4	94.7	6.91	2008.585	55
HJ 1893	23350+4731	9.6 9.9	249.2	4.94	2008.585	56
ES 859 AB	23375+4832	8.3 10.6	217.5	88.88	2008.585	57
AG 429	23527+2920	9.4 10.3	270.5	6.42	2008.587	58
AG 296	23557+3830	10.1 10.2	55.2	5.93	2008.585	59
HJ 5435 AB	23574-1606	9.4 10.7	8.2	14.81	2008.585	60
STF3049 AC	23590+5545	5.0 10.3	66.1	106.16	2008.585	61
HJ 1929 AB-C	00039+2759	8.7 9.5	287.4	5.43	2008.607	62
STF3056 AB-C	00047+3416	7.1 9.5	3.3	25.68	2008.607	63
STF3056 AB-D	00047+3416	7.1 10.5	238.2	95.29	2008.607	63
STF 4	00099+0827	9.4 9.5	275.5	5.43	2008.607	64
STF 3	00100+4623	7.8 9.0	83.0	4.94	2008.607	65
STF 22 AB-C	00174+0853	7.1 7.6	234.4	3.95	2008.607	66
STF 78	00591+0523	10.2 10.4	243.1	4.94	2008.607	67
STT 11 AB-C	01072+3839	7.6 8.7	164.1	59.74	2008.609	68
STF 101	01139-0737	7.5 10.2	346.5	20.74	2008.607	69
ES 119 AC	01180+5355	8.2 10.7	276.8	44.44	2008.607	70
STI1560	01192+5821	9.9 10.2	324.8	13.83	2008.609	71
BU 1102 A-BC	01274+6017	7.9 10.6	264.9	63.20	2008.609	72
EGB 1	01397+4602	9.5 10.4	144.6	5.93	2008.609	73
STF 155 AB	01443+0929	7.8 8.0	326.0	4.94	2008.609	74
KPR 1 AC	01443+0929	7.8 8.4	283.9	191.58	2008.609	74
STF 180 AB	01535+1918	4.5 4.6	0.4	7.41	2008.609	75

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NAME	RA DEC	MAGS	PA	SEP	DATE	NOTES
STF 180 AC	01535+1918	4.5 8.5	81.6	216.26	2008.609	75
HDS 259	01545+5954	8.3 10.1	211.8	16.79	2008.609	76
ES 2144	01567+3505	10.1 10.6	143.2	6.42	2008.609	77
STI1786	02088+5823	9.9 10.7	321.4	15.80	2008.626	78
STF 225 AC	02132+5412	8.1 10.4	160.5	152.57	2008.626	79
ES 764 AB	02249+5153	9.6 10.6	62.6	35.55	2008.626	80
STF 293 AD	02443+5704	9.3 8.7*	343.6	187.63	2008.626	81
HJ 655	02476+1014	9.1 10.2	308.5	23.70	2008.626	82
STF 304	02488+4911	7.5 10.7	289.2	26.17	2008.626	83
AG 55 AB-C	02502+0641	9.9 10.3	178.1	45.92	2008.626	84
A 2341 AD	02544+0946	9.6 10.6	308.3	126.40	2008.626	85
HJ 2162 AB	02548+4332	10.5 10.7	39.5	12.84	2008.626	86
ES 464	03213+4743	10.1 10.6	67.4	6.91	2008.626	87
ARG 55 AB	03247+4417	9.4 10.7	199.2	26.17	2008.721	88
SMA 38	03348+4408	10.2 10.7	68.3	21.67	2008.721	89
STF 400 AB-C	03350+6002	6.8 10.7	235.8	92.33	2008.721	90
A 1707 AC	03419+4331	7.6 10.4	144.9	64.68	2008.721	91
AG 72	03428+3016	10.4 10.7	281.5	6.42	2008.721	92
HL 7 AE	03449+2407	3.7 10.6	345.5	186.14	2008.721	93
ES 770 AB	03494+5214	10.2 10.4	232.5	69.62	2008.721	94
HDS 486	03530+4557	8.5 10.2	311.1	16.75	2008.721	95
S 440 AB	03566+5042	5.3 10.5	30.7	75.54	2008.721	96
STT 68 AB	03597+4809	7.8 9.2	176.1	39.00	2008.721	97

* Companion star is the brighter component.

Table Notes

1. In Hercules. Separation slightly increasing. Spect. F0.
2. Epsilon Lyrae. AB-CD = sep. inc.; common proper mot. Spect. F1V, A4V.
3. Beta Lyrae. AB, AE, AF = relatively fixed. Spect. AB = B7V, B3.
4. In Lyra. Sep. increasing; p.a. decreasing. Spect. A0.
5. In Cygnus. Relatively fixed. Spect. A0, A0.
6. In Sagitta. Sep. & p.a. increasing. Spect. F8.
7. In Cygnus. Common proper motion; p.a. decreasing. Spect. G5, G5.

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8. 31 Cygni. Aa-C = relatively fixed. Aa-D = p.a. inc. Spect. K0, B9, A2.
9. In Cygnus. Separation slightly decreasing.
10. In Aquila. Sep. & p.a. decreasing. Spect. K2.
11. In Cygnus. Relatively fixed. Common proper motion. Spect. K0.
12. In Cygnus. Separation decreasing. Spect. A2.
13. In Cygnus. Sep. & p.a. decreasing. Spect. F0.
14. In Delphinus. Sep. & p.a. decreasing. Spect. F2II.
15. In Capricornus. Sep. increasing; p.a. decreasing. Spect. G3IV, G3V.
16. In Cygnus. Sep. & p.a. decreasing. Spect. G0, G0.
17. Nu or 66 Cygni. Sep. & p.a. increasing. Spect. B2V
18. In Cygnus. Relatively fixed.
19. In Cygnus. Sep. & p.a. slightly decreasing. Spect. K2, A0.
20. In Cygnus. Common proper motion; separation increasing. Spect. F8V, G5.
21. In Equuleus. Relatively fixed. Common proper motion. Spect. A5IV, F0.
22. In Cygnus. Separation slightly increasing. Spect. A2.
23. In Cygnus. Sep. increasing; p.a. decreasing. Spect. K0.
24. In Cygnus. Relatively fixed. Common proper motion. Spect. F8, G0.
25. In Cygnus. Sep. & p.a. increasing. Spect. K0.
26. In Aquarius. Separation increasing.
27. In Pegasus. Relatively fixed. Common proper motion. Spect. F8, F8.
28. In Cepheus. Relatively fixed. Common proper motion. Spect. B9.5V, A0.
29. In Pegasus. Relatively fixed. Common proper motion. Spect. G5III, G0.
30. In Lacerta. AB & AD = sep. increasing; p.a. decreasing. Spect. AD = A5V, K0.
31. In Aquarius. Position angle decreasing. Spect. K2.
32. In Aquarius. Relatively fixed. Common proper motion.
33. In Pegasus. Sep. & p.a. increasing. Spect. G5.
34. In Lacerta. Sep. increasing; p.a. decreasing. Spect. K2III.
35. In Lacerta. Relatively fixed. Common proper motion. Spect. F0IV, F0IV.
36. In Lacerta. Separation increasing. Spect. A3.
37. In Lacerta. Relatively fixed. Spect. A0, A0.
38. In Pegasus. Position angle decreasing. Spect. G5, F8.
39. In Lacerta. Common proper motion; p.a. decreasing. Spect. F8.
40. In Lacerta. Common proper motion; p.a. decreasing. Spect. A2V, A2V.
41. In Pegasus. Relatively fixed. Common proper motion.
42. In Cepheus. Relatively fixed. Common proper motion. Spect. F8, G0.
43. In Aquarius. Relatively fixed. Spect. F8.
44. In Pegasus. Sep. increasing; p.a. decreasing. Spect. K0.
45. In Pegasus. Relatively fixed. Common proper motion. Spect. F8.
46. In Pegasus. Sep. & p.a. increasing. Spect. F8.
47. In Pegasus. Relatively fixed. Common proper motion. Spect. A5, A5.
48. In Andromeda. Relatively fixed. Common proper motion. Spect. A2, A2.
49. In Andromeda. Relatively fixed. Spect. B3, B9.
50. In Pegasus. Relatively fixed. Common proper motion. Spect. K0, G.
51. 8 Andromedae. Separation slightly decreasing. Spect. M2III.
52. In Cassiopeia. Relatively fixed. Spect. F6V.

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53. In Andromeda. Common proper motion; p.a. decreasing. Spect. A0, A0.
54. In Aquarius. Relatively fixed. Common proper motion. Spect. G5, G0.
55. In Cassiopeia. Separation slightly increasing. Spect. A4I.
56. In Andromeda. Common proper motion; sep. & p.a. increasing. Spect. F0.
57. In Andromeda. Separation slightly decreasing. Spect. K0.
58. In Pegasus. Separation slightly increasing. Spect. F0.
59. In Andromeda. Common proper motion; separation slightly increasing.
60. In Cetus. Relatively fixed. Common proper motion. Spect. G0V.
61. Sigma or 8 Cassiopeiae. Separation decreasing. Spect. B1V.
62. In Pegasus. Sep. increasing; p.a. decreasing. Spect. F8.
63. In Andromeda. AB-C = sep. & p.a. inc. AB-D = sep. dec. Spect. K0.
64. In Pisces. Common proper motion. Sep. dec.; p.a. inc. Spect. G5, G5.
65. In Andromeda. Sep. increasing; p.a. decreasing. Spect. A4V, A3+.
66. In Pisces. Sep. & p.a. slightly decreasing. Spect. F5, F5.
67. In Pisces. Common proper motion; p.a. decreasing. Spect. F8, F8.
68. In Andromeda. Sep. decreasing; p.a. increasing. Spect. F8, A5.
69. In Cetus. Common proper motion; p.a. increasing. Spect. G5.
70. In Cassiopeia. Separation increasing. Spect. A2.
71. In NGC 457 star cluster in Cassiopeia. Increasing p.a. Spect. B2.
72. In Cassiopeia. Separation increasing. Spect. B3I.
73. In Andromeda. Relatively fixed.
74. In Pisces. AB = p.a. dec.; c.p.m. AC = sep. inc. Spect. F2, F5, F0.
75. 5 or γ Arietis. AB = p.a. inc.; sep. dec; c.p.m. AC = sep. dec. Spect. A, B9V, K.
76. In Cassiopeia. Separation increasing. Spect. B9IV, B9IV.
77. In Triangulum. Relatively fixed. Common proper motion.
78. In Perseus. Sep. & p.a. increasing. Spect. B6V.
79. In Perseus. Separation increasing. Spect. A0, G0.
80. In Perseus. Separation slightly decreasing. Spect. B8.
81. In Perseus. Sep. decreasing; p.a. increasing. Spect. K0, A2.
82. In Cetus. Relatively fixed. Common proper motion. Spect. F5.
83. In Perseus. Separation increasing. Spect. A0V.
84. In Cetus. Sep. decreasing; p.a. increasing. Spect. G0.
85. In Cetus. Separation slightly increasing. Spect. G5.
86. In Perseus. Position angle increasing.
87. In Perseus. Relatively fixed. Common proper motion.
88. In Perseus. Relatively fixed. Common proper motion. Spect. F5.
89. In Perseus. Relatively fixed. Common proper motion.
90. In Camelopardus. Relatively fixed. Spect. F3V.
91. In Perseus. Separation decreasing. Spect. G5.
92. In Taurus. Common proper motion; p.a. decreasing. Spect. F8.
93. 17 Tauri. Separation increasing. Spect. B5.
94. In Perseus. Position angle increasing.
95. In Perseus. Sep. increasing; p.a. decreasing. Spect. B9, B9.
96. 43 Persei. Relatively fixed. Common proper motion. Spect. F5IV.
97. In Perseus. Relatively fixed. Common proper motion. Spect. B9.

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value during the past 10 years. Secondly, a decrease in the theta value is also being noted for HJ 1741 AB. Since 1998, a 2.4 degrees shift has occurred because of proper motion by the "A" component.

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