

BEA 1 a New “Old” Companion of WDS 06167+3852 J 591 in Auriga

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Abstract: In this paper I offer confirmation of the single observation of J 591 AB as well as an observation of a new component. Both components were observed during a neglected doubles stars measurements session. Also, both were previously registered in older professional images.

Although I have visually observed double stars for a long time, it was only in 2006 that I started making CCD measurements. The instrument I used is a Takahashi Mewlon 300. This is a good 300 mm Dall-Kirkham reflector with a focal length of 3,572 mm mounted on a 10 Micron GM 2000 equatorial mount. This last is a rock-solid german mount resembling the Astro-Physics GE 900GTO (accredited with having a 3 second periodical error and is a well-tested) with FS2 controller. This mount is fixed and well aligned to the north pole and therefore is very easy to take images of a considerable number of pairs in a night. The sensor is the very well known, cooled SBIG ST7XME with precise square 9 micron pixels. Finally, the optical train is composed of the telescope, an Astronomik anti IR filter, a 2X TeleVue Barlow lens, one flip mirror, and lastly the SBIG camera. The distance from the Barlow lens and the sensor is pretty long and so the equivalent focal length of the system is about 12500 mm with a image scale of about 0.15"/pixel.

For data reduction I use Reduc 3.63, a well known and fine program by Florent Losse.

(<http://www.astrosurf.com/hfosaf/Reduc/Tutorial.htm>)

For calibration stars I usually use the pairs from the Guy Morlet list that Florent Losse sent me with the Reduc program, one pair at the start of the measurement session and one pair at the end. The error, using these stars, is well under the errors imposed by

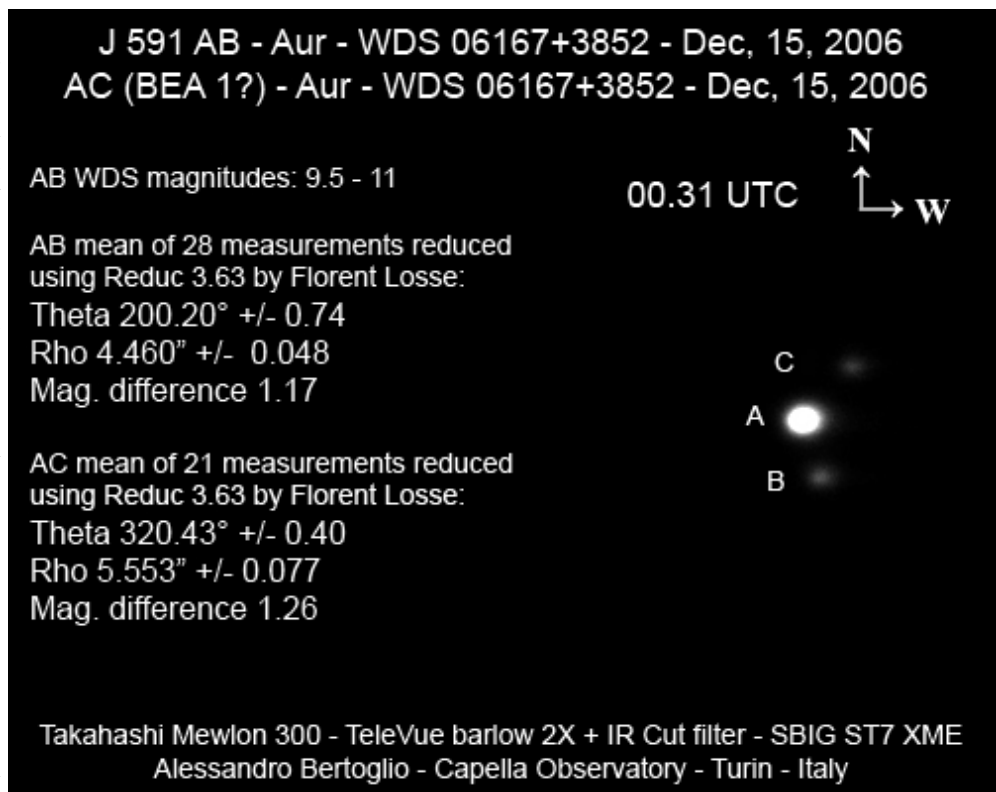


Figure 1: CCD image of J 591 made by the author.

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the night conditions. I make an average of the calibration parameters from these two pairs and I use this average for the reduction of all double stars measured during the night.

Normally, I take from 50 to 100 images of each pair. Then, with Reduc I measure every image, discarding the worst. Finally, I obtain an average of separations and position angles and the errors (sigma) of the remaining images. Reduc is also able to estimate the magnitude difference but it's not a photometric program (and the technique I use is not well suited for this work), but normally the error is pretty low, about 0.1 – 0.3 magnitudes.

I made a personal list of neglected doubles from the last general list of this kind of pairs published on the WDS web site. One of these stars is J 591. The last catalog reports only one measurement of this star made in 1911 (I think by the discoverer) and nothing else: theta 187 degrees, rho 5 seconds and magnitudes 9.5 and 11. Moreover, in the catalog this star is composed only by this two components. On December 15 2006 at 0.31 UTC I obtained 100 images of this pair, see Figure 1, and it was obvious that a third C component was easily visible at about the same distance as the AB pair. My measurements of this system are given in Table 1.

The WDS has a note for J 591 AB indicating that Giacobini tried to confirm the single measurement of this pair and could not and there is doubt as to its existence. My image, as well as the 2 MASS image (Figure 2), clearly show the B component. Moreover, my measurements of the PA and sep. of the B compo-

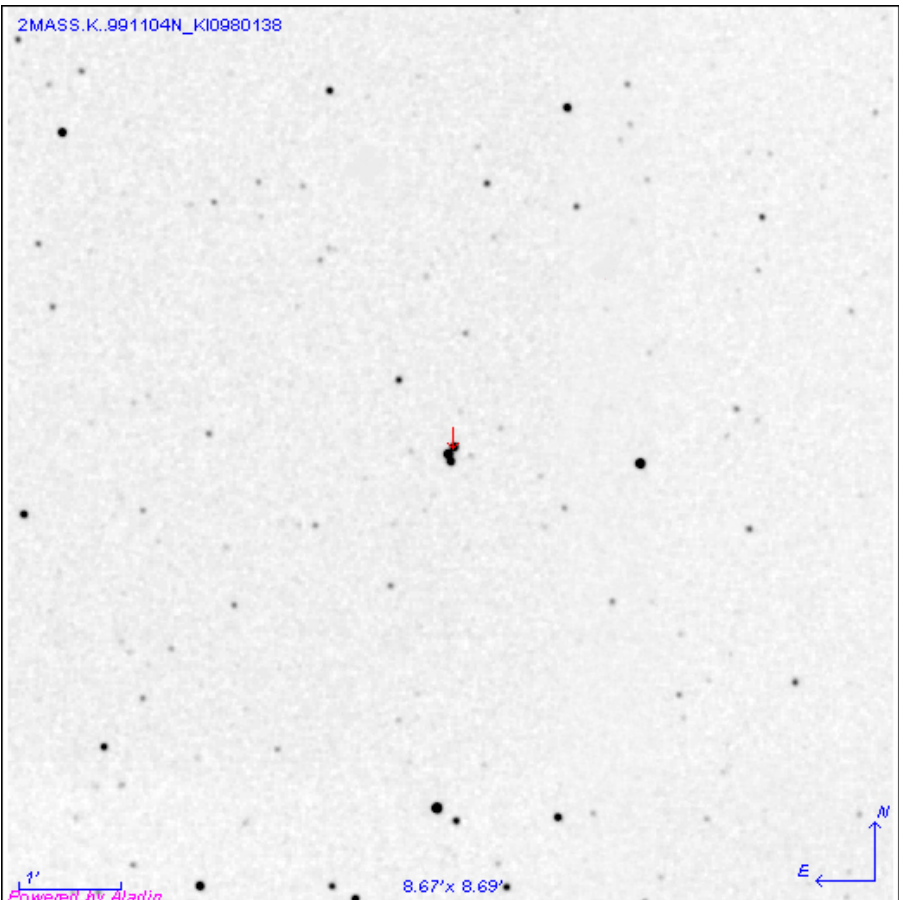


Figure 2: 2MASS image of J 591 AB showing the new companion.

nent are consistent with the original 1911 measurements.

As for the new C component; initially, I thought it to be a reflection. But it is a real image as I could see it with the eyepiece attached to the flip mirror. The eyepiece was a 40 mm Plossl at about 300X. Moreover, there are previous professional images that show

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Name	RA+DEC	Mag Diff	PA	PA sigma	Sep	Sep sigma	Epoch	N
J 591 AB	06167+3852	1.17	200.2	0.7	4.46	0.05	2006.9543	28
BEA 1 AC	06167+3852	1.26	320.4	0.4	5.55	0.08	2005.9543	21

Table 1: Position angle and separation measurements of the original pair and the new companion to J 591.

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this third star, see Figure 2.

Since the separation of the components AB and AC very similar, and the magnitude difference between B and C only about 0.1 magnitude, I am very surprised that the discoverer did not report the C star. It is an obvious triple, even in smaller instruments. Maybe the C component was too close in 1911? Is C a variable star? There is interesting material for further study. I hope other double star observers will search for this system to confirm my observations.

For an amateur such as me, there is great satisfaction in this small “discovery”. Usually for us there is only great cold and tiredness.

Acknowledgements

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Mr Bertoglio tells us that when he was seven his father gave him a small telescope starting his passion for astronomy. From 1986 to 1993 he was involved in photoelectric photometry work in collaboration with other amateur and professional astronomers in I.A.P.P.P. and was coauthor of the published results in AJ and IBVS. In 1981 he founded the Gruppo Astrofili W. Herschel, the Turin local amateur astronomy group.

