

Two New Double Stars from Lunar Occultations: SAO 117948 and TYC 1310-16-1

Dave Herald

International Occultation Timing Association (IOTA)
Murrumbateman, Australia

Abstract: Lunar occultation observations by the author in March 2013 detected two new double stars SAO 117948 and TYC 1310-16-1.

SAO 117948

On March 24, 2013 a lunar occultation of SAO 117948 was video-recorded at 25 frames/sec using a 40 cm telescope. The moon was 90% illuminated, resulting in significant background noise in the video recording. Figure one shows the recorded light curve.

Given the noise levels in the measured light curve, the video was carefully inspected on a frame-by-frame basis to confirm that the step event at around frame 110 was 'real'. The duration of the step event was 0.36 secs. With the radial velocity of the moon at the location of the occultation (at position angle 69.7 degrees) being 0.2457"/second, the separation of the components of this star is at least 0.09". The magnitudes of SAO 117948 are 10.66 (BT) and 9.78 (VT), and from the heights of the three portions of the light curve the V magnitudes of the components are derived as 10.3 and 10.9 – with the fainter component being occulted first.

The Lunar Occultation Archive (VizieR Catalogue number VI/132A) was reviewed to ascertain whether there were any earlier occultation observations of this star that indicated the star was double. There are only 8 prior lunar occultation observations – four on 1975 June 14, two on 1993 April 3, and one each on 1995 May 8 and June 5. All observations were observed visually, and involved disappearance events at position

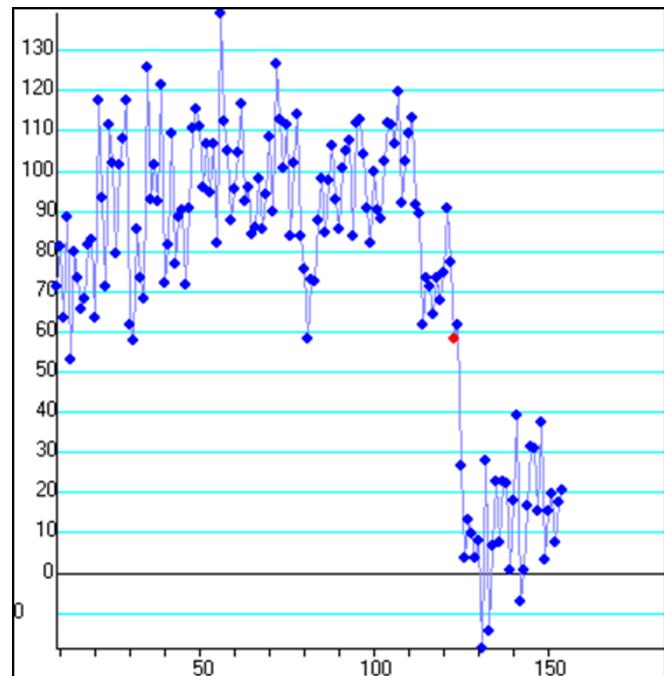


Figure 1. Light curve of SAO 117948 recorded during a lunar occultation.

angles between 59 and 161 deg. There is no indication of double star phenomena in any of the reports, which is not surprising since the disappearance of the fainter

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star before the brighter star would not have been readily seen by a visual observer.

Star SAO 117948 = TYC 828-1185-1 = PPM 156256 = 4UCAC 493-55268

Coordinates(J2000) 9h51m27.43s, +8°30'03.2"

Spectral type G5

Mag A 10.3 ± 0.1 (V)

Mag B 10.9 ± 0.1 (V)

Epoch 2013.23

Separation $>0.09''$

PA at epoch between 160 and 340 deg

TYC 1310-16-1

On March 9, 2013, a lunar occultation of TYC 1310-16-1 was video-recorded at 25 frames/sec using a 40 cm telescope. This is the first time this star has been observed in lunar occultation. The moon was 47% illuminated. Despite the moon's altitude being a relatively low 13 degrees, a good recording was obtained. The resulting light curve is shown in Figure 2.

The intermediate step duration lasted 0.64 secs. With the radial velocity of the moon at the location of the occultation (at position angle 79.8 degrees) being $0.363''/\text{second}$, the separation of the components of this star is at least $0.23''$. The magnitudes of TYC 1310-16-1 are 10.50 (BT) and 9.58 (VT), and from the heights of the three portions of the light curve the V magnitudes of the components are derived as 10.0 and 10.5 – with the fainter component being occulted first.

Star TYC 1310-16-1 = XZ 76885 = 4UCAC 555-18614

Coordinates (J2000) 5h 42m 25.69s, +20° 51' 19.0"

Spectral type unknown

Mag A 10.0 ± 0.1 (V)

Mag B 10.5 ± 0.1 (V)

Epoch 2013.21

Separation $>0.23''$

PA at epoch between 170 and 350 deg

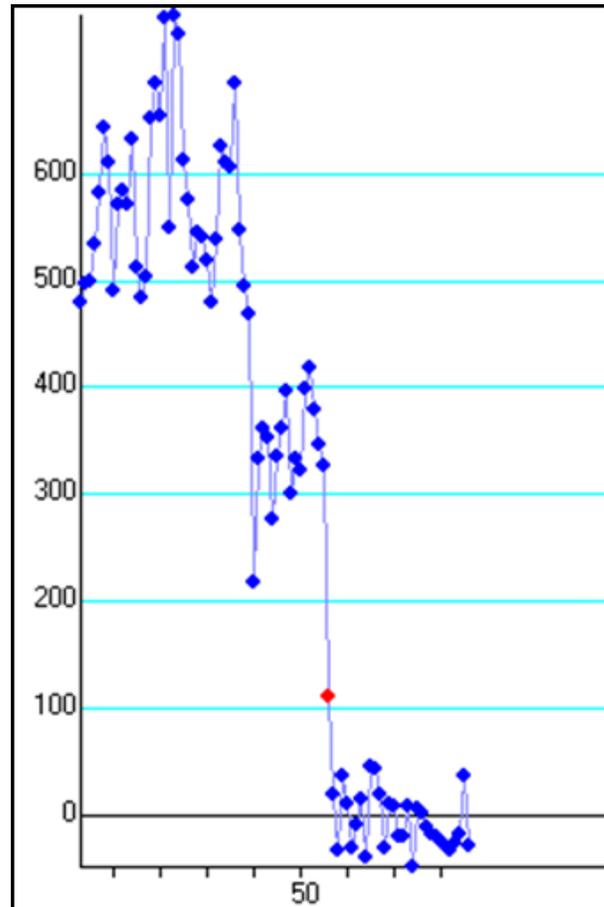


Figure 2. Light curve of TYC 1310-16-1 during a lunar occultation.