

MICROMETER AND CCD MEASUREMENTS OF DOUBLE STARS

(Series 51)

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SUMMARY: 36 micrometric measurements of 20 double or multiple systems carried out with the Zeiss 65/1055 cm Refractor of Belgrade Observatory are communicated. Also 35 CCD measurements of 15 double or multiple systems are included.

The present measurements follow the ones published in Series 50 (Popović & Pavlović, 1997).

The series contains 71 measurements of 35 double or multiple systems. The comparison of the measurements with the ephemeris in the case of orbital pairs was performed with respect to the Ephemeris Catalogue by Couteau et al. (1986).

The observations of this series are reduced by applying the standard procedure, just as in the case of the earlier ones.

The results are presented in Tables 1, 2 and 3.

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REFERENCES

- Couteau, P., Morel, P. J., Fulconis, M.: 1986, Cinquième Catalogue d'Ephemeride d'Etoiles Doubles Visuelles. *Publication de l'Observatoire de Nice*.
- Popović, G. M., Pavlović R.: 1997, *Bull. Obs. Astron. Belgrade*, **155**, 97.
- Worley C. E., Douglass G. G. : 1996, *The Washington Double Star Catalog, 1996.0*, available on cdsarc.u-strasbg.fr.

Table 1. Micrometer Measurements of Double Stars

WDS	Disc.	Mult.		ADS BD	Epoch	P [$^{\circ}$]	ρ ["]	Est.Mag.	Weight	Obs	Notes
01058 + 0455	STF	90	AB	903	1998.032	83.6	33.14		2+1	Pop	
02096 + 4443	POP	148			1998.032	118.7	2.26	10.0-12.5	1+1	Pop	
03141 + 3518	POP	71			1998.032	104.4	3.39	11.0-13.0	1+1	Pop	
03355 + 3528	POP	83		+34 $^{\circ}$ 685	1998.032	257.0	0.50		2+2	Pop	N
11563 + 3527	STT	241	AB	8355	1998.405	139.2	1.57	8.0-10.0	1+2	Pop	N
11563 + 3527	STT	241	AB	8355	1998.405	145.0	1.59		2+2	Pav	
12306 + 0943	STF	1647		8575	1998.419	245.2	1.23	0.1	2+2	Pop	N
12306 + 0943	STF	1647		8575	1998.419	245.7	1.40		2+2	Pav	
12419 + 0953	HO	54	BC	8631	1998.405	139.0	1.68	10.5-10.4	2+2	Pop	
12419 + 0953	HO	54	BC	8631	1998.410	137.7	1.92		1+2	Pop	
12419 + 0953	HO	54	BC	8631	1998.419	139.8	1.88	10.0-10.0	1+2	Pop	
					1998.411	138.8	1.82		3n	Pop	N
12419 + 0953	HO	54	BC	8631	1998.405	142.8	2.12		2+2	Pav	
13343 + 0012	STF	1757	AB	8949	1998.405	122.2	2.03		1+2	Pop	
13343 + 0012	STF	1757	AB	8949	1998.413	122.6	1.74	7.5- 8.5	2+2	Pop	
					1998.409	122.4	1.88		2n	Pop	N
13537 + 4104	POP	153			1998.410	343.2	1.06	8.9- 9.5	1+2	Pop	
13537 + 4104	POP	153			1998.413	342.8	0.79	0.2	3+2	Pop	
					1998.412	343.0	0.92		2n	Pop	N
15265 + 4400	STT	296	AB	9639	1998.405	276.1	1.90	1.7	3+2	Pop	N
15265 + 4400	STT	296	AC	9639	1998.405	313.7	78.67		3+2	Pop	N
15265 + 4400	STT	296	AB	9639	1998.405	284.3	1.94		2+2	Pav	
15265 + 4400	STT	296	AC	9639	1998.405	311.5	77.78		2+2	Pav	
15499 + 4431	BU	621		9802	1998.419	30.5	0.70	8.0- 9.5	3+2	Pop	N
15499 + 4431	BU	621		9802	1998.419	27.5	0.77	1.5	2+2	Pav	
16009 + 1315	STT	303		9880	1998.410	174.1	1.38	7.5- 8.0	1+2	Pop	N
17019 + 0827	STF	2114		10312	1998.405	191.0	1.31		1+2	Pop	N
17019 + 0827	STF	2114		10312	1998.405	185.8	1.34		1+1	Pav	
17166 + 3229	POP	222		+32.2878	1997.501	17.0	7.68	8.4-13.5	1+1	Pop	N
17166 + 3229	POP	222		+32.2878	1997.501	21.8	8.52	2.5	1+1	Pav	

Table 1. (continue)

WDS	Disc	Mult.	ADS BD	Epoch	P [°]	ρ ["]	Est.Mag.	Weight	Obs	Notes
17147 + 3448	POP	76		1997.501	111.6	2.00	12.0-13.0	1+1	Pop	
17147 + 3448	POP	76		1998.402	105.7	2.24	12.0-13.0	1+1	Pop	
				1997.954	108.6	2.12		2n	Pop	N
17165 + 3448	POP	77	AB	1997.501	327.0	4.42	10.0-11.0	1+1	Pop	
17165 + 3448	POP	77	AB	1997.501	329.8	4.75	2.0	1+1	Pav	
17186 + 3228	L	15	10461	1997.501	299.7	2.69	10.0-11.0	1+1	Pop	N
17186 + 3228	L	15	10461	1997.501	302.8	3.50	10.1-11.2	1+1	Pav	
18018 + 0118	BU	1125	10990	1998.402	single			2+2	Pop	N
18018 + 0118	BU	1125	10990	1998.402	single			2+2	Pav	
18054 + 6216	HU	1290	AB	11073	1998.402	single		1+1	Pop	N

Table 2. CCD Measurements of Double Stars

WDS	Disc.	Mult.	ADS BD	Epoch	P [°]	ρ ["]	Auth.	Nr. frames	Obs	Notes	
03091 + 4415	STF	351	2365	1998.035	115.68	27.38	Pop	4	Pop-Pav		
					115.40	27.26	Pav	4	Pop-Pav		
03113 + 4431	POP	223	+43°642	1998.035	181.06	14.88	Pop	2	Pop-Pav	N	
03121 + 3712	STF	360	2390	1998.035	124.49	2.72	Pop	6	Pop-Pav	N	
					125.42	2.70	Pav	6	Pop-Pav		
03123 + 3659	STF	361	2394	1998.035	14.57	10.32	Pop	1	Pop-Pav		
					14.15	10.45	Pav	1	Pop-Pav		
04083 + 1720	STT	72	3006	1998.035	326.07	4.73	Pop	6	Pop-Pav		
					328.15	4.71	Pav	5	Pop-Pav		
05364 + 2200	STF	742	4200	1998.071	275.06	3.96	Pop	4	Pop-Pav	N	
					275.58	3.91	Pav	3	Pop-Pav		
12161 + 4040	STF	1622	8489	1998.353	260.66	11.68	Pop	5	Pop-Pav		
					260.15	11.63	Pav	5	Pop-Pav		
12281 + 4448	STF	1645	8561	1998.361	157.27	9.85	Pop	3	Pop-Pav		
					157.37	9.98	Pav	3	Pop-Pav		
13343 + 00..	STF	1757	AB	8949	1998.361	123.59	1.84	Pop	3	Pop-Pav	N
					123.06	1.91	Pav	2	Pop-Pav		
13343 + 00..	STF	1757	AC	8949	1998.361	137.29	54.52	Pop	2	Pop-Pav	
13430 + 0333	STF	1777	9000	1998.353	226.54	2.54	Pop	2	Pop-Pav	N	
					228.92	2.59	Pav	3	Pop-Pav		
14407 + 1626	STF	1864	AB	9338	1998.361	109.72	5.56	Pop	9	Pop-Pav	N
					108.14	5.52	Pav	9	Pop-Pav		
15174 + 4348	STF	1934	AB	9573	1997.487	15.39	9.40	Pop	17	Pop-Pav	N

Table 2. (continue)

WDS	Disc.	Mult.	ADS BD	Epoch	P [°]	ρ ["]	Auth.	Nr. frames	Obs	Notes
15300 + 2531	STF	1950		1997.487	89.42	3.13	Pop	12	Pop-Pav	
					91.85	3.00	Pav	15	Pop-Pav	
17167 + 3504		AB	+35°2942	1997.487	321.27	57.84	Pop	4	Pop-Pav	N
					321.46	57.98	Pav	4	Pop-Pav	
17167 + 3504		AP	+35°2942	1997.487	331.37	24.87	Pop	3	Pop-Pav	N
					331.25	24.77	Pav	3	Pop-Pav	
17165 + 3448	POP	77	AB	1997.487	323.90	5.36	Pop	3	Pop-Pav	N
					322.12	5.30	Pav	3	Pop-Pav	
17165 + 3448	POP	77	AC	1997.487	342.73	63.46	Pop	4	Pop-Pav	
					343.40	63.46	Pav	4	Pop-Pav	
17147 + 34484	POP	77	CD	1997.487	80.43	11.42	Pop	1	Pop-Pav	

Table 3. Notes

WDS	Disc.	Mult.	Notes
03113+4431	POP	223	The first measurement.
03121+3712	STF	360	Hopmann, 1965: (Pop) $-0^{\circ}7$, $+0''12$; (Pav) $+0^{\circ}2$, $+0''10$
03355+3528	POP	83	Decrease in angle.
05364+2200	STF	742	Hopmann, 1973: (Pop) $+1^{\circ}7$, $-0''12$; (Pav) $+2^{\circ}2$, $-0''17$
11563+3527	STT	241	AB Since 1849 the angle has increased by $\approx 20^{\circ}$
12306+0943	STF	1647	The angle has increased by 43° .
12419+0953	HO	54	BC Slow decrease in angle.
13343-0019	STF	1757	AB Heintz, 1956: (Pop) $-7^{\circ}1$, $+0''20$ (mic.); $-5^{\circ}9$, $+0''16$ (ccd) Heintz, 1956: (Pav) $-5^{\circ}4$, $+0''23$ (ccd)
13430+0333	STF	1777	Slow decrease in both coordinates.
13537+4104	POP	153	Slow decrease in angle.
14407+1626	STF	1864	AB Slow decrease in angle.
15174+4348	STF	1934	AB The change in both coordinates.
15265+4400	STT	296	AB The angle has decreased by 52° since 1845. Marked increase in distance.
15265+4400	STT	296	AC The change in both coordinates.
15499+4431	BU	621	Since 1891 the angle has decreased by 32°
16009+1315	STT	303	The distance has hardly changed and the angle has increased by 63° since 1846.
17019+0827	STF	2114	The angle has increased by 55° since 1830. No evidence of change in distance.
17147+3448	POP	76	Slow decrease in angle.
17165+3448	POP	77	AB There are no good agreements between micrometer and CCD measurements.
17166+3229	POP	222	The first measurement.
17167+3504			AB The first measurement.
17167+3504			AP The first measurement.
17186+3228	L	15	In IC No 135 I published a new pair PAV 2 which seems to be identical to L 15 pair. However, I have surely measured a pair about $2'$ north of the star identified by Guide 6.0 as L 15 pair.
18018+0118	BU	1125	Popović-Živkov, 1998: $123^{\circ}6$, $0''56$.
18054+6216	HU	1290	AB Živkov-Pavlović, 1998: $346^{\circ}7$, $0''21$. Probably this pair have a faint companion C: 135° , $1''56$

МИКРОМЕТАРСКА И ССД МЕРЕЊА ДВОЈНИХ ЗВЕЗДА

(Серија 51)

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Претходно саопштење

Саопштавају се 35 микрометарска мерења 20 двојних или вишеструких система реализованих на Zeiss рефрактору 65/1055 cm

Опсерваторије у Београду. Такође се дају 35 ССД мерења 15 двојних или вишеструких система.