

Blue Star Observatory Measurement of Eight Possible New Pairs

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Abstract: This paper presents the results of photographic measurements of eight possible new multiple stars visible in southern skies. These possible new pairs were found as part of our regular survey of neglected southern pairs in the period 2017 – 2019.

Introduction

These latest results are part of an ongoing programme commenced in 2008 by the Double Star Section of the Astronomical Association of Queensland. The nearby target stars were selected from the Washington Double Star Catalogue (WDSC) and were observed in Queensland, Australia from a latitude of approximately 27° S.

Method

Each of these possible new pairs has been found as part of our regular programme of measuring neglected southern pairs which has been in progress now for a number of years. Usually located within the FOV of the neglected pair (or close by), using Vizier etc., Janke has determined that they are not currently identified in the WDSC.

As per our regular data gathering of neglected pairs, nightly sets of one hundred images were ob-

tained with the equipment described above. The images were then stacked using Atik DAWN software and analysed using the astrometric double star program REDUC (Losse, 2008). Approximately ten stacked images of each target were taken per night for seven nights and the results averaged to obtain measures of separation and position angle with sufficient confidence.

Full details of the method are given in Napier-Munn and Jenkinson (2009). Subsequent work on the errors inherent in the method is described in Napier-Munn and Jenkinson (2014).

Fellow AAQ members Culshaw, Hughes and Hughes provided invaluable assistance with image processing using Losse's REDUC software, and Janke with processing the original FITS image files into JPEG photographs.

System	New measure			Comment
	PA °	Sep. "	Epoch*	
RSS331 nearby pair	319.232	4.471	2017.396	Possible new pair located SE of RSS331.
BRT1582 nearby pair #1	348.73	4.697	2019.836	Possible new pair located E of BRT1582.
BRT1582 nearby pair #2	252.58	12.804	2019.836	Possible new pair located SW of BRT1582.
B1241 nearby pair	90.132	4.251	2018.366	Possible new pair located NE of B1241.
HU1406 nearby pair #1	225.494	6.971	2019.009	Possible #1 new pair of two located NW of HU1406.
HU1406 nearby pair #2	172.540	4.033	2019.009	Possible #2 new pair of two located NW of HU1406.
J1755 nearby pair	89.700	4.581	2018.543	Possible new pair located NE of J1755.
RST3237 nearby pair	351.262	5.713	2019.655	Possible new pair located NE of RST3237.

Table 1: Position Angle and Separations of target systems.

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<u>RSS331 Centaurus</u> <u>nearby pair</u>	RA. 14 22.55	DEC. -30 36 31	Last Measure
<u>Date</u>	<u>No. images</u>	<u>PA°</u>	<u>Sep"</u>
16 May 2017	10	318.98	4.707
26 May 2017	10	319.23	4.323
27 May 2017	10	318.68	4.395
30 May 2017	10	319.71	4.426
02 June 2017	10	318.75	4.489
04 June 2017	10	320.04	4.488
Mean		319.232	4.471
Standard deviation		0.544	0.131
95% CI +/-		0.571	0.138
P(t) movement		0.000	0.000
COMMENTS Possible new pair located SE of RSS331. Six nights imaging only.			

Table 2: Individual measurements of RSS331 Centaurus nearby pair.

<u>BRT1582 Sculptor</u> <u>nearby pair #1</u>	RA. 00 55 30.142	DEC. -36 16 41.24	Last Measure n/a
<u>Date</u>	<u>No. images</u>	<u>PA°</u>	<u>Sep"</u>
23 October 2019	10	348.97	4.691
27 October 2019	10	348.45	4.762
01 November 2019	10	348.58	4.621
04 November 2019	10	348.89	4.709
10 November 2019	10	348.36	4.645
12 November 2019	10	349.13	4.754
Mean		348.730	4.697
Standard deviation		0.310	0.057
95% CI +/-		0.325	0.060
P(t) movement		0.000	0.000
COMMENTS Possible new pair located east of BRT1582 Sculptor. Six nights imaging only due to extended poor weather.			

Table 3: Individual measurements of BRT1582 Sculptor nearby pair #1.



Figure 1: Position of nearby pair and RSS 331 Centaurus.



Figure 2: BRT1582 Sculptor nearby pair #1.

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<u>BRT1582 Sculptor nearby pair #2</u>	RA. 00 54 29.146	DEC. -36 23 47.69	Last Measure n/a
	MAG. 11.54 & 12.29	PA. n/a	SEP. n/a
<u>Date</u>	<u>No. Images</u>	<u>PA. °</u>	<u>SEP. "</u>
23 October 2019	10	252.61	12.859
27 October 2019	10	252.71	12.783
1 November 2019	10	252.32	12.814
4 November 2019	10	252.61	12.800
10 November 2019	10	252.62	12.789
12 November 2019	10	252.61	12.776
Mean		252.580	12.804
SD		0.133	0.030
95% CI +/-		0.140	0.032
P(t) movement		0.000	0.000
<u>COMMENTS</u>			
Possible new pair located south west of BRT 1582 Sculptor. Six nights imaging only due to extended poor weather.			

Table 4: Individual measurements of BRT1582 Sculptor nearby pair #2.

<u>B1241 Centaurus nearby pair</u>	RA. 14 15 52	DEC. -50 43 34	Last Measure n/a
	MAG. 11.01 & 13.9	PA. n/a	SEP. n/a
<u>Date</u>	<u>No. images</u>	<u>PA°</u>	<u>Sep"</u>
09 May 2018	10	90.66	4.36
11 May 2018	10	89.95	4.177
13 May 2018	10	90.11	4.219
15 May 2018	10	89.82	4.242
16 May 2018	10	90.32	4.246
21 May 2018	10	89.93	4.26
Mean		90.132	4.251
Standard deviation		0.312	0.061
95% CI +/-		0.327	0.064
P(t) movement		0.000	0.000
<u>COMMENTS</u>			
Possible new pair located NE of B1241. Six nights imaging only.			

Table 5: Individual measurements of B1241 Centaurus nearby pair.

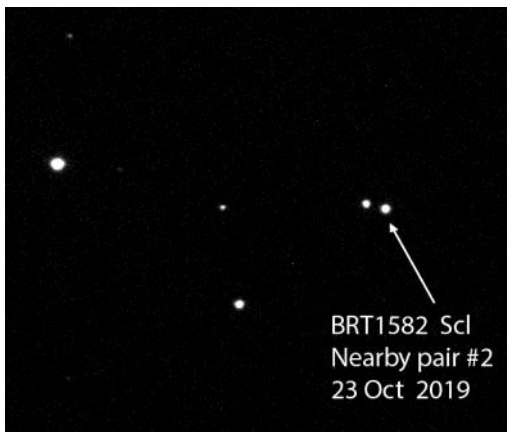


Figure 3: BRT 1582 Sculptor nearby pair #2.

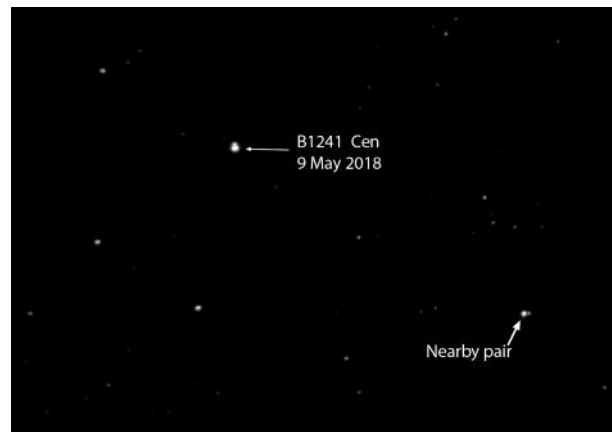


Figure 4: Position of nearby pair and B1241 Centaurus.

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<u>HU1406 Pictor</u> <u>nearby pair #1</u>	RA. 06 12 42.755 MAG.12.82 & 12.96	DEC. -56 05 43.06 PA. n/a °	Last Measure n/a SEP. n/a "
<u>Date</u>	<u>No. images</u>	<u>PA°</u>	<u>Sep"</u>
29 December 2018	10	225.58	6.969
30 December 2018	10	225.45	6.986
31 December 2018	10	225.56	6.972
1 January 2019	10	225.31	6.961
2 January 2019	10	225.45	6.971
4 January 2019	10	225.55	6.963
11 January 2019	10	225.56	6.978
Mean		225.494	6.971
Standard deviation		0.097	0.009
95% CI +/-		0.090	0.008
P(t) movement		0.000	0.000
COMMENTS Possible #1 new pair of two located NW of HU1406 Pictor. Additional FOV image included.			

Table 6: Individual measurements of HU1406 Pictor nearby pair #1.

<u>HU1406 Pictor</u> <u>nearby pair #2</u>	RA. 06 12 38.771 MAG.13.74 & 16.75	DEC. -56 05 51.73 PA. n/a °	Last Measure n/a SEP. n/a "
<u>Date</u>	<u>No. images</u>	<u>PA°</u>	<u>Sep"</u>
29 December 2018	10	171.75	3.995
30 December 2018	10	172.43	4.115
31 December 2018	10	173.97	3.972
1 January 2019	10	172.02	4.112
2 January 2019	10	171.87	4.151
4 January 2019	10	172.66	4.036
11 January 2019	10	173.08	3.849
Mean		172.540	4.033
Standard deviation		0.786	0.105
95% CI +/-		0.727	0.097
P(t) movement		0.000	0.000
COMMENTS Possible #2 new pair of two located NW of HU1406 Pictor. Additional FOV image included.			

Table 7: Individual measurements of HU1406 Pictor nearby pair #2.

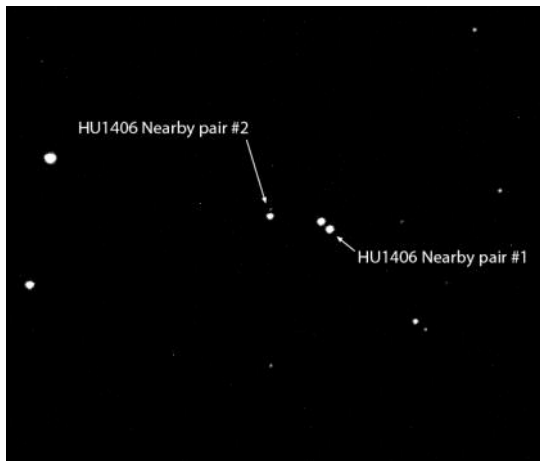


Figure 5: HU1406 Pictor Nearby pairs 1 and 2.



Figure 5: Additional FOV image of HU1406 Pictor Nearby pairs 1 and 2.

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<u>J1755</u> <u>nearby pair (N.E.)</u>	RA. 19 02 08.42.2 MAG. 9.8 & 11.7	DEC. -20 40 38.6 PA. n/a°	Last Measure n/a SEP. n/a"
<u>Date</u>	<u>No. images</u>	<u>PA°</u>	<u>Sep"</u>
13 July 2018	10	91.4	4.563
14 July 2018	10	89.7	4.369
15 July 2018	10	88.35	4.552
17 July 2018	10	89.69	4.815
18 July 2018	10	89.85	4.611
22 July 2018	10	89.21	4.573
Mean		89.700	4.581
Standard deviation		0.998	0.143
95% CI +/-		1.047	0.150
P(t) movement		0.000	0.000
COMMENTS			
Possible new pair located NE of J1755. Six nights imaging only.			

Table 8: Individual measurements of J1755 nearby pair.

<u>RST3237</u> <u>Sagittarius nearby pair</u>	RA. 19 44.51 MAG. 13.9 & 16.94	DEC. -18 29 PA n/a°	Last Measured n/a Sep n/a"
<u>Date</u>	<u>No. images</u>	<u>PA°</u>	<u>Sep"</u>
23 August 2019	10	352.2	5.886
24 August 2019	10	351.4	5.706
01 September 2019	10	351.46	5.693
02 September 2019	10	350.66	5.751
03 September 2019	10	350.59	5.529
Mean		351.262	5.713
Standard deviation		0.662	0.128
95% CI +/-		0.822	0.159
P(t) movement		0.000	0.000
COMMENTS			
Possible new pair in Sagittarius located NE of RST3237. Five nights imaging only due to extended poor weather.			

Table 9: Individual measurements of RST3237 Sagittarius nearby pair.



Figure 7: J1755 and nearby pair.

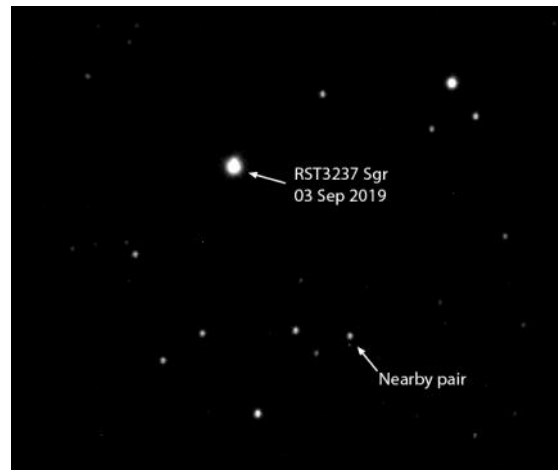


Figure 8: RST3237 Sagittarius and nearby pair.

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