

A New Double Star from Lunar Occultations: HIP 87306

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Abstract: A lunar occultation of HIP 87306 (= ZC2564, star #2564 in Robertson's Zodiacal Catalog of 1940) observed on 2009 Aug 2 showed this star to be a double star with a separation of $0.086''$. Two video observations made in 2003 were subsequently identified and retrieved, enabling a measurement for that epoch to also be made.

Observation

On 2009 Aug 2 Messner and Sandy observed a lunar occultation of HIP 87306 (=ZC 2564) using (respectively) a 45 cm and a 20 cm telescope and video. The occultation light curve of both observers showed a clear step event, as shown in their light curves, Figure 1.

Follow-up observations were made in Japan on 2009 Aug 29, by H. Togashi and M. Kashiwagura – with neither observer recording a step event.

A check of past occultation observations identified a video observation by Herald on 2008 May 22 which on review showed a probable short step event. (This observation has not been used in this analysis; the lunar limb was aligned similar to the observations of Togashi and Kashiwagura.) Also identified were video observations by Sandy on 2003 May 18 and 2003 July 12. These were retrieved, and measured using current measurement techniques. The vector angles for the 2003 events differed by 85° , allowing for a good solution – assuming minimal change over the two months between the occultations. {The solution below indicates the pair has been closing at a rate of $0.005''/\text{year}$, with no change in position angle}

The double star characteristics were derived using

the standard analysis of the observations described by Herald (2009). For the 2009 occultations, Figure 2 shows the location of the lunar limb relative to the primary star at the time of the occultation of the secondary star. The image width is $0.30''$.

The derived double star solutions for the two epochs are:

Star	HIP 87306 = ZC 2564 = HD 162083 = SAO 185826 = CD-27° 11991 = CPD-27° 5802
Coordinates (J2000)	17h 50m 21.14s, -27° 03' 42.0"
Spectral type	A3
Mag A	7.6 ± 0.1 (V)
Mag B	7.8 ± 0.1 (V)
Epoch	2009.62
Separation	$0.086'' \pm 0.002''$
Position Angle	$195.30^\circ \pm 0.33^\circ$
Observers	S. Messner, R. Sandy, H. Togashi and M. Kashiwagura
Epoch	2003.44
Separation	$0.116''$
Position Angle	196.0°
Observer	R Sandy

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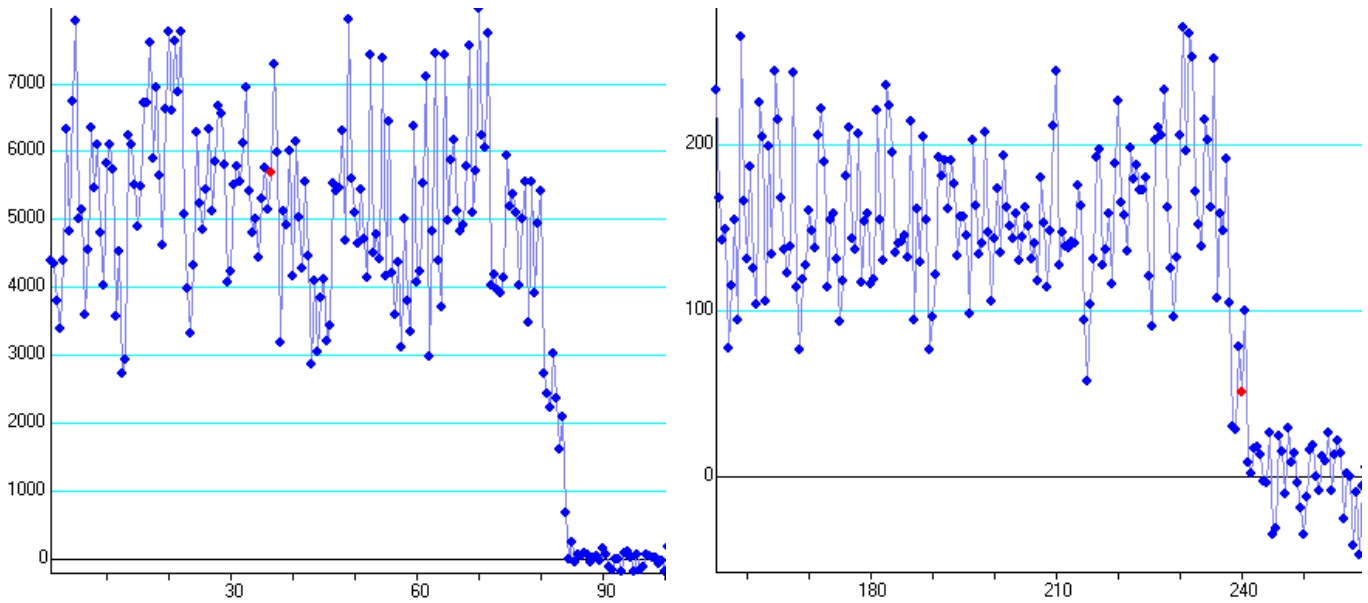


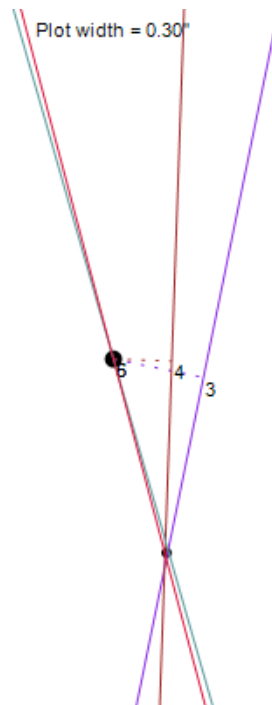
Figure 1: Light curves of Messner and Sandy on 2009 Aug 2. The step event is at a height of about 2500 on Messner's curve, and 70 on Sandy's curve.

The two solutions suggest the star is closing at a rate of 0.005" per year, with no change in position angle.

References

- Herald, D., 2009, "SAO97883 – A New Double star", *JDSO*, **5**, 208-210.
- Robertson, J., 1940, "Catalog of 3539 Zodiacal Stars for the Equinox 1950.0", *Astronomical Papers prepared for the use of the American Ephemeris and Nautical Almanac*, Vol 10, Part II.

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Figure 2: Plot of the lunar limb at the time of the 2009 occultations. (3) = Messner on July 12, (4) = Sandy on July 12. The other two lines are from Togashi and Kashiwagura on Aug 29.