

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 4706

Konkoly Observatory
Budapest
14 May 1999

HU ISSN 0374 – 0676

V500 Aql: AN ECLIPSING CLASSICAL NOVA

R. HAEFNER

Universitäts-Sternwarte, Scheinerstr. 1, 81679 München, Germany

V500 Aql (Nova Aquilae 1943) experienced little observing attention. The rather incomplete outburst light curve (e.g. Payne-Gaposchkin, 1957) nevertheless allowed the classification as a moderately fast nova ($t_3 = 42^{\text{d}}$). After reaching the maximum brightness of about 6.1 mag (photographic) the system faded to 17.8 mag. Its distance amounts to 4.9 kpc (e.g. Shafter, 1997). From a spectrum taken about 170 days after maximum the expansion velocity was determined to be $\sim 2800 \text{ km s}^{-1}$ (Sanford, 1943). Based on the presence of [Ne III] and [Fe VII] lines in this spectrum Della Valle and Livio (1998) suggest this nova to be a member of the He/N class. Further information (e.g. coordinates, finding chart, literature) may be found in the catalogues published by Duerbeck (1987) or Downes et al. (1997).

The present photometric observations were obtained in August 1994 using the CCD camera on the 0.9-m Dutch telescope at the European Southern Observatory. Since the star appeared quite faint (~ 20 mag) the measurements were performed in integral light. Table 1 gives the observing log.

Table 1: Journal of observations. Start is the time for the midpoint of the first exposure. The observation interval includes also gaps due to any interruption of the exposure series.

Date (1994)	Start (UT)	Interval (h)	Int. Time (min)	Frames No.	Obs. Run
14 Aug.	0:59:09	5.705	5	60	1
17 Aug.	0:20:38	6.262	5	67	2

Differential instrumental magnitudes were derived relative to nearby comparison stars on the same CCD image. Fig. 1 presents the resulting light curve obtained during the first night (run 1). Two eclipses (depth ~ 0.4 mag, duration ~ 25 min) about 3.5 hours apart are easily recognizable. Also shown are the measurements of a comparison star of comparable brightness. The larger scatter in the V500 Aql data hints at flickering activity in the nova system. Two further eclipses could be recorded during the second night (run 2) when the system was ~ 0.15 mag brighter. Further, the eclipse profiles had changed to a somewhat shallower shape. All this indicates that V500 Aql was probably met at the beginning of a (dwarf nova) outburst, a behaviour shared with some further classical novae. Unfortunately, the data of the second night suffer from worse meteorological conditions resulting in a larger scatter. After allowing for the 0.15 mag difference the combined data

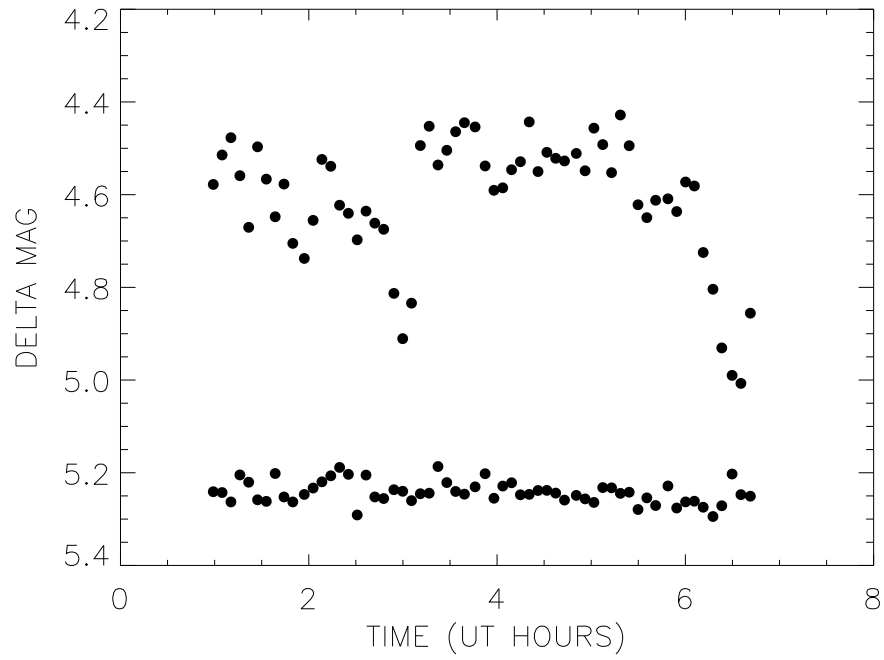


Figure 1. The light curve of V500 Aql (top) compared with a constant star (bottom). The measurements were obtained on 14 August 1994.

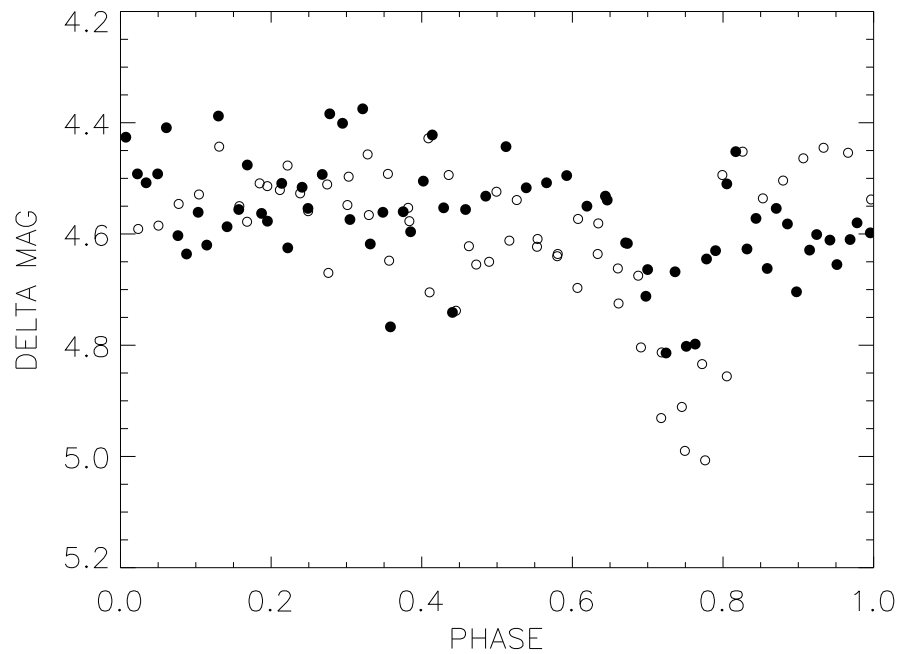


Figure 2. The phased light curve of V500 Aql based on an orbital period of 3.485 hours. Open circles: data of run 1, filled circles: data of run 2.

set was subjected to a periodogram analysis yielding an orbital period of 3.485 ± 0.02 hours. Fig. 2 shows the resulting phase diagram. The large scatter during the eclipse phase is due to the different eclipse profiles and the enhanced scatter of run 2.

The present data set does not allow to derive more detailed parameters but it is sufficient to demonstrate the eclipse phenomenon in the V500 Aql system.

References:

- Della Valle, M., Livio, M., 1998, ApJ, **596**, 818
Downes, R.A., Webbink, R.F., Shara, M.M., 1997, PASP, **109**, 345
Duerbeck, H.W., 1987, Space Sci. Rev., **45**, Nos. 1-2
Payne-Gaposchkin, C., 1957, *The Galactic Novae*, North-Holland Publ. Co., Amsterdam
Sanford, R.F., 1943, PASP, **55**, 284
Shafter, W.A., 1997, ApJ, **487**, 226