Double Star Measurements Using a Webcam

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Abstract: I report on the measurements of 48 double stars using a standard webcam.

In my observations I use a small 8" Newtonian telescope with a standard webcam. For measurements of double stars, I use two different focal lengths, 1500 mm and 3000 mm.

For automatic analyses of those records, I use a software tool. This program is called REDUC and was written by Mr. Florent Losse, a French double star observer. REDUC is a special tool for analyses of double star measurements. It is a freeware program that I got from Mr. Losse by email.

For each double star system I observe, I make a short video of 10 seconds up to 30 seconds. Later the best 30 to 100 frames are evaluated automatically. The statistical results of the measurements are very good and repeatable.

The critical part of the measurements is the scale calibration of the optical systems. For this I made many star trails with different stars. For my 1500 mm videos, this method works very well, but not so for my 3000 mm records. The bias was about 0.5% up to 1%. So I had to correct the scale calibration manually by comparison with 3 different data sets: 1) my own data set of the 1500 mm measurements; 2) ephemerides from calibrating systems; and 3) data from the 4th interferometric catalogue

The manually corrected 3000 mm scale calibration is best for double stars with separation from 1.6" up to 30".

In the table are my measurements for 48 double stars. The magnitudes are from Washington Double Star Catalogue and not measured by me.

Name	RA + DEC	Mags	P.A.	Separation	Date	N	Notes
STFA 1	00464+3057	7.25 7.43	55.1	47.04	2006.789	1	
STF 60 AB	00491+5749	3.52 7.36	320.6	13.12	2006.986	1	
STF 668 A-BC	05145-0812	0.3 6.8	203.6	9.00	2006.986	1	
STF 738 AB	05351+0956	3.51 5.45	45.3	4.33	2006.986	1	

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Name	RA + DEC	Mags	P.A.	Separation	Date	N	Notes
STF 738AC	05351+0956	3.7 10.72	184.5	28.78	2006.968	1	
STF 738AD	05351+0956	3.51 9.63	271.2	77.83	2006.968	1	
STF 738AE	05351+0956	3.51 9.22	279.0	150.10	2006.968	1	
STF 748Aa-B	05353-0523	6.55 7.49	31.0	8.67	2006.986	1	
STF 748Aa-C	05353-0523	6.55 5.06	131.4	12.76	2006.986	1	
STF 748Aa-D	05353-0523	6.55 6.38	95.4	21.35	2006.986	1	
STFA 16AB	05354-0525	5.03 6.19	92.7	52.06	2006.986	1	
STFA 16AC	05354-0525	5.2 9.1	97.7	127.60	2006.986	1	
STF 761AB	05386-0233	7.86 8.39	202.6	67.69	2006.986	1	
STF 761AB	05386-0233	7.86 8.55	208.8	71.54	2006.986	1	
STF 762AB-C	05387-0236	3.73 8.79	238.3	10.85	2006.986	1	
STF 762AB-D	05387-0236	3.76 6.56	83.7	12.92	2006.986	1	
STF 762AB-E	05387-0236	3.76 6.34	61.7	41.40	2006.986	1	
STF 774AaB	05407-0157	1.88 3.70	173.4	2.30	2006.986	1	
STF 774AaC	05407-0157	1.88 9.55	9.9	58.03	2006.986	1	
STF1110AB	07346+3153	1.93 2.97	59.4	4.39	2006.986	1	
STF 180AB	01535+1918	4.52 4.58	0.2	7.42	2006.830	1	
H 5 12AB	01579+2336	4.80 6.65	47.3	37.12	2006.986	1	
STF 205A-BC	02039+4220	2.31 5.02	62.7	9.67	2006.789	1	1
STF1523	11182+3132	4.33 4.80	238.1	1.67	2006.312	1	
SHJ 162Aa-B	13149-1122	7.11 8.18	142.2	107.30	2006.425	1	
H 3 7AC	16054-1948	2.59 4.52	21.1	13.51	2006.477	1	
H 5 6Aa-C	16120-1928	4.21 6.60	336.6	40.86	2006.460	1	
STFA 31Aa-B	16406+0413	5.76 6.92	229.4	69.03	2006.460	1	

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Name	RA + DEC	Mags	P.A.	Separation	Date	N	Notes
STF2140	17146+1423	3.48 5.40	100.9	4.93	2006.460	1	
STF3127 Aa-B	17150+2450	3.14 8.3	282.0	11.57	2006.460	1	
STF2161 Aa-B	17237+3709	4.5 5.4	317.4	4.12	2006.441	1	
STF2202 AB	17446+0235	6.13 6.47	93.5	20.48	2006.501	1	
STF2220 A-BC	17465+2743	3.42 9.78	249.1	34.58	2006.501	1	
STF2264	18015+2136	4.85 5.20	254.1	6.28	2006.477	1	
STF2272 AB	18055+0230	4.20 6.20	136.6	5.28	2006.582	4	
STF2280 Aa-B	18078+2606	5.81 5.84	183.6	14.23	2006.540	1	
STF2382 AB	18443+3940	5.01 6.10	348.5	2.35	2006.616	3	2
STF2383 Cc-D	18443+3940	5.25 5.38	79.6	2.33	2006.616	3	3
STF2417 AB	18562+0412	4.59 4.93	103.9	22.12	2006.545	1	
SHJ 289	19135+3902	8.01 8.71	56.5	38.93	2006.679	1	
STF2487 AB	19138+3909	4.38 8.58	80.6	28.33	2006.679	1	
STFA 43 Aa-B	19307+2758	3.37 4.68	54.2	34.27	2006.477	4	
STF2580 AB	19464+3344	5.06 9.25	68.1	26.01	2006.786	1	
STF2690 Aa-BC	20312+1116	7.12 7.39	254.1	17.28	2006.690	1	
STF2727	20467+1607	4.36 5.03	265.5	9.03	2006.690	1	
STF2758 AB	21069+3845	5.35 6.10	151.1	30.86	2006.810	2	
STF2993 AB	23141-0855	7.60 8.17	175.6	24.93	2006.874	1	
STF3008	23238-0828	7.21 7.67	150.6	6.00	2006.874	1	

Notes to table:

1: STF 205A-BC, Gamma Andromedae: STF 205A-BC was discovered by the German astronomer Christian Mayer on January 29, 1777. Source: Christian Gründliche Vertheidigung neuer Beobachtungen von Fixsterntrabanten, welche zu Mannheim auf der kurfürstlichen Sternwarte entdeckt worden sind, Christian Mayer, Mannheim 1778

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see also : http://www.epsilon-lyrae.de/Doppelsterne/Galerie/Andromeda.html

2: STF2382, Epsilon 1 Lyrae: STF2382 was discovered by the German astronomer Christian Mayer on August 15, 1778. His results in polar coordinates were 3.4" and 31 deg (average of 7 measurements). Source: De novis in coelo sidereo phaenomenis in miris stellarum fixarum comitibus, Christian Mayer, Mannheim 1779 See also:

http://www.epsilon-lyrae.de/Beobachtungstipp/Beobachtungstipp.html#Christian_Mayers_Beobachtungen_

http://www.epsilon-lyrae.de/Beobachtungstipp/CM_Observationen/CM_Notizen_1778_08_15.html

3: STF2383, Epsilon 2 Lyrae : STF2383 was also discovered by Christian Mayer on August 23, 1778: 2.8" and 155 deg (average of 10 measurements). Source : De novis in coelo sidereo phaenomenis in miris stellarum fixarum comitibus, Christian Mayer, Mannheim 1779 See also:

http://www.epsilon-lyrae.de/Beobachtungstipp/CM_Observationen/CM_Buch3_1778_08_23.html