

THE SEARCHES OF THE PERIODS AND DEFINITION OF THE VARIABILITY TYPES OF NEW VARIABLE STARS TX CRV, DP CAM, IRAS 17583+5150

A.P. Solonovich, I.S. Bryukhanov, I.M. Sergey

Amateur group of variable stars observers "Betelgeuse",
the Republic Center of Technical Creativity of Pupils,
220023, Belarus, Minsk, Makaionak street, 12,
betelgeize_astro@mail.ru

ABSTRACT. The measurements of brightness of the stars TX Crv, DP Cam, IRAS 17583+5150 discovered by "IRAS" and "HIPPARCOS" are carried out using negatives of Odessa observatory. Proposed types of these stars: TX Crv – type ISB(?), DP Cam – type ISB, IRAS 17583+5150 – type SRB (SRC).

Key words: Variable Stars.

The history of research

The analysis of the photo-electric measurements series of "HIPPARCOS" experiment allow Roger W. Sinnott to inform in electronic version of magazine "Sky & Telescope" that the new variable stars TX Crv and DP Cam are of EA type (Sinnott, 2000a; 2000b). The same assumption has stated also by Sergey E. Gur'yanov in the magazine "Zvezdochet" (2000). During the measurements of brightness of the stars TX Crv, DP Cam using negatives of Odessa observatory authors used the identification cards and the stars of comparison from magazines "Sky and Telescope" and "Zvezdochet". At the time of the work with these stars Ivan S. Bryukhanov discovered the optical variability of the star Tyc 2 3523 1519 1 (IRAS 17583+5150, IRC+50275 HD 164645).

TX Crv

The eye estimations of brightness of the star TX Crv (HIP 58579, spectrum G0) were carried out by Ivan S. Bryukhanov using Neiland-Blazko method on 238 photographic plates. Also 88 measurements of brightness of the star TX Crv from "HIPPARCOS" data were used in this investigation. It was not revealed eclipses of the star on negatives of Odessa observatory – the amplitude of fluctuations of the brightness of the star TX Crv – 8.0^m – 8.3^m in V rays within the range of

errors.

According to "HIPPARCOS" data (the amplitude of fluctuations of brightness of the star TX Crv – 8.0^m – 9.5^m in V rays) 6 casual decreases of TX Crv brightness were registered which can not be eclipses of TX Crv in any way (Table 1).

As a result of search of the period using Lafler-Kinman method Ivan S. Bryukhanov was not established the period of fluctuations of brightness of the star. Authors assume that TX Crv either a non-variable star, or a variable star of ISB type.

The long and exact photo-electric and visual measurements of TX Crv brightness are required for confirmation or refutations of changeability type.

Table 1:

2448217.1970	H. J. D.	8.922 in V range
2448294.8591		9.334
2448622.4628		8.830
2448983.1108		9.548
2449014.4785		8.972
2449024.8111		9.150

DP Cam

The eye estimations of Ivan M. Sergey of brightness of the star DP Cam (HIP 22498, spectrum 7) carried out using Neiland-Blazko method on 445 photographic plates, also 171 measurements of brightness of the star DP Cam based on "HIPPARCOS" experiment data were used in the investigation. Ivan M. Sergey was not revealed eclipses of the star on negatives of Odessa observatory. The amplitude of a chaotic fluctuations of brightness of the star DP Cam – 10.0^m – 10.9^m in V range.

According to "HIPPARCOS" data (amplitude of

the fluctuations of brightness of the star DP Cam – 9.9^m – 11.6^m in V rays) 2 casual decreases of DP Cam brightness were registered which can not be eclipsed by TX Crv any way (Table 2).

As a result of search of the period using Laffer-Kinman method by Ivan S. Bryukhanov the period of fluctuations of brightness of the star was not established. Authors assume that DP Cam is a variable star of ISB type. Fast sinusoidal or chaotic changes of DP Cam brightness are appreciable (Fig. 1, 2, 3).

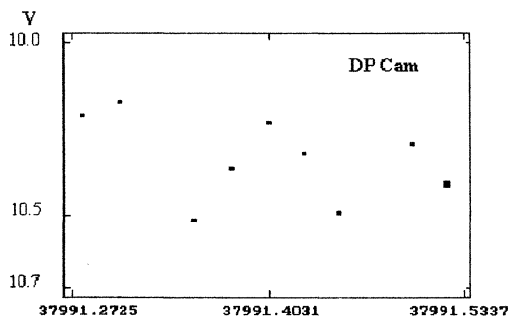


Figure 1: 2437991 J.D. The Odessa photograph collection

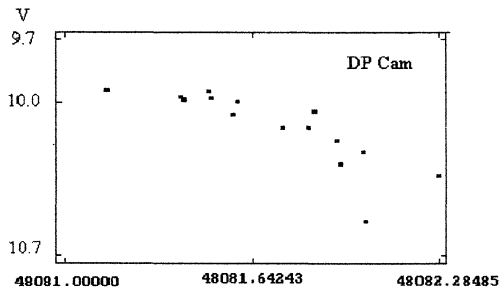


Figure 2: "HIPPARCOS" 2448081-2448082

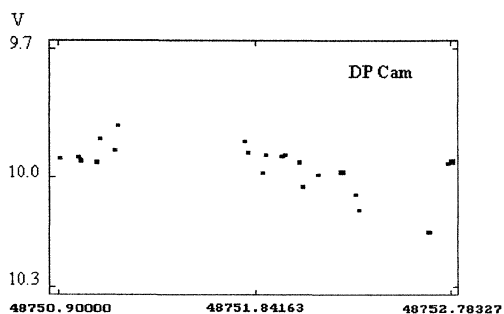


Figure 3: "HIPPARCOS" 2448750-2448752

The long and exact photo-electric and visual measurements of DP Cam brightness are required for

Table 2:

2448018.7527	H. J. D.	11.642 in V rays
2448180.9388		11.005

confirmation or refutation of variability type.

IRAS 17583+5150

Ivan S. Bryukhanov has opened the optical variability of the star Tyc 2 3523 1519 1 (IRAS 17583+5150, IRC+50275, HD 164645) (spectrum Mc) on negatives of Odessa observatory. Measurements were carried out only on negatives of Odessa observatory where the maximal amplitude of fluctuations of the brightness of the star – 7.4^m – 8.9^m in V range. The map and stars of comparison in a visual range for IRAS 17583+5150 (Fig. 4):

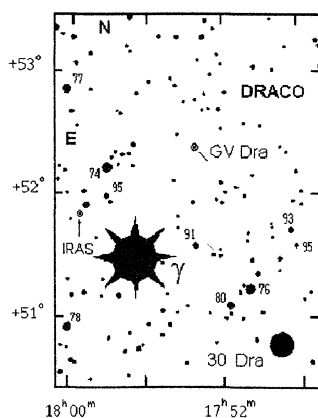


Figure 4: The map and the stars of comparison IRAS 17583+5150 and GV Dra (Sinnott, 2000a; 2000b)

Using Neiland-Blazko method on 567 photographic plates, the eye estimations of Ivan S. Bryukhanov of brightness of the star IRAS 17583+5150 were carried out. The search of period or cycles of fluctuations of star's brightness by Ivan S. Bryukhanov using Laffer-Kinman method was carried out.

The series of measurements of the star's brightness are divided by the author into 3 intervals: the early observations from 2436432 to 2441898 JD, amplitude of fluctuations from 8.1^m up to 8.9^m magnitude; observations from 2442243 to 2448184 JD, the amplitude of fluctuations from 7.4^m up to 8.7^m magnitude; the late observations from 2448391 to 2449221 JD, the amplitude of fluctuations from 7.9^m up to 8.7^m.

The early observations gave the cycles of 3386, 3320, 406.5(?) and 58.8 days. The observations from 2442243 to 2448184 JD with the big amplitude show the cycles of 56.2, 388(?), 48.7 days, 1497–1500 days.

The late observations show cycles only of 11 and 17 days. The fluctuations of star's brightness in this period are produce chaotic-effect most likely because of small quantity of measurements – only 28 points.

3 best diagrams of magnitude fluctuations of star IRAS 17583+5150 in V range (figures 5, 6, 7) are given below:

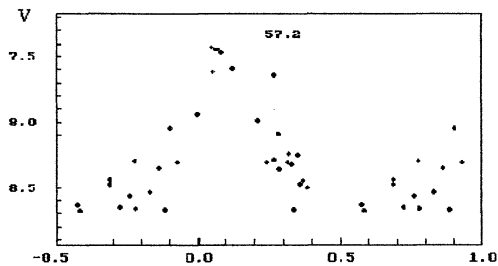


Figure 5: IRAS 17583+5150 2441573-2445879 J.D.

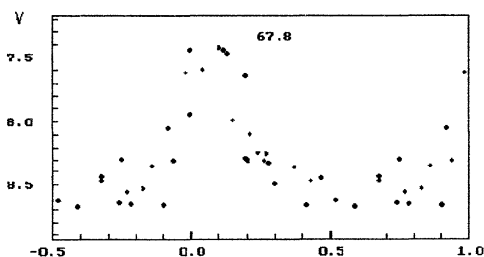


Figure 6: IRAS 17583+5150 2441573-2445879 J.D.

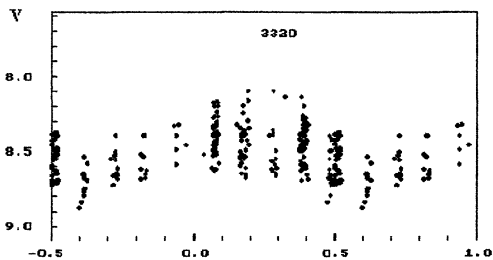


Figure 7: IRAS 17583+5150 2346432-2441898 J.D.

Acknowledgements. We are thankful to Samus Nikolai Nikolaevich and Hryshel Maksim Aleksandrovich for consultations and help in work.

References

- Gur'yanov S.E.: 2000, *Zvezdochet*, 4.
 Lafler J., Kinman T.D.: 1965, *Ap. J. Suppl.*, 11, 216.
 Sinnott R.W.: 2000a, http://skyandtelescope.com/observing/objects/variablestars/article_291_1.asp.
 Sinnott R.W.: 2000b, http://skyandtelescope.com/observing/objects/variablestars/article_292_1.asp.