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DH AQUILAE – A NEW SU UMa-TYPE DWARF NOVA

After discovery as a variable star, DH Aql was confirmed to be a large-amplitude dwarf nova by Tsessevich (1969). He observed three outbursts from 268 Sternberg plates. These outbursts were all short-lived (lasting less than a few days), accompanied by a rapid decline up to 1.3 mag day^{-1} . He deduced from these observations the outburst cycle length of DH Aql as 268 days. The General Catalogue of Variable Stars (GCVS) adopted these outburst parameters and UGSS-type classification. Zhukov and Solovjev (1972) also reported a similar short outburst in 1972. A similar conclusion was obtained by more recent visual monitoring. Vanmunster and Howell (1995) list only three confirmed outbursts for the period 1991–1994. A photoelectric photometry ($V=18.25$) during quiescence (Bruch and Engel 1994) suggests a large outburst amplitude of $\sim 5.7 \text{ mag}$.

All the above facts – 1) a large outburst amplitude, 2) existence of short outbursts with a rapid decline, 3) low outburst frequency – seem to suggest SU UMa-type classification rather than SS Cyg-type suggested in GCVS, despite the fact that long outbursts suggesting superoutbursts seem to be missing at least from available literature.

Szentasko, Vanmunster and others distributed alert notices of a bright outburst of DH Aql via vsnet. The peak brightness ($m_v=12.4$) seemed to surpass most of the historical outbursts, so we started *V*-band CCD photometry in order to check whether this outburst is a superoutburst.

The observations were done on Sep. 23 and 25, 1994 using a CCD camera (Thomson, TH 7882CDA, 576×384 pixels with $23 \mu\text{m}$ square pixel size) attached to the Cassegrain focus of 0.6-m reflector (focal length=4.8m) at Ouda Station, Kyoto University (Ohtani et al., 1992). An interference filter was used which had been designed to reproduce the Johnson *V* band. The mode of 2×2 on-chip summation was employed. The exposure time was 60–90 sec and saving dead time of 13 sec throughout observations.

We reduced the data using the personal-computer-based aperture photometry package developed by one of the authors (T.K.). This package automatically subtracts bias-frames, applies flat fielding and enables us to estimate the instrumental magnitudes. The aperture size was $9''$ in radius. The sky level was determined from pixels whose distance from the individual objects are between $24''$ to $48''$.

An identification chart of DH Aql based on our CCD image is drawn in Figure 1. Figure 2 shows the light curve of DH Aql on Sep. 25, 1994 with the differential magnitude of DH Aql and the star “C₁” in Figure 1. The detection of superhumps clearly seen in Figure 2 and the long duration (at least 14 days) of the present outburst (Mattei 1995) indicate that this outburst is doubtlessly a superoutburst. We analysed the Sep. 25 light curve, using phase dispersion minimization (PDM) method (Stellingwerf 1978) implemented in IRAF package (IRAF is distributed by National Optical Astronomy Observatories, U.S.A.) and obtained $0.0805 (\pm 0.003)$ day as the best estimation of superhump period. The present observations first established DH Aql as an SU UMa-type dwarf nova.

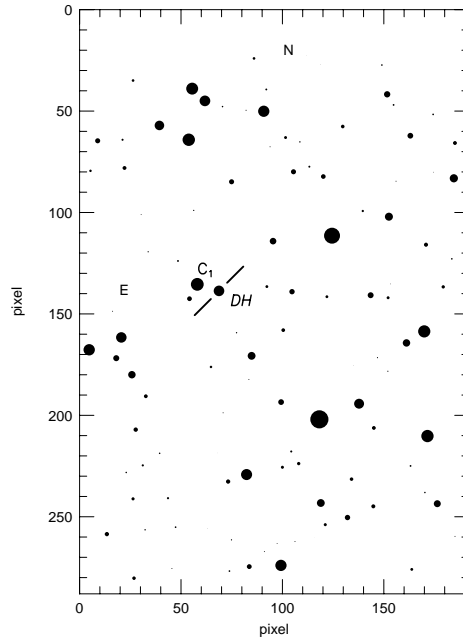


Figure. 1. Field map of DH Aql. The field of view is about 6×9 arcmin. The variable (DH) and comparison (C_1) are marked.

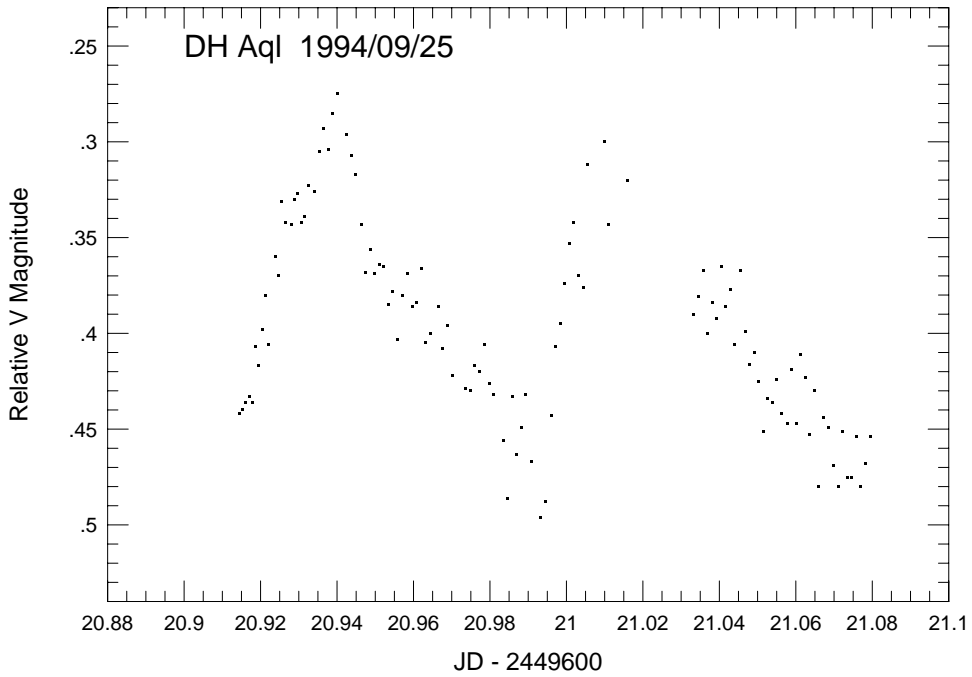


Figure. 2. Time-resolved photometry at Ouda on Sep. 25, 1994. Superhumps with a period of 0.0805 day are clearly seen.

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Daisaku NOGAMI
 Taichi KATO
 Dept. of Astron., Faculty of Sci.
 Kyoto University
 Sakyo-ku, Kyoto 606-01 Japan

References:

- Bruch, A., Engel, A., 1994, *Astron. Astrophys. Suppl.*, **104**, 79
 Ohtani, H., Uesugi, A., Tomita, Y., Yoshida, M., Kosugi, G., Noumaru, J., Araya, S., and Ohta, K., 1992, *Mem. Fac. of Sci., Kyoto Univ., Series A of Physics, Astrophysics, Geophysics and Chemistry*, **38**, 167
 Mattei, J. A., 1995, Observations from the AAVSO International Database, private communication
 Stellingwerf, R. F., 1978, *ApJ*, **224**, 953
 Tsessevich, V. P., 1969, *Astron. Tsirk.*, No. 529
 Vanmunster, T., Howell, S. B., 1995, "Outburst Activity Data on Selected Cataclysmic Variables"
 Zhukov, G. V., Solovjev, V. Ya., 1972, *Astron. Tsirk.*, No. 729