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CYCLIC VARIABILITY OF V1101 Aql

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V1101 Aql, originally discovered as an irregular variable, has been regarded as a Z Cam-type dwarf nova (Meinunger 1965; Vogt and Bateson 1982). Pastukhova and Shugarov (1994) dealed with the long-term behavior of this star, showing the presence of occasional fadings. Downes et al. (1995) presented low-resolution spectroscopy, which supported the cataclysmic nature of the star, but the possibility of being a Herbig Ae/Be star remained. Masetti and Della Valle (1998) obtained time-resolved CCD photometry, which indicated possible orbital periods of 3.46 or 4.00 hr.

Our observations were done using a CCD camera (Thomson TH 7882, 576×384 pixels, on-chip 2×2 binning adopted) attached to the Cassegrain focus of the 60-cm reflector (focal length = 4.8 m) 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 exposure time was 30–90 s, depending on the transparency of the sky. The frames were first corrected for standard de-biasing and flat fielding, and were then processed by a microcomputer-based automatic-aperture photometry package developed by one of the authors (TK). The relative V magnitudes of the variable were determined against GSC 1618.977, whose magnitude was determined as $V = 11.96$ using the local comparison stars by Misselt (1996). The constancy of the comparison was confirmed using GSC 1618.1649 ($V = 13.51$). The summary of observations is given in Table 1.

The overall light curve is given in Figure 1. The light curve shows the quasi-periodic cyclic variation with a period of $\sim$14 d, and an amplitude of 0.7 mag. The coverage by Pastukhova and Shugarov (1994) was not dense enough to clearly illustrate this modulation. Though the period of the modulation is close to that typical of Z Cam-type dwarf novae, the amplitude is rather small. The presence of short excursions to faint states (Pastukhova and Shugarov 1994) is also unusual for Z Cam-type dwarf novae. However, the light modulation is reminiscent of FY Vul, which bears spectroscopic similarity to V1101 Aql (Downes et al. 1995). There may be a previously unrecognized group of low-amplitude dwarf novae. The Herbig Ae/Be classification may better explain the presence of occasional fadings, and the possibly associated nebulosity (Masetti and Della Valle 1998), but 0.7-mag cyclic variation seems to be unusual for this class of objects. Another object exhibiting similar activities is FY Per, whose cyclic variations, with a typical period of 20–30 d, and a full amplitude of $\sim$1.2 mag have been recently established (Watanabe and Maehara 1999), and whose nature has been also discussed as either a cataclysmic variable or a Herbig Ae/Be star (Okazaki 1993). More observations are needed to clarify the nature of this intriguing object.

Table 1: CCD observation of V1101 Aql

JD start[a]	JD end[a]	mag[b]	error[c]	N^d
50291.999	50292.003	2.360	0.032	4
50293.115	50293.118	2.320	0.013	5
50294.109	50294.112	2.462	0.018	5
50295.053	50295.057	2.506	0.042	5
50296.094	50296.098	2.281	0.019	5
50301.109	50301.120	2.018	0.004	9
50302.148	50302.172	2.140	0.005	20
50303.133	50303.144	2.310	0.006	10
50304.156	50304.159	2.449	0.014	5
50305.176	50305.176	2.425	0.007	2
50307.137	50307.140	2.423	0.007	5
50313.077	50313.081	2.214	0.004	5
50314.107	50314.110	1.915	0.006	5
50316.089	50316.092	2.018	0.008	5
50321.054	50321.054	2.557	-	1
50331.949	50331.952	2.023	0.010	3
50333.994	50333.995	2.331	0.008	2
50334.960	50334.962	2.519	0.017	3
50337.918	50337.920	2.307	0.023	3
50340.965	50340.967	2.340	0.006	3
50341.937	50341.938	2.270	0.005	3
50342.949	50342.951	2.065	0.016	3
50401.879	50401.881	2.408	0.023	3
50403.872	50403.872	2.782	-	1
50629.113	50629.114	2.015	0.004	3

[a] JD − 2400000
[b] Magnitude relative to GSC 1618.977
[c] Standard error of nightly average
[d] Number of frames

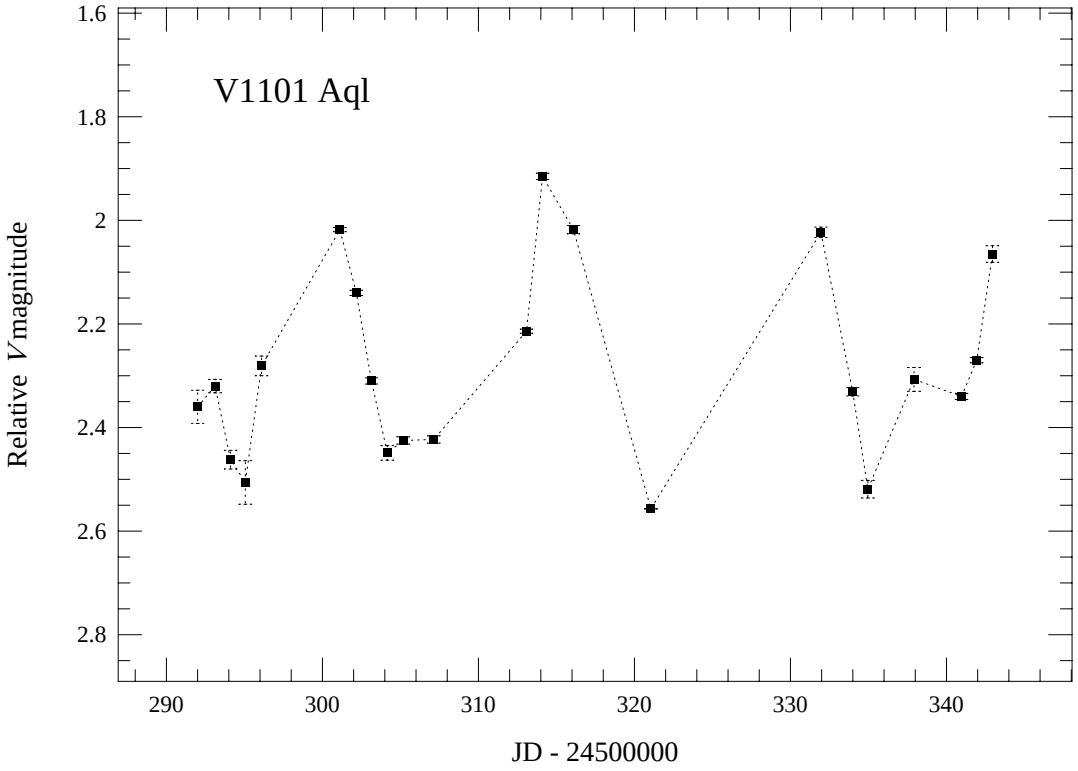

Figure 1. Light curve of V1101 Aql

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