Speckle Interferometry of KUI 71, A 351 AB, and A 234 AB

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Abstract KUI 71 (WDS 16053+5810) and A 351 AB (WDS 17293+2924) were measured via speckle interferometry with a 2.1-meter telescope at Kitt Peak National Observatory on 2014.284. The position angles and separations of these two pairs were found to be 10.7° and 0.6″, and 52.8° and 0.38, respectively. We were unable to resolve A 234 AB (WDS 17526+2536).

Introduction

Published observations of three double stars were compared with recent speckle interferometry observations made in April 2014 at Kitt Peak National Observatory (Genet et al. 2014). These three stars were KUI 71 (WDS 16053+5810), A 351 AB (WDS 17293+2924), and A 234 AB (WDS 17526+2536). PlateSolve 3 (Rowe and Genet 2015) was used to reduce the Kitt Peak observations. Figure 1 shows students at the Army and Navy Academy analyzing the data.

Figure 1: Army and Navy Cadets David Hoffman (rear), Blake Howard (left front), and Ayden Haen (right).

Results and Discussion of KUI 71

The 10 previous observations of KUI 71, as well as our 2014 observation of position angle of 10.7° and separation of 0.61″, are provided in Table 1. The autocorellogram of KUI 71 we obtained from PlateSolve 3 is given in Figure 2. The position angle and separation do not easily match with historical records. However, no data has been reported for this star since 1991, so some change may be expected.

KUI 71		
EPOCH	Position Angle°	Separation″
1933.67	6.0	0.76
1938.36	7.1	0.78
1947.46	9.4	0.72
1948.18	9.5	0.76
1954.59	8.5	0.71
1959.44	17.1	0.62
1962.87	18.4	0.61
1976.38	15.8	0.48
1991.25	12.0	0.67
1991.27	22.0	0.45
2014.283	10.7	0.61

Table 1: Historical measurements of KUI 71 compared to the present study.

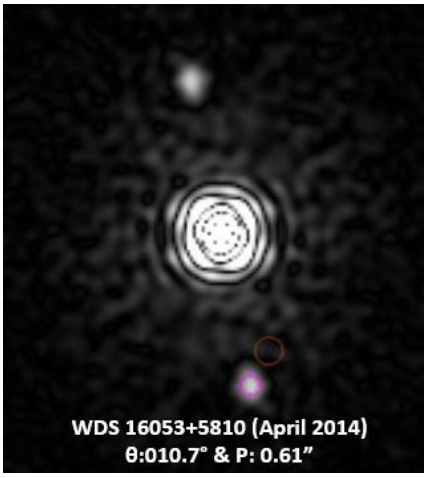

Figure 2: The autocorellogram of KUI 71 obtained from PlateSolve 3.

Results and Discussion of A 351 AB

A 351 AB is part of a multiple star system which includes KUI 82 AB,C. The Washington Double Star Catalog (WDS) lists primary and secondary magnitudes of 9.7 and 9.95 for A 351 AB. The primary star has a spectral type of K2 but no spectral type for the secondary is reported. In 2012, Malkov et al. estimated a period of 60 years and a semi-major axis of 0.60″ for A 351 AB with a highly inclined orbit. Further, Malkov provided dynamical, photometric, and spectroscopic masses of 1.06 $M_{\odot}$ ± 0.24, 1.33 $M_{\odot}$, and 0.79 $M_{\odot}$, respectively.

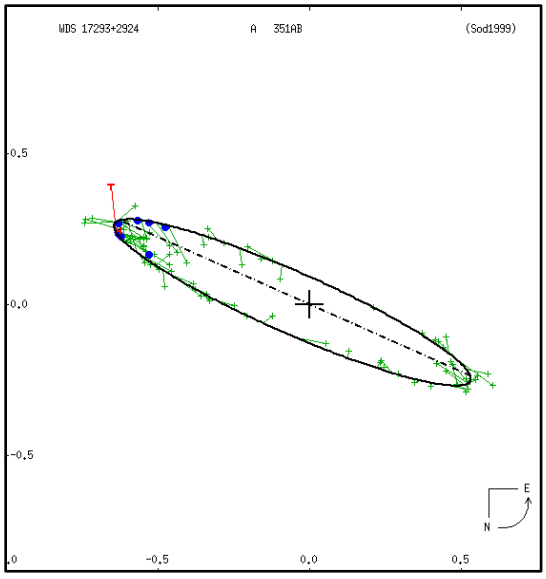

Figure 3: Orbital Plot of A 351 AB, courtesy U.S. Naval Observatory 6th Orbital Catalog.

There are eighty-seven historical measurements of this binary star listed in the WDS and shown in the plot in Figure 3. Our position angle and separation measurements of 52.8° and 0.38″ were in line with previous observations.

Results and Discussion of A 234 AB

A 234 AB is a multiple star system which includes LBU 1 AB,C. LBU AB,C was first measured in 1897 and A 234 AB was first measured in 1901. We attempted to observe A 234 AB because it had a low delta magnitude, 9.17 and 9.5 for the primary and secondary, respectively.

When processed, the speckle data from the Kitt Peak observations made in April 2014 did not reveal a discernable companion in the autocorrelogram shown in Figure 4.

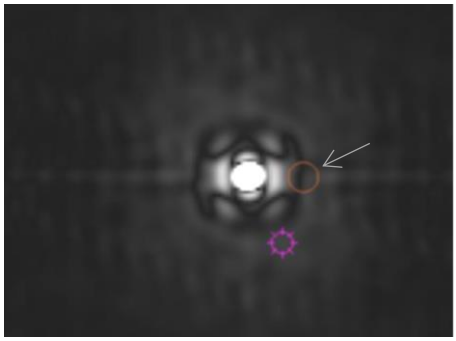

Figure 4. Autocorrelogram of A 234 AB obtained from PlateSolve 3. No secondary was discernable.

The 37 reported observations in the WDS of A 234 AB are graphed in Table 4.

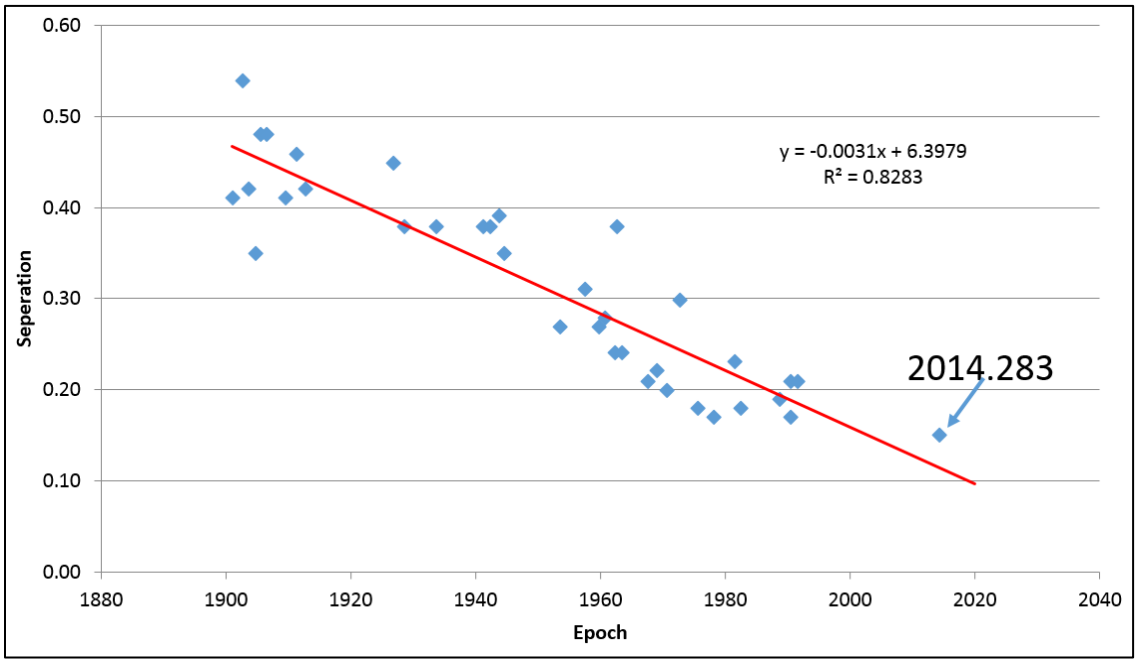

Table 4: Graphical plot of historical measurements of A 234 AB.

The projected separation of A 234 for 2014.283 is 0.15″. This is near the telescopic limits of the Kitt Peak observations and may be why the secondary star was not able to be observed.

Conclusions

The authors successfully contributed new measurements of the double stars KUI 71 and A 351 AB. They were unable to discern the secondary star of A 234 AB.

Acknowledgements

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