COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS
Number 4479

Konkoly Observatory
Budapest
22 May 1997
HU ISSN 0374 – 0676

FUOR V1057 Cyg - TWO YEARS IN LOCAL MINIMUM

The star V1057 Cyg belongs to a small-number group of eruptive FU Orionis variables or Fuors (Herbig 1977; Hartmann et al. 1993). Since peak light in 1970 the light curve of the Fuor V1057 Cyg exhibits most remarkable and dynamic changes in comparison with more quiescent behavior in post-outburst stage of two other best-studied Fuors FU Ori and V1515 Cyg. Over the period 1970-1994 V1057 Cyg had declined by about of 3.5 mag in B (Figure 1). In contrast, FU Ori and V1515 Cyg have a much slower declining rates. Throughout post-outburst states both FU Ori and V1515 Cyg have faded by 1.1 (1937-1994) and 0.3 mag (1974-1994) in B, respectively. Moreover, in 1995 V1057 Cyg had suddenly dimmed by 0.8 mag in B (Ibrahimov 1996). Note that the 1995 drop in magnitude of V1057 Cyg is similar to the 1980 one of V1515 Cyg. In 1996 the observations of V1057 Cyg were continued at Mt. Maydanak observatory. These observations have been obtained using the same equipment as described in Ibrahimov (1996). These new observations are combined with existing ones and used to construct the figures. Figure 1 shows historical pg/B light curve of the Fuor based on all available data which have been compiled by the authors and joined with Mt. Maydanak database. Figure 2 shows a more detailed V-light curve of the Fuor based on our own observations in 1995-96. Figure 3 shows the brightness and color variations of the Fuor in 1978, 1981-96 based only on Mt. Maydanak observations.

The figures allow to conclude that the Fuor still remains in local minimum. The observations of 1995-96 (Figure 2) show that the star has no visible trend neither to increase nor to following decrease its brightness. Besides, Figures 2 and 3 indicate the presence of a gradual increase in the amplitude of light variations from 0.2V in 1981-91 to 0.5V in 1996. The similar increases in the amplitudes of light variations are observed in U, B, and R too. Since mid-eighties to 1996 the amplitudes have increased from 0.5 to 0.8 in U, from 0.2 to 0.6 in B, and from 0.1 to 0.3 mag in R.

The evolution of the colors of the Fuor in 1978-96 is most interesting (Figure 3). Despite the continuation of smoothed large-scale fading till 1986, the colors had practically constant values in 1978-86 (cf. the Table in Ibrahimov 1996). During the next five years 1986-90 the light curve shows a slight bowl-shaped increase in the brightness. This increasing light is accompanied by monotonic decrease of the average value of the U−B color from +1.15 to +1.03 mag. At the same time the other two colors did not change. Thus, both colors have remained practically constant during 1978-90: B−V = +1.76 and V−R = +1.59 mag. During 1991-94 the light curve of the star exhibited saw-tooth variations. These variations are out of phase with similar saw-tooth color variations: i.e., redder colors correspond to higher brightness and vice versa. The 1995 drop in magnitude of V1057 Cyg has led to common reddening by 0.2-0.3 mag of all three colors of the star.

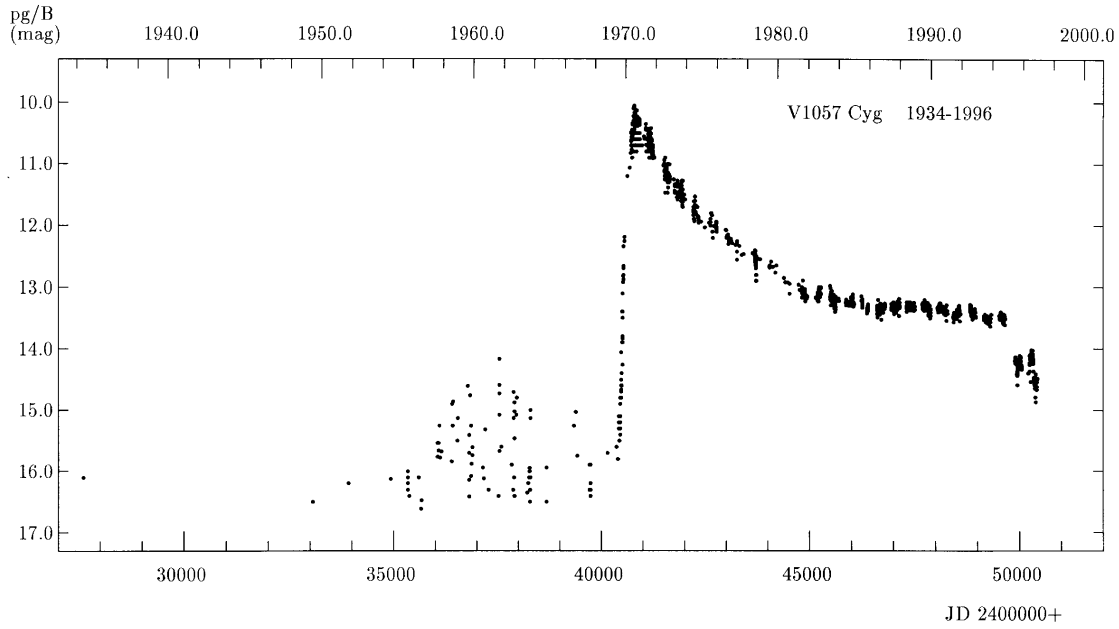

Figure 1. Historical pg/B light curve of V1057 Cyg in 1934-1996

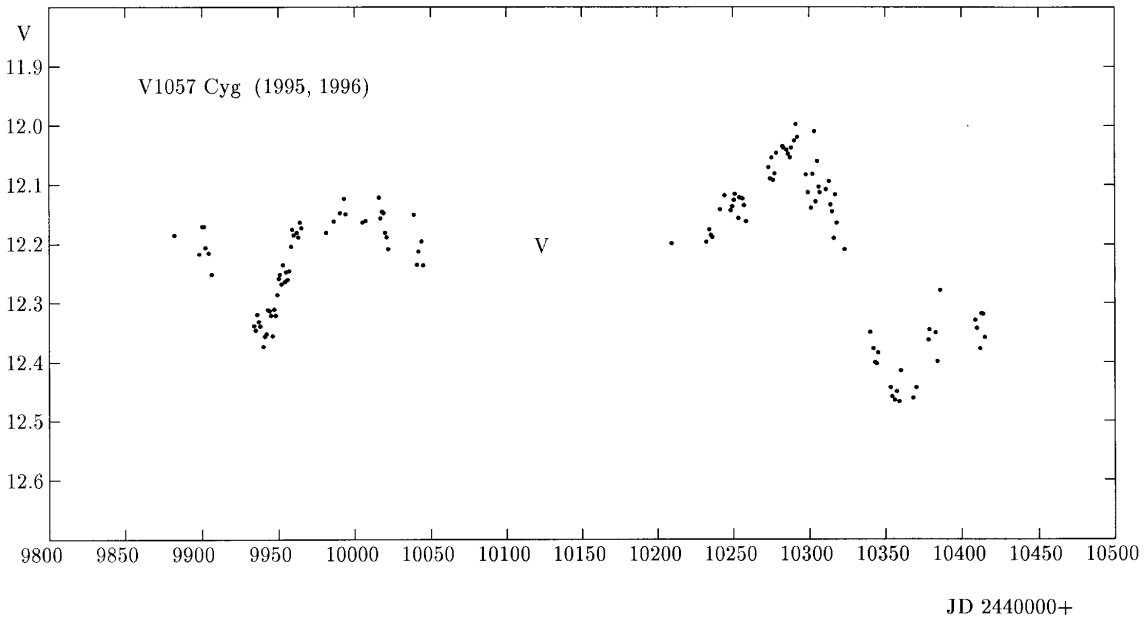

Figure 2. Detail V-light curve of V1057 Cyg in 1995-1996

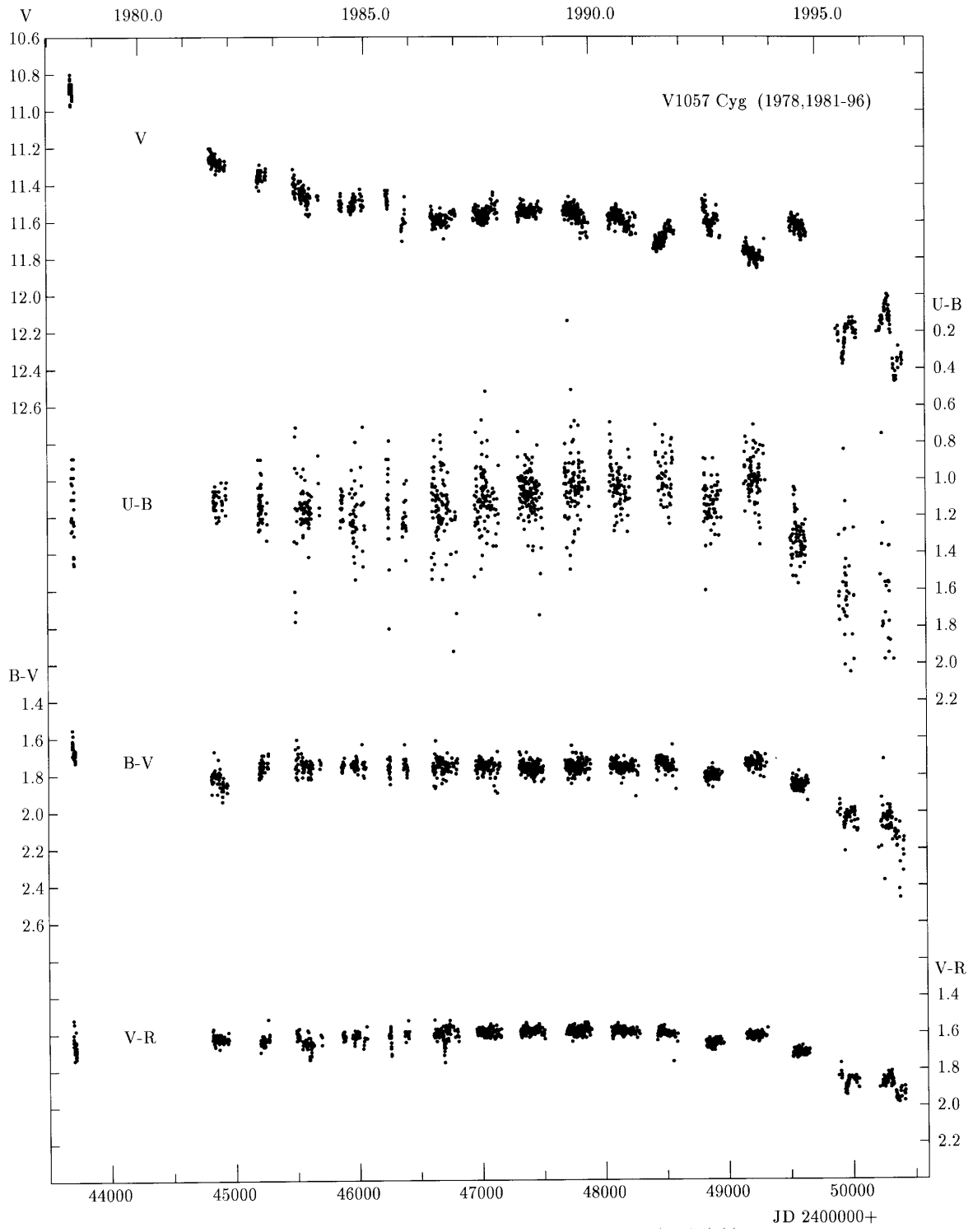

Figure 3. Brightness and color variations of V1057 Cyg in 1978-1996

Now it can be defined that during the decade since mid-eighties to 1996 the general changes of the colors are about of 0.5 mag for U−B and about of 0.3 mag for both B−V and V−R.

Thus, we conclude that the new active phase of photometric changes of the Fuor V1057 Cyg began in 1991. The detected increase in the amplitude of light variations since 1991, remarkable behavior of the colors and the 1995 drop in magnitude of V1057 Cyg provide strong support to the conclusion. The mentioned changes (except the 1980 drop in magnitude of V1515 Cyg) have no analogies in the photometric behavior of the other Fuors. New observations of the Fuor in this active and interesting state are very important and useful.

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