

Measurements with Reticle Micrometer Performed by a New Double Stars Observing Group from Poland

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Abstract: Measurements of 19 double stars using a reticle micrometer eyepiece are reported. The observational program was held in spring and summer of 2015 as an extended workshop for a new double stars observing group from Szczecin, Poland. The goal of the program was to learn how to measure position angle and separation using a reticle micrometer eyepiece.

Introduction

A new group of double stars observers has been informally founded as a part of the Polish Astronomy Amateur Association, division Szczecin. None of the observers had previous experience in double star astronomy, so it was clearly an educational program to learn how to use a reticle micrometer eyepiece and to spark an interest in double stars in general. The purpose was also to learn the basics before taking the next steps in the vast field of double star astronomy.

The program was based on the observing list generated by Brian Mason from the USNO, previously requested by the first author. The list contained 54 stars with the following specifications:

- RA: from 13h to 18h
- DEC: from 15° to 60°
- Magnitudes: > 10 mag, no lower limit
- Separation: from 10" to 80"
- Last observation: 2005

The limits were mainly determined by the observatory location close to the city center where the measurements were carried out. The telescope used was the Zeiss Coude-Refractor 150/2250 from the year 1980.

Method

Calibration was performed via the drift method and

led to value 9.253'' for one division at the linear scale of the Celestron Micrometer Eyepiece. Measurements were carried out in two to five person groups at the time, with an exception of 1 night when only 1 person ran observations. Each person's position angle and separation results were noted and averaged. Ten out of 20 observed stars was measured during two or more nights. In those cases Bessellian dates were averaged. For each system, the measurement errors were calculated as a standard deviation of all results.

Results

Nineteen double stars were measured from May to September 2015, giving a total of 245 single observations. The vast spread of errors is due to a few factors like poor telescope drive and lack of experience for the program participants. Table 1 gives the measurements and uncertainties.

Acknowledgements

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The authors are all amateur astronomers with a special interest in double stars and photometry. All participants of the described program are members of the Astronomy Amateur Association, Szczecin Division.

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Table 1. Measurements of the Double Stars

disc	wds	mags	PA	err	SEP	err	date
HZG 8AC	11045+3814	6.04, 7.56	83.75	0.76	150.64	0.77	2015.368
HJL1062	11202+1707	7.92, 9.13	187	0	103.63	0	2015.390
HJL1065AC	11390+4109	8.11, 9.18	3.63	0.29	132.32	2.37	2015.553
ARG 101	11512+3322	6.27, 9.28	273.75	0.5	46.08	0.77	2015.390
STTA112AB	11545+1925	8.28, 8.49	36.75	0.35	73.79	0.33	2015.384
STFA 25AC	13135+6717	6.64, 8.89	223.38	0.18	105.02	1.31	2015.550
HJ 1231AC	13253+4028	8.67, 8.85	233.25	1.06	92.53	0	2015.550
STF1831AC	14161+5643	7.16, 6.73	221.69	0.74	112.19	0.33	2015.381
STF1830CE	14161+5643	6.73, 9.33	246.67	0.58	139.03	0.89	2015.384
ARY 42	15174+3022	9.3, 9.63	188.33	0.58	92.76	1.58	2015.409
STTA138BC	15201+6023	7.76, 9.28	48.81	0.49	91.6	0.59	2015.550
BAR 41CD	15520+4238	7.8, 9.7	51.5	0.58	66.62	0.76	2015.409
ARY 12	15599+6914	8.9, 8.95	248.38	0.48	124.22	0.89	2015.384
STFA 30BC	16362+5255	6.42, 5.5	16.86	0.43	91.47	0.4	2015.396
BU 953AB,D	16366+6948	8.04, 8.03	46.39	0.47	147.96	1.05	2015.507
POP1222AD	16448+3544	9.37, 8.91	7	0.61	158.5	0.41	2015.444
STTA151AB	17039+5314	7.93, 9.34	171.4	0.67	88.42	1	2015.537
S 689AB	17246+3913	7.48, 8.44	198.15	0.84	91.19	0.58	2015.529
STTA157AB	17407+3117	6.43, 7.92	106.2	0.69	118.28	0.83	2015.537