

# Measurements of 16th Hour Northern Neglected Double Stars

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**Abstract:** CCD images were taken of 16 neglected double stars from the United States Naval Observatory (USNO) northern list of neglected double stars. The star group's positional data were all measured using the software measurement utility, MPO Canopus. All CCD images were made at Stonegate Observatory Ann Arbor, Michigan, June 20, 2008 at 42:17:48N and 83:50:14W.

## Introduction

The double stars were selected from the Washington Double Star (WDS) catalog listing of neglected double stars [1]. Stars were all chosen for low air mass positions during the early morning measurement period. All data were collected using a 14 inch, f/6.6 Schmidt-Cassegrain telescope mounted on a Software Bisque Paramount and imaged using a ST-10XME SBIG CCD camera. A minimum of four 30 second exposures were made of each star group.

## Method

The resulting CCD images were processed and star positions measured using MPO Canopus Double Star Utility [2]. The software utility plate solved each image and determined the scale and coordinates of key stars. The primary and secondary stars were identified on each image and the position angle and separation determined. Canopus is capable of photometric reductions but all images were made with a clear filter only and are recorded as instrumental magnitudes. The position angle (PA) and separation measurements (SEP) were averaged and are shown in Table 1.

## Conclusions

All data trends closely correlate with previous data collected with exception of KZA 116 taken in

1984. These data show significant change with PA increasing from 212 to 292.6 or 80.6 degrees. Considering a possible charting error, the primary and secondary positions were exchanged yielding a PA = 111.5 degrees which is 100.5 degrees decrease from 1984, an even greater movement. No explanation is apparent other than the system is fast moving or measurement errors. This system represents a good short term target to verify potential PA rotation at 17 seconds per month.

## References

1. Mason, Brian D. et al, US Naval Observatory, Neglected Northern Doubles List, Set III. <http://ad.usno.navy.mil/wds/NEGLECTED/neglectednorth3.html>
2. Warner, B.D. (2007). MPO Software, Canopus version 9.4.0.3, Bdw Publishing, <http://minorplanetobserver.com/>

*Table on next page.*

### Measurements of 16th Hour Northern Neglected Double Stars

WDS Name	RA+DEC	MAGS	PA	SEP	DATE	N	NOTES
ES 1089AB	1646.6+4759	10.2, 10.3	150.4	11.00	2008.467	4	1
ES 1089AC	1646.6+4759	10.2, 11.7	29.5	32.48	2008.467	4	2
KZA 111	1644.3+4550	11.7, 12.8	92.5	12.51	2008.467	4	3
KZA 112	1646.8+4527	10.5, 12.9	350.6	38.16	2008.467	5	4
KZA 113	1647.4+4637	12.8, 13.2	157.0	21.36	2008.467	5	5
KZA 114AB	1647.7+4615	12.4, 13.4	247.2	37.62	2008.467	8	6
KZA 114AC	1647.7+4615	12.4, 13.9	239.5	60.58	2008.467	4	6
KZA 114AD	1647.6+4615	12.4, 12.3	212.4	68.57	2008.467	4	7
KZA 114AE	1647.6+4615	12.4, 12.9	228.7	80.75	2008.467	5	6
KZA 115	1649.2+4544	11.6, 12.5	287.7	30.85	2008.467	5	4
KZA 116	1649.5+4620	13.0, 13.0	292.6	13.13	2008.467	3	8
KZA 117	1650.9+4601	12.8, 13.0	325.4	7.93	2008.467	5	9
KZA 120	1653.4+4602	12.6, 12.5	79.1	10.73	2008.467	5	4
KZA 121AB	1654.7+4518	10.9, 11.3	181.7	43.03	2008.467	4	10
KZA 121AC	1654.7+4518	10.9, 12.2	251.1	50.25	2008.467	5	4
KZA 121AD	1654.7+4518	10.9, 12.2	220.8	109.42	2008.467	4	11

**Table 1:** Measurement data of the 16<sup>th</sup> hour neglected double stars. All magnitudes are instrumental.

#### Table Notes:

1. Consistent change with 1911/1983 data of PA = 141, 148 and SEP = 2, 8. PA increased 2.4 degrees, SEP increased 3 seconds.
2. No change from 1911/1911 data of PA = 30, 30 and SEP = 32.6, 32.6.
3. Previous data 1983/84; PA increased 2 degrees from average.
4. Data consistent with 1983/84.
5. Previous data 1983/84; PA decreased 1 degree.
6. Correlates with 1983/84 data.
7. Previous data 1983/84; PA decreased 0.6 degrees.
8. Significant change from 1984; PA increased 80.6 degrees, SEP increased 2.6 seconds.
9. Previous data 1984; PA increased 5.4 degrees.
10. Data consistent with 1892/1998.
11. Data consistent with 1984.

