

## PHOTOMETRY OF THE SUSPECTED CATAclysmic VARIABLE PG0900+401

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### Abstract

Variations of PG0900+401 of about 0.1 magnitude and with a period of about 8.1 hours have been detected photoelectrically, and a light curve has been obtained.

The object PG0900+401 was chosen from the Palomar-Green ultraviolet excess catalogue (Green *et al.* 1986) for photoelectric observations as a suspected cataclysmic variable. It has the coordinates: RA = 09<sup>h</sup> 00<sup>m</sup> 06.5<sup>s</sup>, Dec. = +40° 2' 54" (1950.0). Judging by the catalogue, the photographic B magnitude is 12.84, the faintest magnitude  $B_{\min} = 16.09$ , which is the limiting magnitude estimated from the photographic plate. D. H. Ferguson *et al.* (1984) obtained photoelectric photometry for the star: B = 13.10, U-B = -0.96, B-V = +0.23. This star is a spectroscopic binary without strong emission lines indicative of interaction between components, but it shows marked blending of the contributions of the two components in the blue-green region of the spectrum, which means that the object has a composite spectrum. The preliminary investigation of the collection of photographic plates from our Moscow plate library has shown that the light of the star does not change by more than 0.1 magnitude. Only photoelectric photometry is able to answer the question whether this object has any light variability with an amplitude less than 0.1 magnitude.

The star PG0900+401 has been observed since 1988 at the southern expeditions of our institute in Crimea and Middle Asia (near Alma-Ata), as well as in Moscow (Lenin Hills). In total, we had seven nights of observations of durations from 2 to 4 hours. The dates are as follows: 5/7/1988, Alma-Ata; 2/18/1990, 2/25/1990, 2/26/1990, 3/2/1990, Crimea; 4/18/1990, 4/21/1990, Moscow. Observations were carried out with a one-channel photometer in U, B, V and W, B, V, R bands. We have combined all the observations with the hope of detecting periodicity in the light changes. Naturally, we have especially been interested in periods on the order of some hours.

The power spectrum constructed on the basis of all available data indicated a number of periods in the interval of interest. For instance, in the B band there may be the following periods (in days, listed in the order of diminishing probability):  $P_1 = 0.34$ ,  $P_2 = 0.26$ ,  $P_3 = 0.52$ ... The same method applied to the data in V band gives, among others, the period  $P = 0.36$  day, the V data having a larger scatter.

The light curve of PG0900+401 with the period  $P=0.33818$  day is shown in Figure 1. We may suppose that this period is due to the orbital light variations in a cataclysmic binary system. The solid curve is the mean light curve of the star. One can see that the descending branch of the light curve is somewhat steeper than the ascending branch, although there are an insufficient number of points on the light curve in the phase interval

0.8-0.9 p. We have also looked for periodicity using the V data in the period interval close to 8 hours. We have shown one of the light curves in Figure 2. The scatter on the light curve, in principle, is normal for photoelectric photometry in ordinary atmospheric conditions, at a level of  $\sim 0.03$  magnitude. A part of the dispersion, however, may be due to intrinsic variations of light on short time scales. The presence of such short-time variations is supported by the fact that on the night of 2/26/1990, in the process of continuous monitoring of the star, we discovered variability at a level of 0.05 - 0.07 magnitude with the period  $\sim 280$  seconds. The star was slightly brighter than in Ferguson's observations, namely by  $\sim 0.07$  magnitude in the B band.

We have to emphasize that these results are preliminary in nature and do not pretend to be definitive as to the value and the nature of the period, 280 seconds, of the binary system PG0900+401. We have only tried to attract the attention of observers to this star as it may appear interesting, particularly if it turns out to be a new cataclysmic binary system.

### References

- Ferguson, D. H., Green, R. F., and Liebert, J. 1984, *Astrophys. J.*, **287**, 320.  
Green, R. F., Schmidt, M., and Liebert, J. 1986, *Astrophys. J. Suppl.*, **61**, 305.

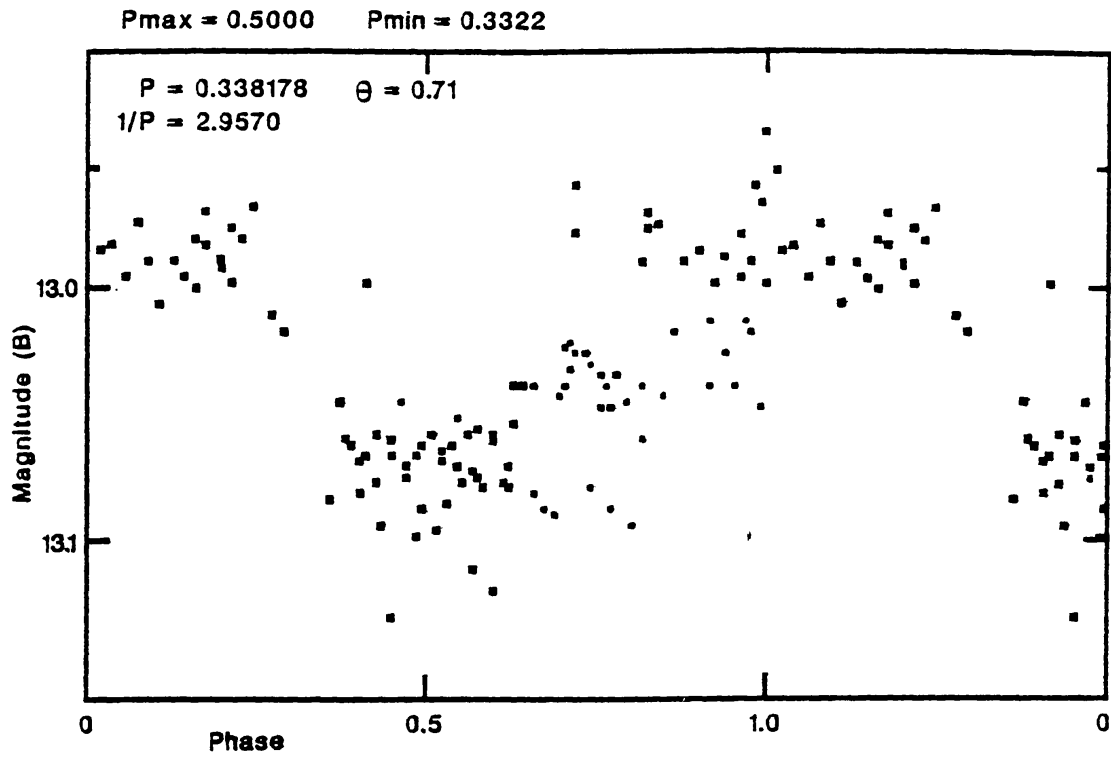


Figure 1. The light curve of PG0900+401 with the B data, using an assumed period  $P = 0.34$  day.

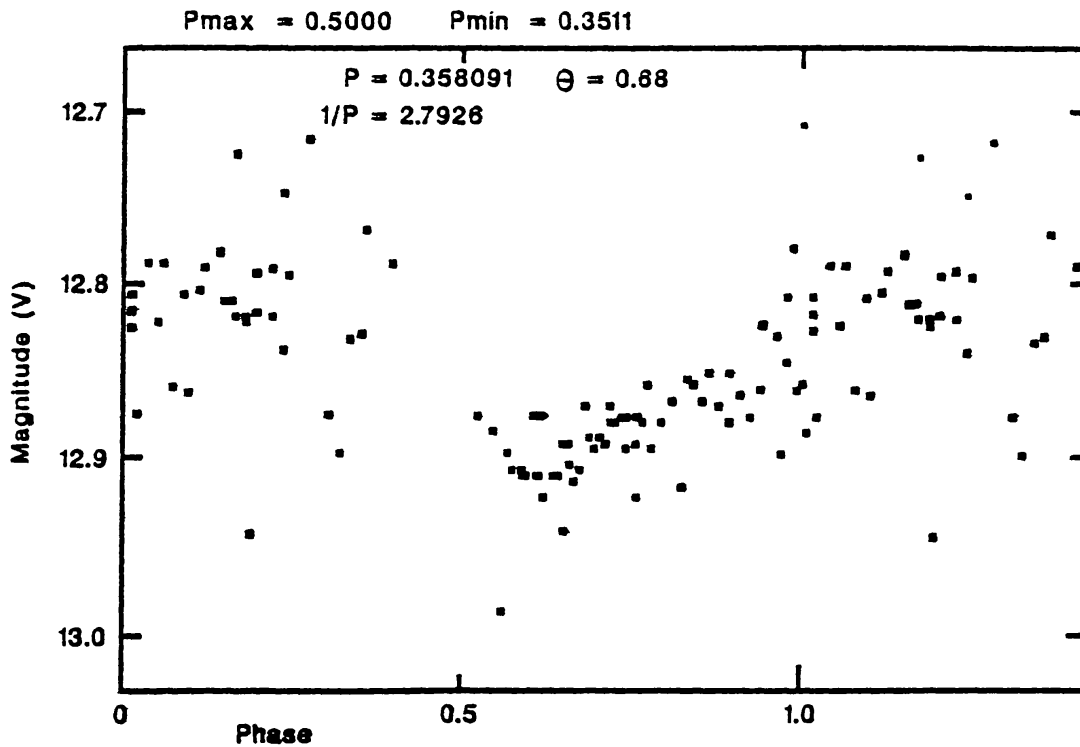


Figure 2. Light curve from the V data with the period  $P = 0.34$  day.