COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS
Number 4103

Konkoly Observatory
Budapest
17 October 1994

HU ISSN 0374 – 0676

PHOTOELECTRIC PHOTOMETRY OF OO Aql

OO Aquilae (BD+8°4224, HD 187183, SAO 125084) is a ninth-magnitude binary with a W Ursae Maioris-type light curve and relatively deep minima. Photoelectric light curves have been published by Binnendjik (1968) and Lafta and Grainger (1985). Binnendijk found over several seasons that the shape of the light curves varied with time. Demircan and Güdür (1981) have published B and V observations, and have also gathered a large number of times minimum light as a part of a period study. In addition, a number of other observers have published occasional times of minimum light.

A spectral type of G5 has been assigned to the system by Roman (1956), and K0 by Hill et al. (1975) based upon classification spectra.

Photoelectric UBV observations of the W UMa type eclipsing binary OO Aql were carried out in the years 1991, 1992 and 1993 at Ankara University Observatory. During a program of photoelectric observations of eclipsing binaries the system was observed in 1991 in two colours (B and V) and in 1992 and 1993 in three colours (U, B and V). The observations were made with a 30-cm Maksutov telescope equipped with an SSP5-A photometer head which is used with an Hamamatsu R1414 photomultiplier tube. Before 29 September 1991 the observations were made by using an EMI 9789QB photomultiplier attached to the Maksutov telescope. The filters used are in close accordance with the standard UBV bands.

The same comparison star BD+8°4220 was chosen as by Demircan and Güdür (1981), and Lafta and Grainger (1985) for nearness in position and brightness to OO Aql. All differential observations were reduced outside the atmosphere using the extinction coefficients calculated in the usual way, and heliocentric correction was made for all the observations. The phases were calculated with the new light elements as:

$$T_0 = 2448853.38634 + 0^d.50678848 \times E$$

The observations are shown in Figures 1, 2 and 3 for the years 1991, 1992 and 1993 respectively together with the (B−V) and (U−B) colour curves. 1991 observations in Figure 1 were made with both photomultipliers cited above.

Total of six primary and six secondary times of minima were calculated using Kwee and van Woerden's (1956) method and listed in Table 1 with their mean errors. The columns in Table 1 are minima type, heliocentric Julian Date, mean error (I) which found by Kwee and van Woerden's (1956) method and filters used respectively. The last two columns are the averaged minima times (mean) and mean errors (II) calculated using the function given as follows:

$$t_{min(mean)} = \frac{\sum_i (t_i/\sigma_i^2)}{\sum_i (1/\sigma_i^2)}$$

$$\text{and } \sigma^2_{mean} = \frac{1}{\sum_i (1/\sigma_i^2)} \quad \text{(Mean err. II)}$$

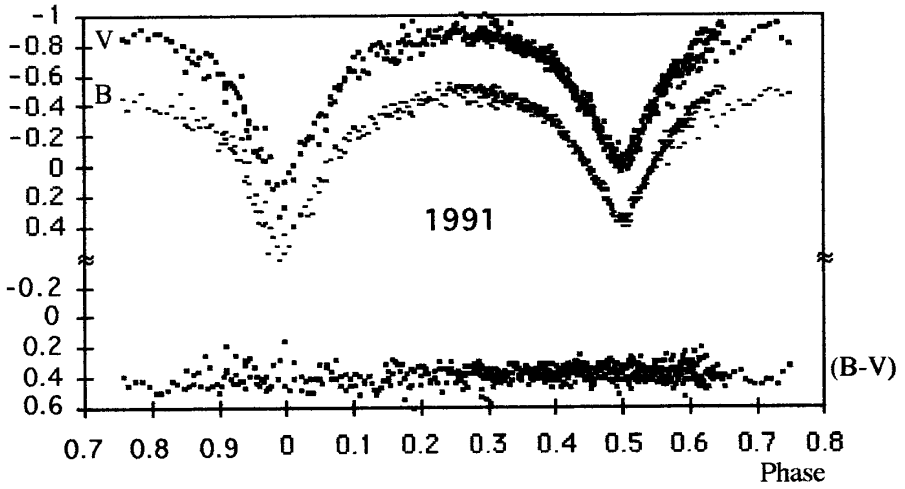

Figure 1

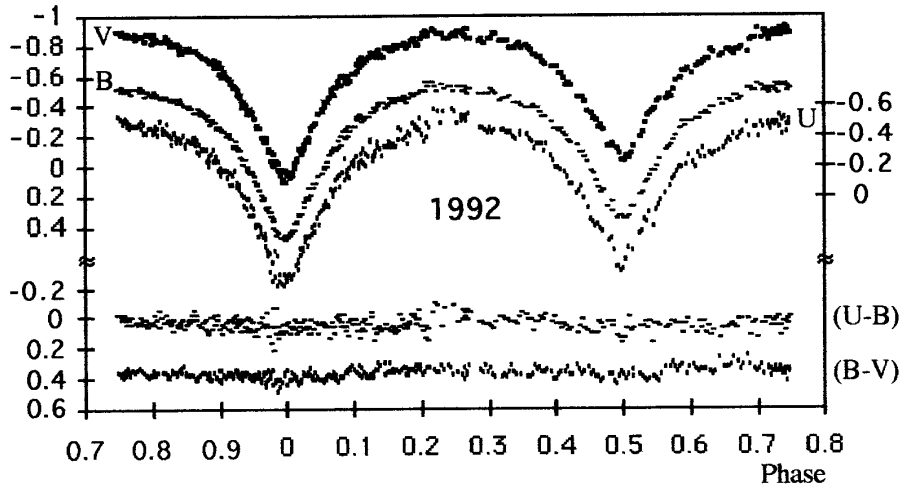

Figure 2

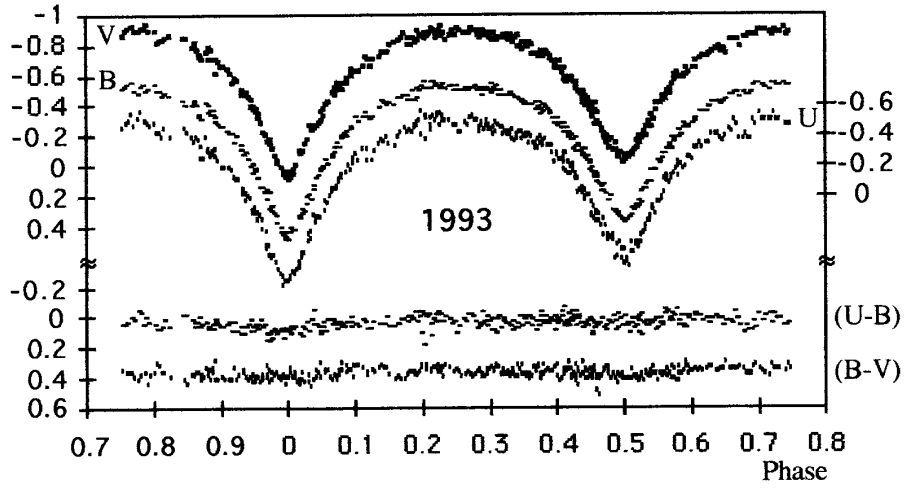

Figure 3

Table I

Min. Type	HJD min. +2400000	Mean err. (I)	Filters	HJD min. (mean)	Mean err. (II)
I	48475.3217	±0.00093	B	48475.3217	±0.00093
I	48477.34759	±0.00047	V	48477.34765	±0.00042
I	48477.34794	±0.00101	B		
II	48530.30831	±0.00036	B	48530.30876	±0.00030
II	48530.30987	±0.00056	V		
II	48531.32242	±0.00029	B	48531.32242	±0.00029
II	48532.3357	±0.00036	V	48532.33591	±0.00022
II	48532.33604	±0.00028	B		
II	48838.43569	±0.00046	U	48838.43601	±0.00017
II	48838.436	±0.00019	B		
II	48838.43679	±0.00068	V		
I	48853.3862	±0.00029	U	48853.38634	±0.00014
I	48853.38632	±0.00019	B		
I	48853.38651	±0.00028	V		
I	48854.39871	±0.00041	U	48854.39936	±0.00016
I	48854.39935	±0.00026	B		
I	48854.39957	±0.00023	V		
II	49179.5057	±0.00026	B	49179.50586	±0.00021
II	49179.50602	±0.00039	V		
II	49179.50681	±0.00088	U		
I	49186.34666	±0.00063	U	49186.34731	±0.00017
I	49186.3471	±0.00028	V		
I	49186.34752	±0.00022	B		
I	49193.44171	±0.00033	V	49193.44196	±0.00019
I	49193.4419	±0.00031	U		
I	49193.44227	±0.00033	B		
II	49238.29217	±0.00025	U	49238.29249	±0.00016
II	49248.29257	±0.00025	V		
II	49238.29301	±0.00038	B		

Birol GÜROL
Ankara University Observatory
06100 Tandoğan-Ankara
Türkiye

References:

Binnendijk, L., 1968, *A.J.*, **73**, 32
Demircan, O., Güdür, N., 1981, in Photometric and Spectroscopic Binary Systems, ed. E. B. Carling and Z. Kopal, D. Reidel Publ., p. 413
Hill, G., Hilditch, R. W., Younger, F., and Fischer, W. A., 1975, *Mem. RAS*, **79**, 131
Kwee, K. K., van Woerden, H., 1956, *Bull Astron. Neth.*, **12**, 327
Lafta, S. J., Grainger, J. F., 1985, *Ap. Space Sci.*, **114**, 23
Roman, N. G., 1956, *Ap. J.*, **123**, 247