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UBV PHOTOMETRY OF CYG X-1 FROM 1996 TO 2003

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The preliminary results of analysis of *UBV*-photometry of the black hole candidate Cyg X-1 in primary minimum are presented. These observations were carried out with the main goal of studying in detail the variability that was detected by Lyuty in 1985 in the optical light curve of this system near orbital phase 0.00.

Additional blue radiation in primary minimum was found in Cyg X-1 mean light curve based on all published data (1-2 measurements daily). It appears as a narrow peak near orbital phase 0.0 (the superior conjunction of the relativistic component, the X-ray source behind the optical star). Our goal was to confirm this effect independently and to study the properties of this radiation.

The observations of Cyg X-1 were carried out with an *UBV* photometer on the 60 cm telescope in Crimea by the usual method of differential observations. BD+34°3816, with magnitudes V=$9^m.976$, $B-V$=+0.590 and $U-B$=+0.064, was used as a standard star. The individual measurements are accurate to $0^m.05$ in the V,B bands and $0^m.1$ in the U band. 23 data sets with durations from 2 to 6 hours were obtained beginning from 1996 up to now, but only 15 data sets were used for analysis. For comparison, observations in the secondary minimum in phases 0.48–0.53 were also performed. The orbital phases were determined with the elements of Brossopp et al. (1999): Min I=JD 2441163.529 $\mp$ $5^d.5599829\ E$. Our observations for U band as an example are plotted in Fig.1 (different symbols pertain the different nights). The additional radiation appears as excess on the light curve at phases 0.00–0.04. The amplitude of this radiation is maximum in the U band.

From analysis of new *UBV* observations of Cyg X-1 the following conclusions can be drawn:

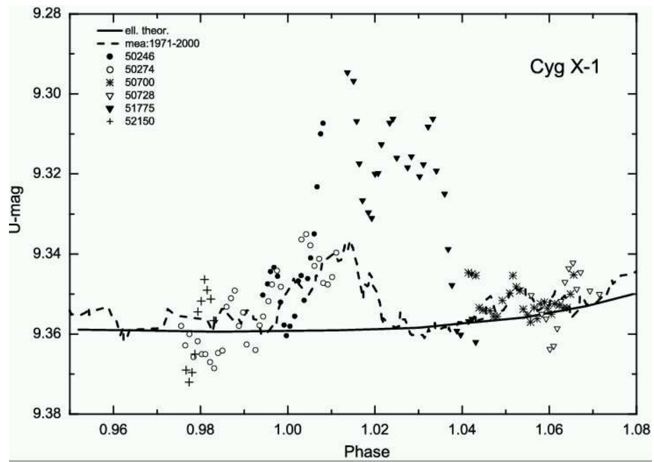

Fig. 1. The light curve of Cyg X-1 near the primary minimum. The solid line indicates the ellipsoidal curve. The dashed line shows the mean light curve for all our observations since 1971.

- The additional radiation is detected in the Cyg X-1 daily light curves at phases 0.00–0.04
- Effect seems to be variable: it appears not every primary minimum of Cyg X-1
- The peak of additional radiation have a more complicated structure than we believed before.
- The additional radiation does not observed at the secondary minimum

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