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«Variability analysis of Gaia16bnz by optical follow-up from Terskol observatories»

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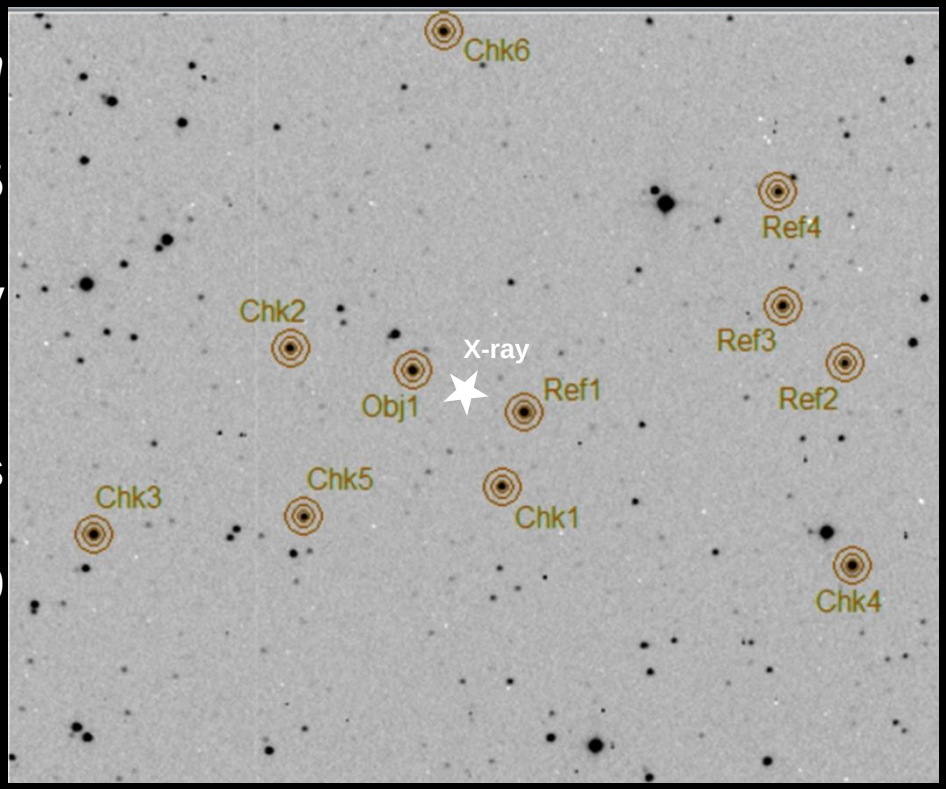
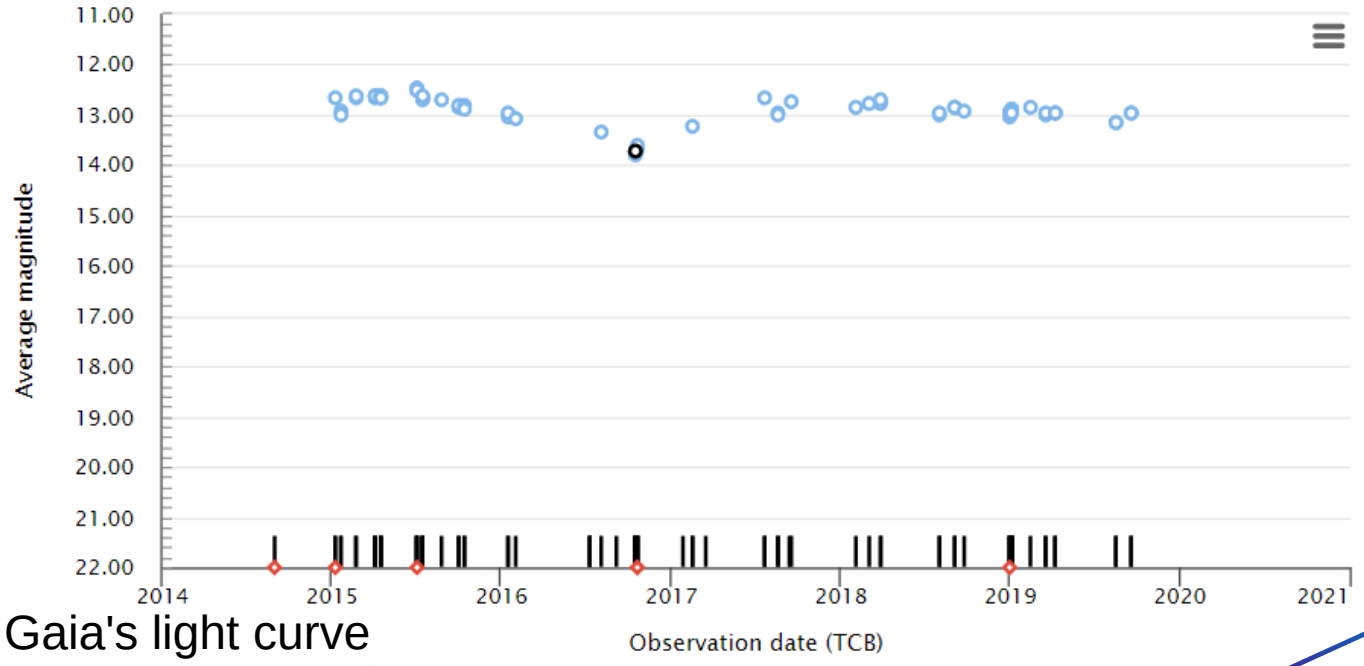
Gaia 16bnz

Alert on 17-10-2016: *1.3 mag decline in 13th mag blue source over >1yr .*
Coordinates: 03:40:17.98 +49:21:32.15
Historic magnitude 12.70
The object shows a permanent variability since July 2015.
Distance of the X-ray source **1RXS J034014.5+492125** to Gaia16bnz is 34.73 arcsec.
GaiaDR2: Teff = 8580.67 K = ==> A9
Parallax 1.8419+/- 0.0390
(distance 543+/-12 pc)



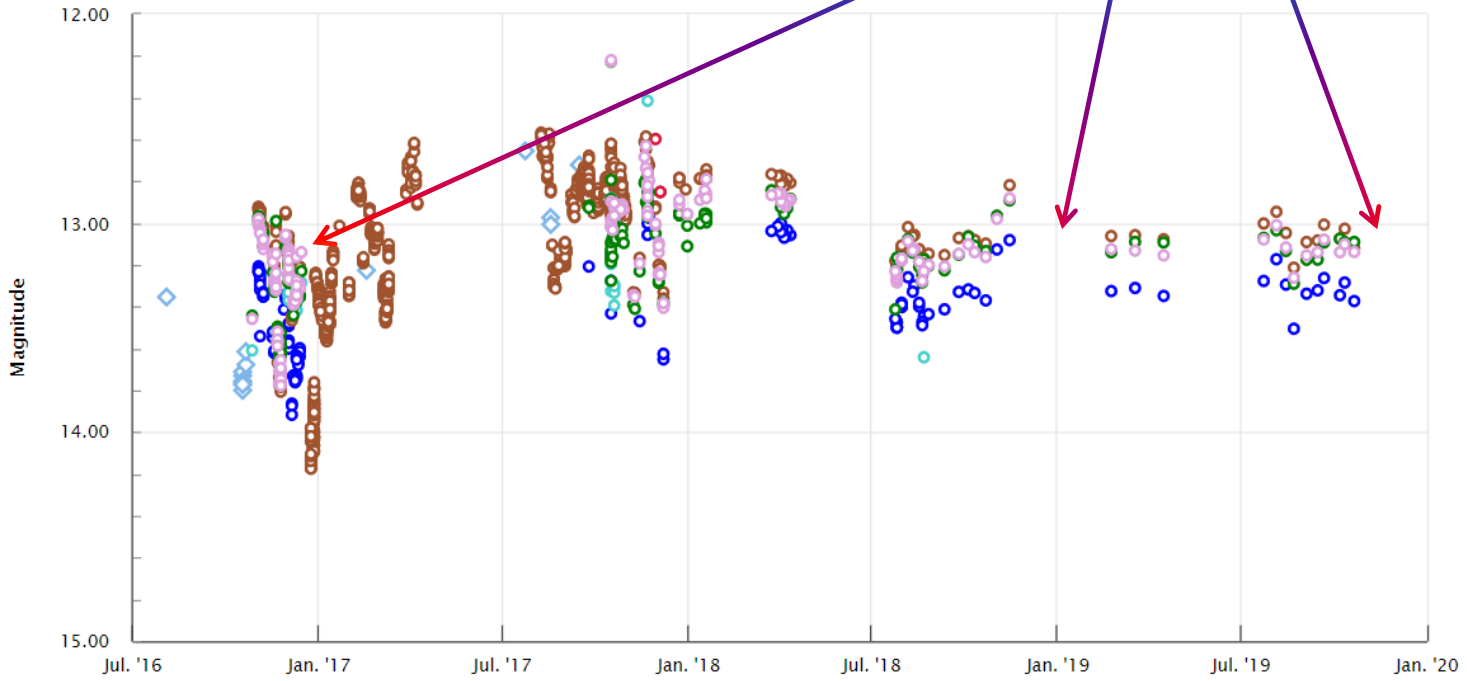
We present the results of long-term BVRI photometry of the blue source Gaia16bnz, which has been performed at the Terskol Observatory since 2016. Observations were obtained using the 60-cm Cassegrain telescope (Zeiss-600) and a SBIG STL-1001 CCD with a field of view of 10.9x10.9 arcmin.

Reference stars (10 stars) were selected in the field of the object. Data processing took place in the MaximDL package.



Gaia's light curve

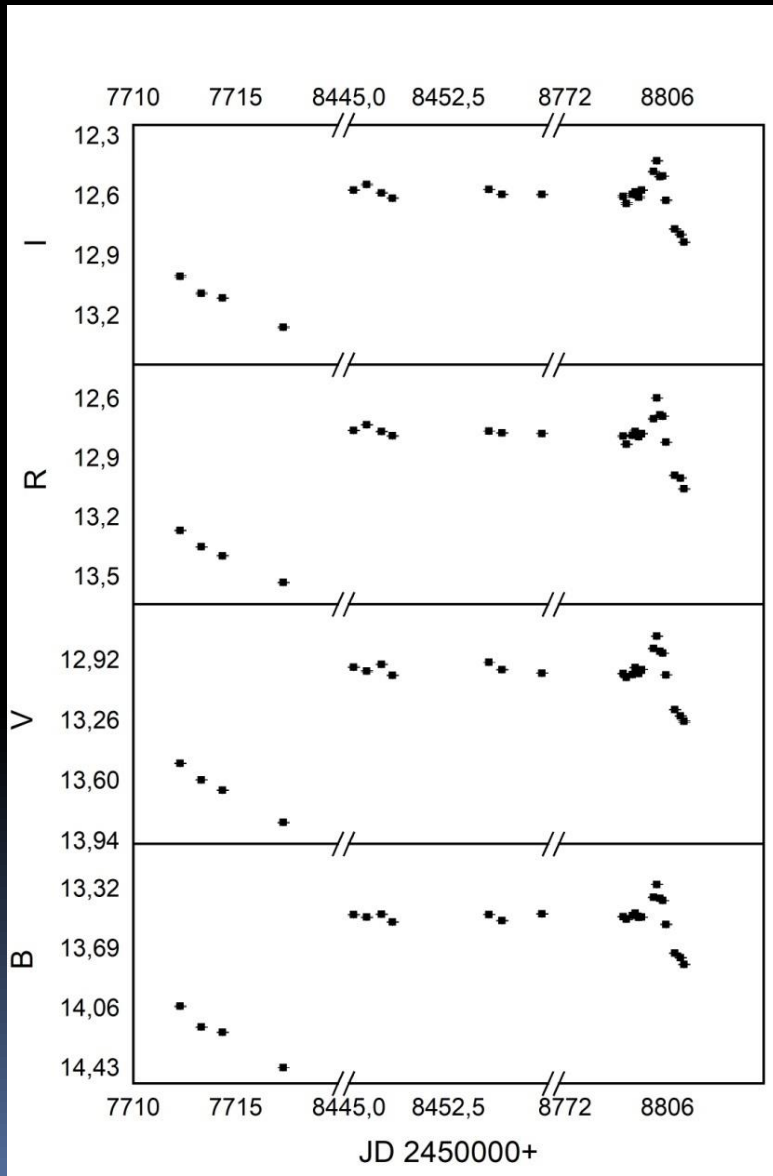
Our observations from Terskol relate to three time periods: for 2016 (and is in good agreement with general observations), for 2018 and 2019.

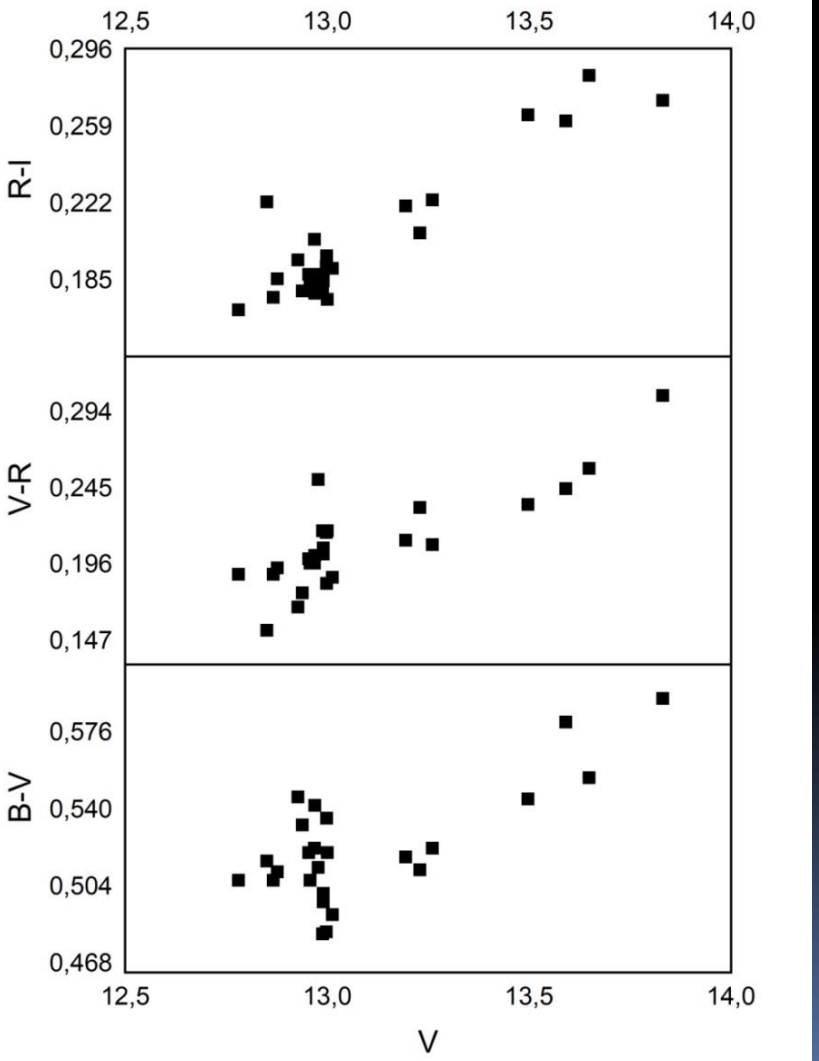


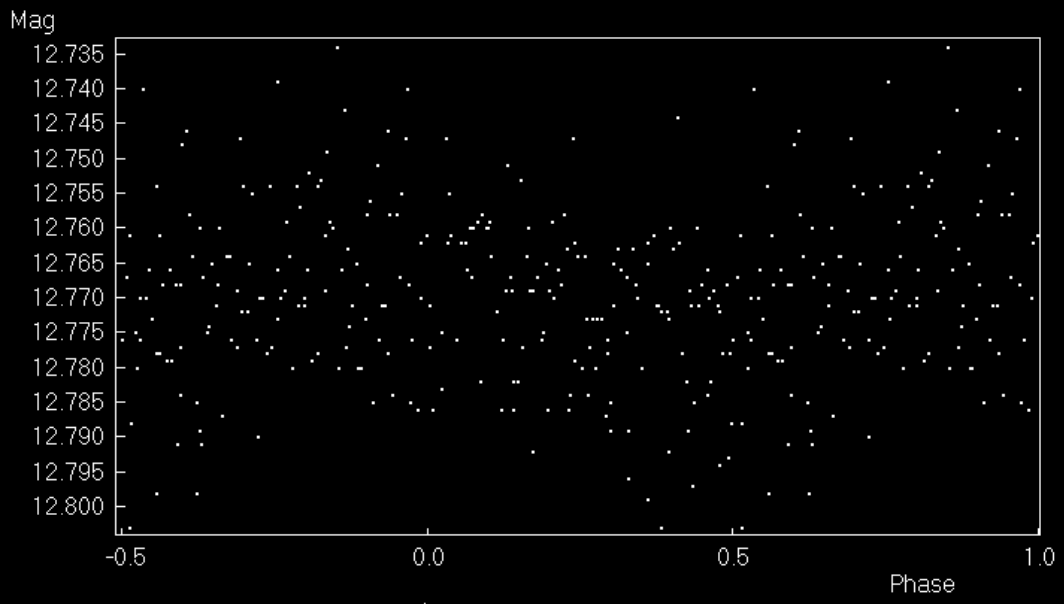
General observer's light curve

According to new data, now the object, after a small sharp peak, is in decline.

The color-magnitude diagrams increases with respect to increasing V band magnitude, confirming the bluer-when-brighter (BWB) trends.

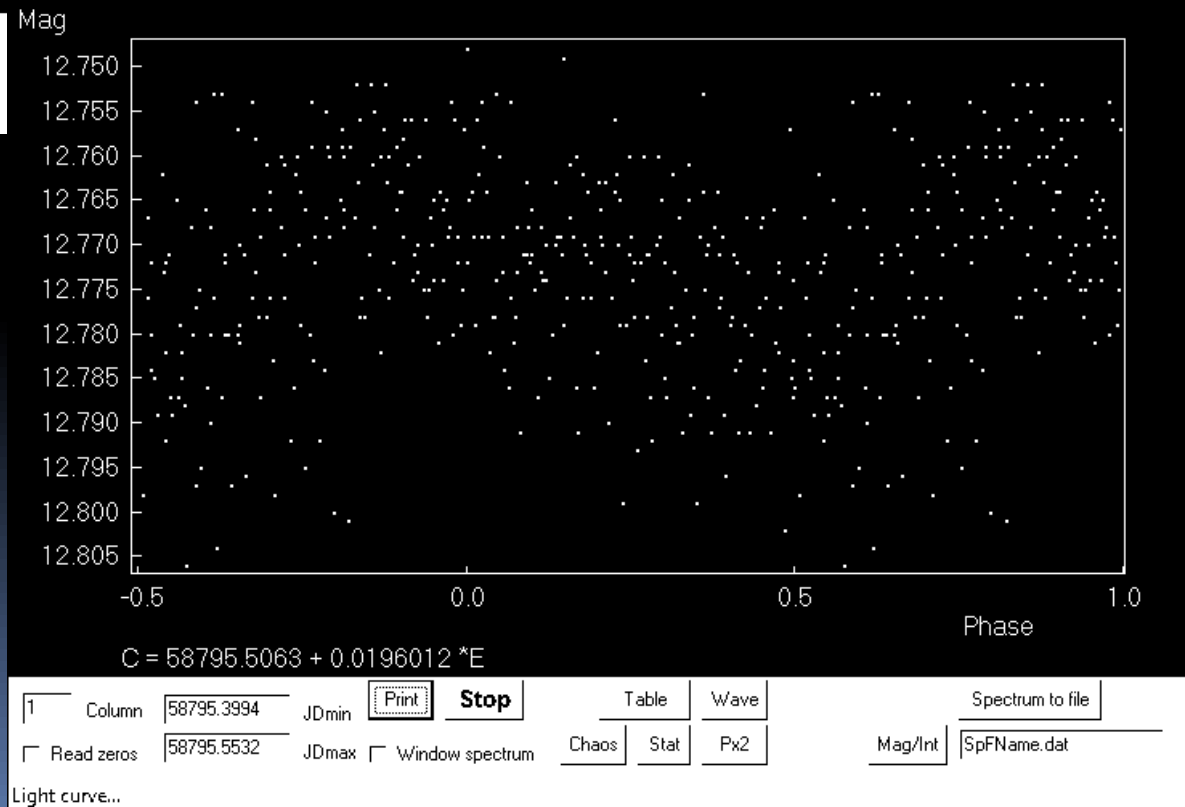


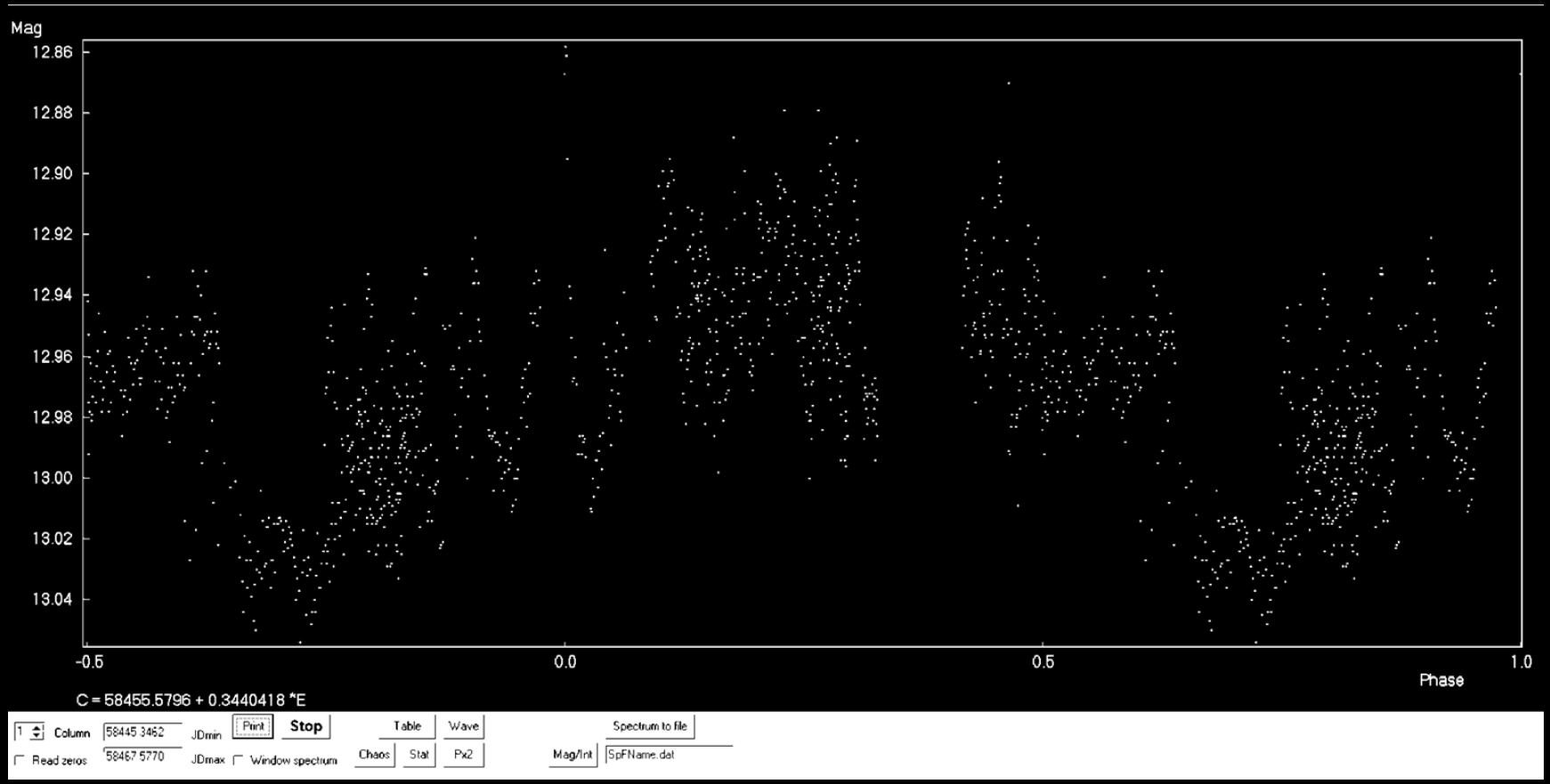




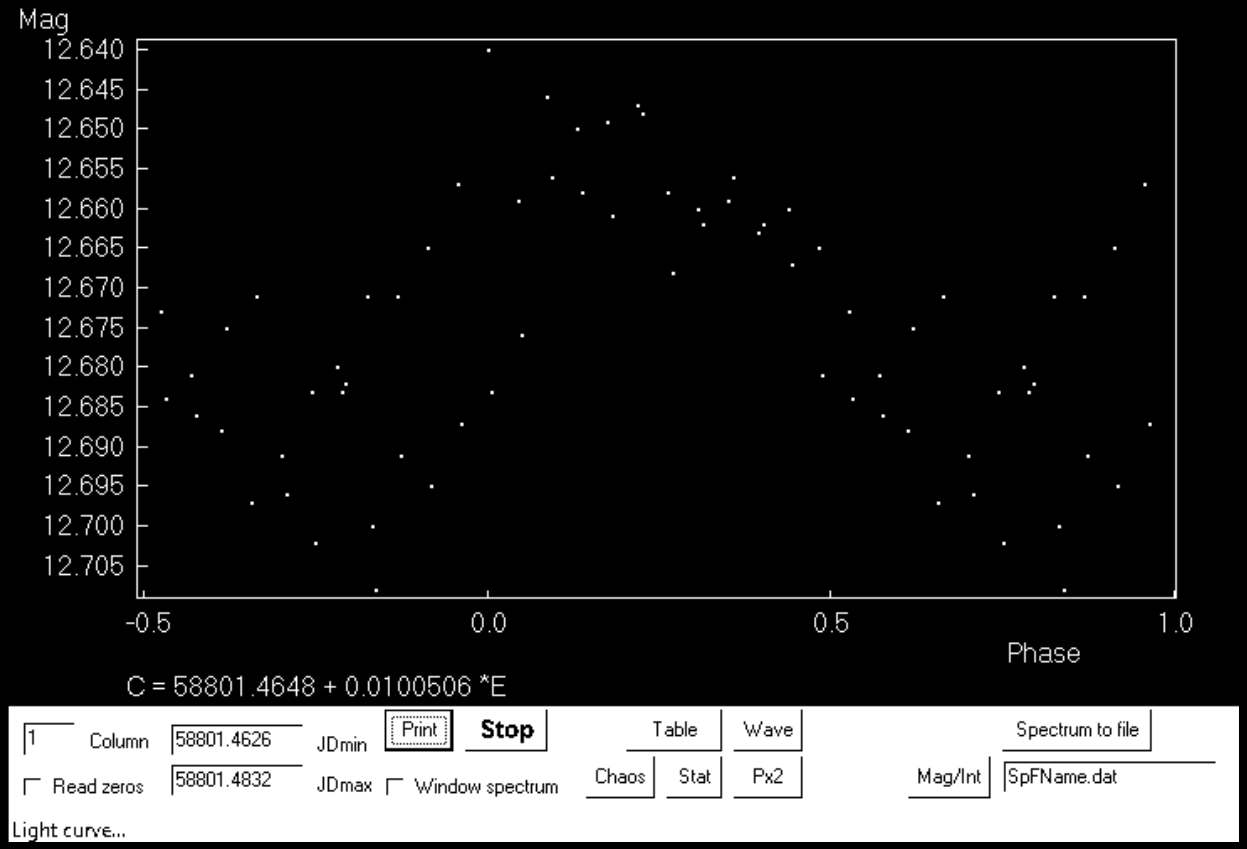
For two nights, for 4 hours each, we find a period of about 0.021 days, that is, 30 minutes (0.022 days for one night and 0.019 for the second night). The amplitude is about 0.06m.

The periods were found using the Goransky program using the method discrete Fourier transform for arbitrarily distributed time series.





This period was found from the summarized observations for November-December 2018 and equals 0.344 day (8,256 hours) with an amplitude of 0.15m. A total of 5 nights were used in filter V (for a total of about 10 hours). It also shows the small period, which we recently determined by new observations as 0.02 day.

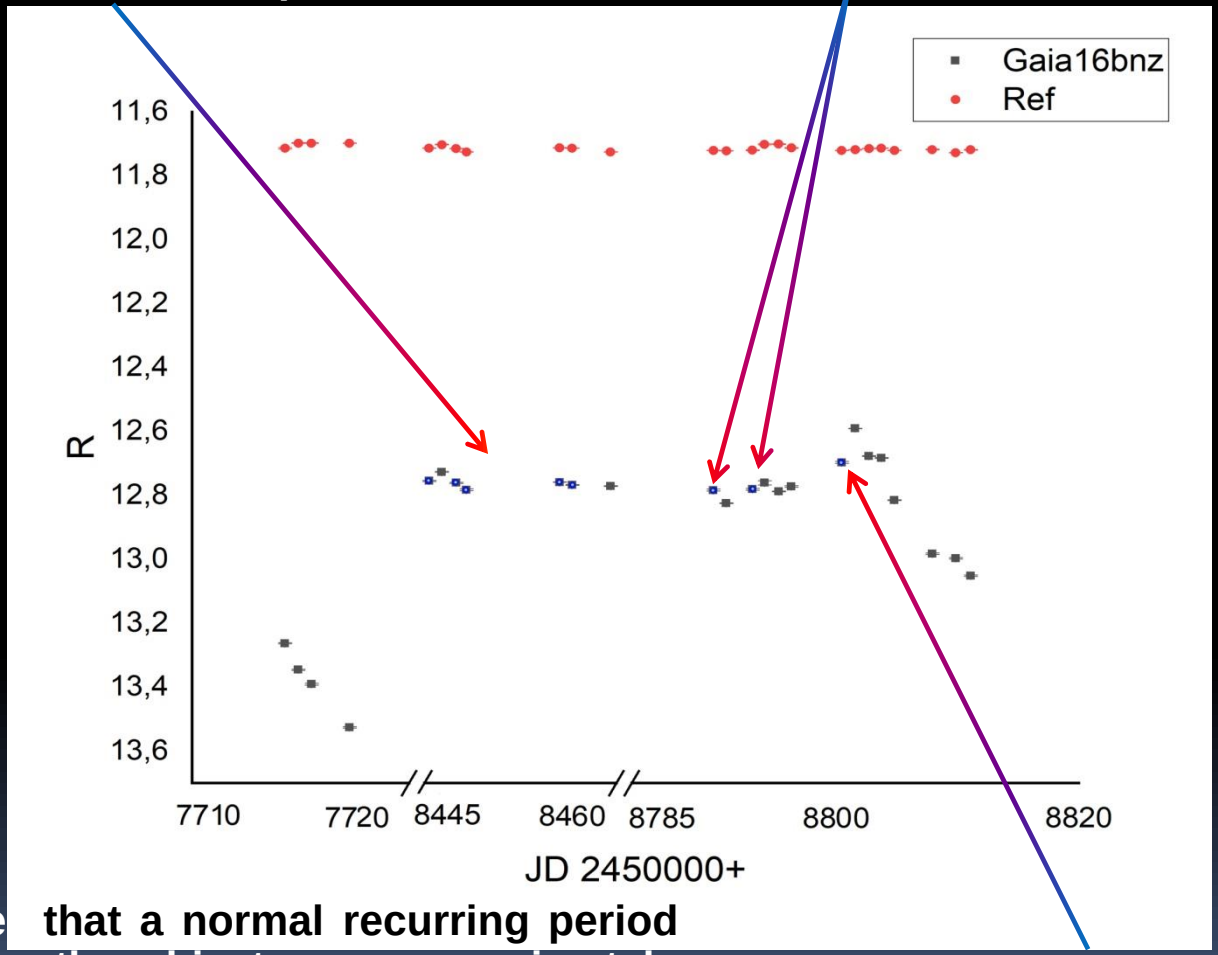


This period was found just on the night when a sharp increase in luminosity was observed. Observations were carried out for 3 hours with an exposure of 30 seconds in R filter. The period is 0.01 day (14.4 minutes).

For comparison, the magnitude of one of the reference stars is shown on the light curve in the filter R with errors.

According to the summarized data for five nights, a period of 0.34 days was found, and a small period was also noted.

According to the data for two nights, a small period of 0.02 was found

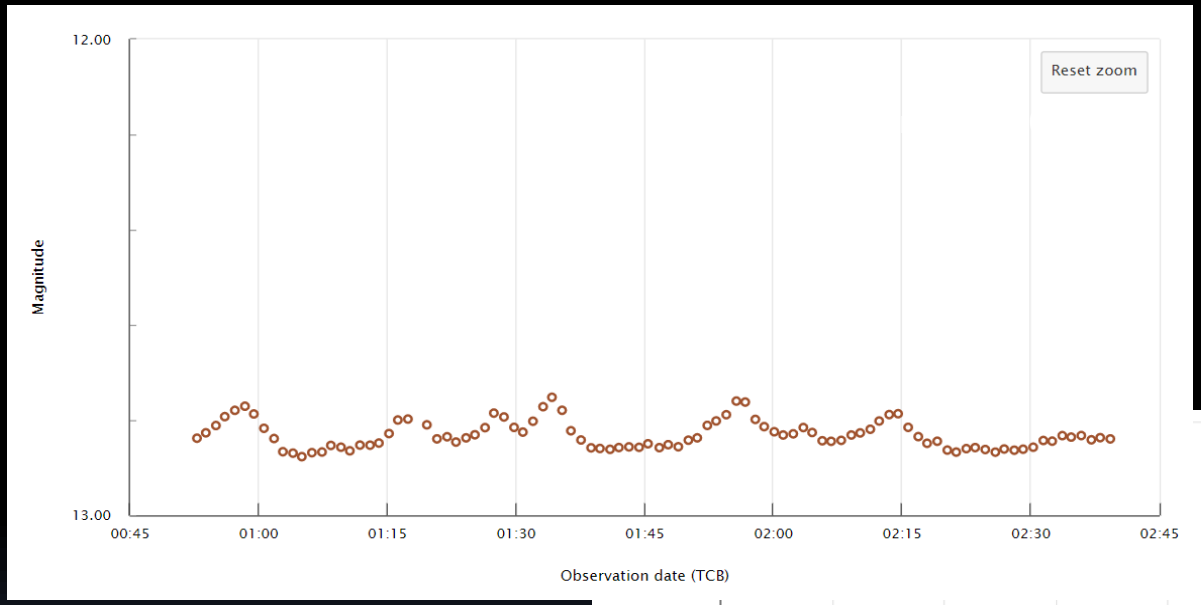


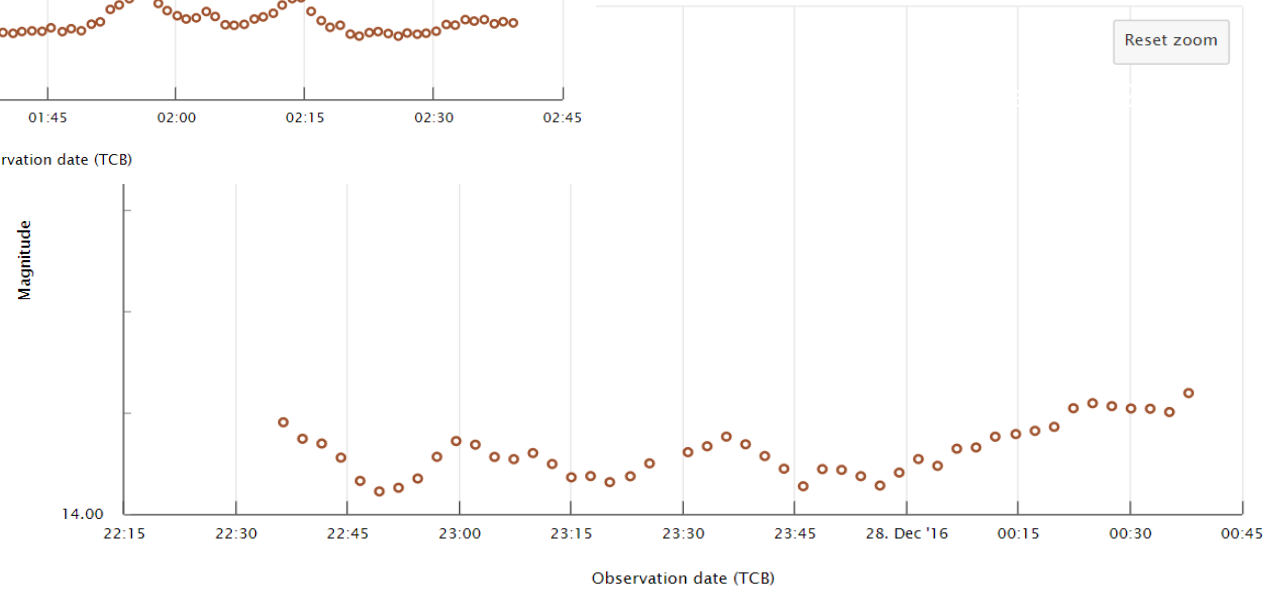
You may notice that a normal recurring period was found when the object was approximately the same magnitude. The period changed as soon as the object began to show activity.

During the increase in luminosity, a shorter period fell to 0.01

On the Gaia Alert website, the IDV of the object was observed until the end of 2017 at the Observatory Astronomic del Montsec by Umut Burgaz.

Now, two years later, we see that the picture observes IDV is different. Perhaps this is due to the fact that IDV was observed in different phases of the object's activity, as we have seen in our practice that the period detected at a time when the magnitudes remained approximately unchanged and during their change is different.






Thank you for attention!