

Double Star Measurements Using a Webcam and DSLR, Annual Report of 2014

Joerg S. Schlimmer

Seeheim-Jugenheim, Germany

Email: js@epsilon-lyrae.de

Abstract: I report on 138 double star measurements from 2014; minimum separation is 1.4 as (STF 401AB), maximum separation is 400.6 as (SMR 13AE). The mean value of all measurements is 82.6 as.

Report

This is a report of 138 double star measurements from 2014 made with a standard webcam (81 measurements) and a DSLR camera (44 measurements). In 11 further cases measurements was done in both ways. Minimum separation is 1.4 as, maximum separation is 400.6 as. The mean value of all measurements is 82.6 as.

Measurements were done with a 12-inch Newtonian telescope. A detailed description of the optical setup is given in annual report of 2012 (Schlimmer, 2013). Reproduction scale is about 0.77 as for webcam measurements and 0.70 as for DSLR images. In case of DSLR imaging an additional coma corrector was used. In both cases data analyses were done with REDUC software.

Focus of observation in 2014 was stars of Max Wolf's "Catalog About 1053 High Proper Motion Fix Stars" (Wolf, 1919) which are already listed in Simbad Database as well in WDS catalog. There are only 94 matches, because most of Wolf's stars aren't double stars (Schlimmer, 2014). This review is not yet finished and will be continued in 2015. In the notes column of table 1 eighteen of these stars are remarked with Wolf's number as listed in Simbad Database.

During observations of 30/31 Cygni in late summer of 2014 some further companions could be found. Also a further double star in the neighborhood could be found. These discoveries are described below.

WDS20136+4644, 31 Cygni

Next to components H and F further companions

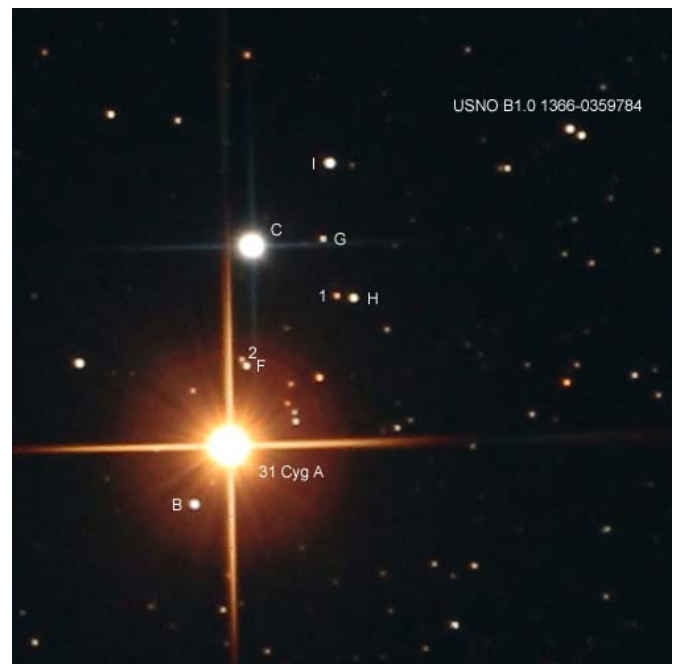


Figure 1. 30/31 Cygni with companions of H and F, exposure time 4 x 180s

could be found (see Figure 1). The distances are 9 as for H1 and 3.6 as for F2. The position angles are 263 degree and 214 degree. The estimated brightness of these companions is about 0.5 magnitudes lower than the associated primaries.

Double Star Measurements Using a Webcam and DSLR, Annual Report of 2014

USNO-B1.0 1366-0359784

This object is next to 31 Cygni is listed as single star in the catalogs. I found 2 components in a distance of about 7 as and a position angle of 59 degree (see figure 1). Coordinates are 20139+4641. The brightness is 12.14 magnitudes (B1 mag) for both components. There is a small proper motion of 10 mas/yr in R.A. and 4 mas/yr in declination. Therefore USNO-B1.0 1366-0359784 is a possible common proper motion pair.

Table 1 shows the measurements of 136 double stars from 2014.

Acknowledgements

This research has made use of the Washington Double Star Catalog maintained at the U.S. Naval Observatory.

This research has made use of the SIMBAD database, operated at CDS, Strasbourg, France

References

Schlimmer, S. Joerg, 2013, "Double Star Measurements Using a Webcam, Annual Report of 2012", *Journal of Double Star Observations*, **9**, 230 - 246.

Schlimmer, S. Joerg, 2014, Doppelsterne und Sternpaare aus Max Wolfs "Katalog von 1053 stärker bewegten Fixsternen" (1919) sowie aus nachfolgenden Arbeiten Wolfs (1920-1929), http://www.epsilon-lyrae.de/Doppelsterne/CPMPairs/Wolf_CommonProperMotionPairs.html

The Washington Double Star Catalog, Mason, B.D., Wycoff, G.L. and Hartkopf, W.I., Astrometry Department, U.S. Naval Observatory, <http://ad.usno.navy.mil/proj/WDS/>

Wolf, Max, 1916, Bewegter Doppelstern in Lynx, *Astronomische Nachrichten* Nr. 4837

Table 1. Measurements of Double Stars from 2014

NAME	RA+DEC	MAGS	PA	SEP	DATE	N	Notes
ES 1867AB	00466+6131	9.33, 11.28	274.1	6.68	2014.893	1	D, Wolf 19
ES 1867AC	00466+6131	9.33, 9.71	299.3	73.37	2014.893	1	D
ARG 3	00573+6020	8.51, 9.41	200.2	20.69	2014.893	1	D
SMR 60BC	03311+2744	7.81, 13.	358.9	2.55	2014.077	1	D
STF 401AB	03313+2734	6.58, 6.93	268.7	1.4	2014.077	1	D
STF 450AB	03474+2355	7.29, 9.4	263	6.27	2014.047	1	W
STF 449	03474+2440	8.78, 11.3	329.3	6.75	2014.047	1	W
STT 64AB	03500+2351	6.81, 10.15	234.6	3.26	2014.047	1	W
STT 64AC	03500+2351	6.81, 10.54	235.4	10.36	2014.047	1	W
BU 550AB	04359+1631	0.85, 13.6	113.9	31.02	2014.062	2	D,W, α Tau
STFB 2AC	04359+1631	0.85, 11.3	31.5	134.74	2014.062	2	D,W, α Tau
STT 560AB	04498+0658	3.22, 11.31	170.8	73.07	2014.047	1	W
BUP 80	05284-0330	7.64, 10.1	205.3	44.14	2014.151	1	D
BU 558AB	05320-0018	2.41, 14.2	228.9	32.95	2014.167	1	D
STFA 14AC	05320-0018	2.41, 6.83	0.8	52.14	2014.167	1	D
HDZ 1	05352-0055	10.8, 11.1	220.5	18.35	2014.151	1	D
STF 746AB	05353-0441	10.4, 10.7	218.5	14.05	2014.151	1	D
STF 751	05358-0059	8.02, 8.96	123.8	15.54	2014.151	1	D
STF 817	05549+0702	8.68, 8.93	73.2	18.68	2014.077	1	D
H 6 39AB	05552+0724	0.77, 14.5	113.4	37.97	2014.077	1	D, α Ori
H 6 39AD	05552+0724	0.77, 13.5	345.7	71.39	2014.077	1	D, α Ori
H 6 39AE	05552+0724	0.77, 11.0	154.6	176.06	2014.077	1	D, α Ori
SLE 831AF	05552+0724	0.77, 12.1	266	168.44	2014.077	1	D, α Ori
SLE 831AG	05552+0724	0.77, 12.8	47.3	148.65	2014.077	1	D, α Ori
SLE 831AH	05552+0724	0.77, 11.2	294	240.03	2014.077	1	D, α Ori

Table 1 continues on next page.

Double Star Measurements Using a Webcam and DSLR, Annual Report of 2014

Table 1(continued). Measurements of Double Stars from 2014

NAME	RA+DEC	MAGS	PA	SEP	DATE	N	Notes
SMR 29AI	05552+0724	0.77, 13.5	237.3	217.79	2014.077	1	D, α Ori
SMR 29AJ	05552+0724	0.77, 13.5	257.6	190.71	2014.077	1	D, α Ori
STT 179	07444+2424	3.7, 8.2	241.1	7.24	2014.184	1	W, 77 Gem
STF1249	08377+1946	11.00, 10.78	40.4	25.17	2014.184	1	W
S 571AD	08399+1933	7.31, 6.67	241.7	92.4	2014.176	2	D,W
BU 584DC	08399+1933	6.67, 7.47	88.5	99.74	2014.176	2	D,W
BKO 34DE	08399+1933	6.67, 11.75	2.9	35.4	2014.167	1	D
LDS 907	08399+4500	12.6, 12.8	180.9	7.27	2014.23	1	D, Wolf 317
STF1254AB	08404+1940	6.44, 10.37	54.7	20.63	2014.176	2	D,W
STF1254AC	08404+1940	6.52, 7.61	342.5	63.25	2014.167	1	D
STF1254AD	08404+1940	6.52, 9.20	44.5	82.51	2014.176	2	D,W
SMR 30AE	08404+1940	6.52, 12.5	155.1	15.23	2014.184	1	W
LDS 908	08559+4632	11.99, 12.14	132.7	9.82	2014.23	1	D, Wolf 323
STF1300AB	09013+1516	9.47, 9.73	181	4.81	2014.184	1	W
ENG9001AC	09013+1516	9.47, 9.93	13.4	202.02	2014.184	1	W
ENG9001AD	09013+1516	9.47, 10.21	61.9	197.85	2014.184	1	W
HJ 4433AB	11256+1627	5.62, 10.84	4.1	55.15	2014.381	1	W, 81 Leo
STF1540AB	11268+0301	6.55, 7.50	149.6	28.04	2014.378	1	W, 83 Leo=Wolf 393
STFA 19AB	11279+0251	5.05, 7.47	181.6	88.34	2014.378	1	W, 84 Leo
STF1547AB	11317+1422	6.33, 9.14	331.2	15.52	2014.381	1	W, 88 Leo=Wolf 401
BU 604AD	11491+1434	2.14, 8.49	194	236.52	2014.381	1	W, β Leo
STF1685AB	12519+1910	7.31, 7.78	201	15.99	2014.43	1	W
BUP 146	12556+0324	3.58, 11.79	126.6	192.05	2014.43	1	W, Wolf 448
STF1712	13035+0928	10.24, 10.57	332.3	8.94	2014.43	1	W
BRT3219	13041+0933	11.0, 12.1	259.6	4.59	2014.43	1	W
A 1785	13058+0904	9.73, 10.82	129.1	2.51	2014.43	1	W
STF1728AB,C	13100+1732	5.2, 10.2	349.3	84.77	2014.43	1	W
LDS5771	13114+0938	8.80, 12.36	169.4	81.75	2014.43	1	W, Wolf 477
S 648	13131+1801	9.35, 9.97	68.8	88.02	2014.43	1	W
HJ 2647	13145+1120	5.82, 12.61	214.8	50.07	2014.43	1	W
S 648	13131+1801	9.35, 9.97	68.8	88.02	2014.43	1	W
STF1733	13163+1715	8.99, 10.37	127.5	4.93	2014.43	1	W
STF1888AB	14514+1906	4.76, 6.95	303.8	5.68	2014.54	1	W, ξ Boo
STF1919	15127+1917	6.71, 7.38	10.5	23.24	2014.54	1	W
STF1925AB	15169-0817	8.14, 9.85	17.9	6.01	2014.504	1	W, Wolf 1139
STF1930AB	15193+0146	5.06, 10.11	35.1	11.36	2014.54	1	W, 5 Ser
STF1954AB	15348+1032	4.17, 5.16	172.7	3.62	2014.54	1	W, d Ser
STF1954AC	15348+1032	4.17, 13.9	18.3	66.64	2014.504	1	D
SMR 62AE	15348+1032	4.17, 15.	42.4	63.54	2014.504	1	D
STF1954CD	15348+1032	13.9, 14.6	337.5	4.07	2014.504	1	D
STT 300	15402+1203	6.32, 10.07	260.9	15.04	2014.545	1	W
A 2230AD	15440+0231	5.95, 10.95	284.9	172.39	2014.504	1	W, Wolf 573
HJ 1277AB	15443+0626	2.65, 11.8	333.8	57.58	2014.54	1	W, α Ser
STF1970AB	15462+1525	3.66, 9.96	263.9	30.45	2014.504	1	W
STF1978	15509+1441	9.19, 10.13	235.2	15.34	2014.545	1	W

Table 1 continues on next page.

Double Star Measurements Using a Webcam and DSLR, Annual Report of 2014

Table 1 (continued). Measurements of Double Stars from 2014

NAME	RA+DEC	MAGS	PA	SEP	DATE	N	Notes
WLF 2	15572+0509	13.36, 15.30	200.8	67.56	2014.43	1	W, Wolf 611+612
STF1993AB	15598+1723	8.59, 8.88	42.8	20.15	2014.545	1	W
STF1994CD	15598+1723	10.03, 12.48	337.2	17.34	2014.545	1	W
LDS 573AB,	C 16555-0820	9.44, 11.76	313.2	72.19	2014.488	3	W, Wolf 629
ENG 59AB	17011-0413	4.99, 9.71	67.4	99.77	2014.504	1	W
ARN 16AC	17011-0413	4.99, 8.75	85	220.88	2014.504	1	W
LDS 585AB	17050-0504	7.86, 10.14	122.7	183.77	2014.504	1	W, Wolf 635+636
HU 1177	17098+3849	9.82, 13.39	86.5	37.55	2014.545	1	W, Wolf 649
AG 209	17278+3607	9.64, 10.19	187.4	34.01	2014.709	2	D, W, Wolf 747
ES 2230	17317+3604	10.54, 11.03	92.5	9.59	2014,709	1	W
STF2277AB	18031+4828	6.25, 8.93	128.1	26.57	2014.753	1	W
STF2277AC	18031+4828	6.25, 10.19	297.8	99.56	2014.753	2	W, Wolf 1405
STF2272AB	18055+0230	4.22, 6.17	127.6	6.27	2014.54	1	W, 70 Oph
STTA171AB	18329+3850	7.02, 8.12	327.6	149.87	2014.6	1	W
H 5 39AB	18369+3846	0.09, 9.5	183.7	82.13	2014.6	1	W, Vega
STFB 9AE	18369+3846	0.09, 9.5	38.7	86.63	2014.6	1	W
STFA 39AB	18501+3322	3.63, 6.69	148.1	45.41	2014.6	1	W
BU 293AC	18501+3322	3.63, 13.0	247.3	46.4	2014.6	1	W
BU 293AE	18501+3322	3.63, 10.14	317	67.1	2014.6	1	W
BU 293AF	18501+3322	3.63, 10.62	17.9	85.7	2014.6	1	W
HL 9001AB	18536+3303	13.1, 15.	262.4	5.02	2014.709	1	W
HL 9001AC	18536+3303	13.1, 15.	3.3	18.76	2014.709	1	W
ES 2028AB	18545+3654	4.30, 11.2	349.1	86.33	2014.583	1	D, δ Lyr2
SMR 13AD	18545+3654	4.30, 8.8	209.7	193.14	2014.583	1	D
SMR 13AE	18545+3654	4.30, 10.3	237.8	400.64	2014.583	1	D
SMR 13AF	18545+3654	4.30,	244.9	369.44	2014.583	1	D
SMR 13AG	18545+3654	4.30,	260.8	335.9	2014.583	1	D
SMR 13AH	18545+3654	4.30,	284	229.39	2014.583	1	D
SMR 13AJ	18545+3654	4.30,	249.1	279.48	2014.583	1	D
SMR 13AK	18545+3654	4.30,	236.2	304.24	2014.583	1	D
SMR 13HI	18545+3654	4.30,	250.5	26.29	2014.583	1	D
ES 2029	18548+3611	10.02, 11.36	205.8	5.06	2014.6	1	W
AGC 9AB	18589+3241	3.24, 12.1	305.4	13.46	2014.6	1	W
STF2487AB	19138+3909	4.38, 8.58	80	28.21	2014.6	1	W
STF2487AC	19138+3909	4.38, 11.42	150.7	161.51	2014.6	1	W
SHJ 292AB	19164+3808	4.48, 10.14	69.9	98.9	2014.6	1	W
SHJ 292AC	19164+3808	4.48, 11.1	128.4	101.29	2014.6	1	W
STT 591AC	19364+5013	4.5, 11.7	179.1	73.04	2014.753	1	W
STG 8AD	19364+5013	4.5, 12.5	52.5	67.04	2014.753	1	W
SKF1976AE	19364+5013	4.54, 12.88	266.3	116.27	2014.753	1	W
STF2579AC	19450+4508	2.89, 12.0	66.3	62.55	2014.753	1	W
SMR 7	20000+1736	10.1, 11.4	264.9	4.1	2014.753	1	W
S 730AB	20001+1737	7.16, 8.45	14.3	112.76	2014.753	1	W
S 730AC	20001+1737	7.16, 10.21	337.7	78.54	2014.753	1	W
S 730AD	20001+1737	7.16, 9.9	198.4	40.67	2014.753	1	W

Table 1 concludes on next page.

Double Star Measurements Using a Webcam and DSLR, Annual Report of 2014

Table 1 (conclusion). Measurements of Double Stars from 2014

NAME	RA+DEC	MAGS	PA	SEP	DATE	N	Notes
ENG 71AB	20111+1611	7.42, 9.67	147.9	211.96	2014.797	1	D, Wolf 873
HZG 15AD	20111+1611	7.42, 11.21	256	35.2	2014.797	1	D
GIC 163AE	20111+1611	7.42, 13.93	95.3	103.92	2014.797	1	D
BUP 205BC	20111+1611	9.67, 12.65	273.1	61.05	2014.797	1	D
HJ 1495AB	20136+4644	3.93, 13.4	327.7	36.1	2014.775	2	W, D, 30 Cyg
STFA 50AC	20136+4644	3.93, 6.97	172.3	106.72	2014.775	2	W, D
STFA 50AD	20136+4644	3.93, 4.83	322.5	335.24	2014.797	1	D
BU 1483AF	20136+4644	3.93, 13.9	166.9	43.49	2014.775	2	W, D
BU 1483CH	20136+4644	6.97, 12.6	61.7	60.58	2014.775	1	W
BU 1483CI	20136+4644	6.97, 12.26	135.3	60.18	2014.775	1	W, D
New H1	20136+4644	12.6,	262.7	8.98	2014.797	1	D, see text
New F2	20136+4644	13.9,	214.4	3.6	2014.797	1	D, see text
New	20139+4641	13., 13.	59.2	7.14	2014.797	1	D, see text
ES 27	20143+4648	10.58, 10.61	339.7	4.02	2014.753	1	W
STF2758AB	21069+3845	5.35, 6.10	151.9	31.34	2014.753	1	W, 61 Cyg
STF2758AE	21069+3845	5.35, 9.63	267.2	332.02	2014.753	1	W
STF2758AF	21069+3845	5.35, 11.3	240	360.65	2014.753	1	W
STF2758AG	21069+3845	5.35, 10.84	235.7	250.16	2014.753	1	W
STF2758AH	21069+3845	5.35, 10.89	272.9	103.66	2014.753	2	W
SMR 1AI	21069+3845	5.35, 10.74	247.2	12.11	2014.753	2	W
SMR 40AO	21069+3845	5.35, 12.65	284.4	151.41	2014.753	2	W
SMR 40AP	21069+3845	5.35, 12.84	294.3	146.18	2014.753	2	W
SMR 40AQ	21069+3845	5.35, 13.19	323.8	67.96	2014.753	2	W

