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PERIOD CHANGE IN THE ECLIPSING BINARY SYSTEM V471 TAURI

V471 Tauri (BD + $16^{o}516$) is an eclipsing binary consisting of a K2V star and a white dwarf. A summary of observations of the system was presented by Young et al. (1983). Three eclipses of the system were observed during the 1983 and 1984 seasons at the Erwin W. Fick Observatory.

The observations were obtained with a two-channel photoelectric photometer at the f/16 Cassegrain focus of the Fick Observatory 61 cm reflector. A dichroic filter reflects wavelengths shorter than 6300 angstroms to an EMI 6256 photomultiplier with a U band filter. The second (Red) channel, which is directed to a Hamamatsu R926 photomultiplier, is used to compensate for changing sky conditions and guiding errors. Simultaneous pulse counting of the outputs in both channels occurs with an integration time of 4 seconds.

The ratio of the U channel counts to the Red channel counts, with mean sky level subtracted, was analyzed using a simple three-line model least squares linear fit to each ingress and egress observed. Although this method will not accurately give the duration of the ingress or egress, it will indicate the midpoint of the ingress or egress, from which the eclipse midpoint time can be determined. The following parameters are tabulated in Table I:

t_{mid} = observed heliocentric time of mid-eclipse.

$O-C_1$ = the difference between t_{mid} observed and predicted by the eclipse midpoint ephemeris of Young and Lanning (1975): JD=2440610.0649+0.52118346 E, where E is the epoch number of the eclipse.

$O-C_2$ = the difference between t_{mid} observed and predicted by the ephemeris of Young et al. (1983): JD=2441913.02368 + 0.521182993 E', where E'=E-2500.

Table I : Results of eclipse timings of V471 Tauri

UT Date	Epoch(A)	t_{mid} (JD-2440000)	$O-C_1$(sec)	$O-C_2$(sec)
12/3/83	9712	5671.79559± 0.00006	-265.3± 5.6	14.5± 5.6
11/2/84	10355	6006.91642± 0.00005	-277.5± 4.7	28.2± 4.7
11/22/84	10391	6025.67892± 0.00005	-286.6± 4.6	20.6± 4.6

(A) as given by the ephemeris of Young and Lanning (1975).

Figure 1 is a plot of $O-C_1$ vs. epoch, for the data in Table I (crosses) and data from Ibanoglu and Evren (1984) (circles). The solid line indicates the O-C expected from the ephemeris of Young. et al. (1983).

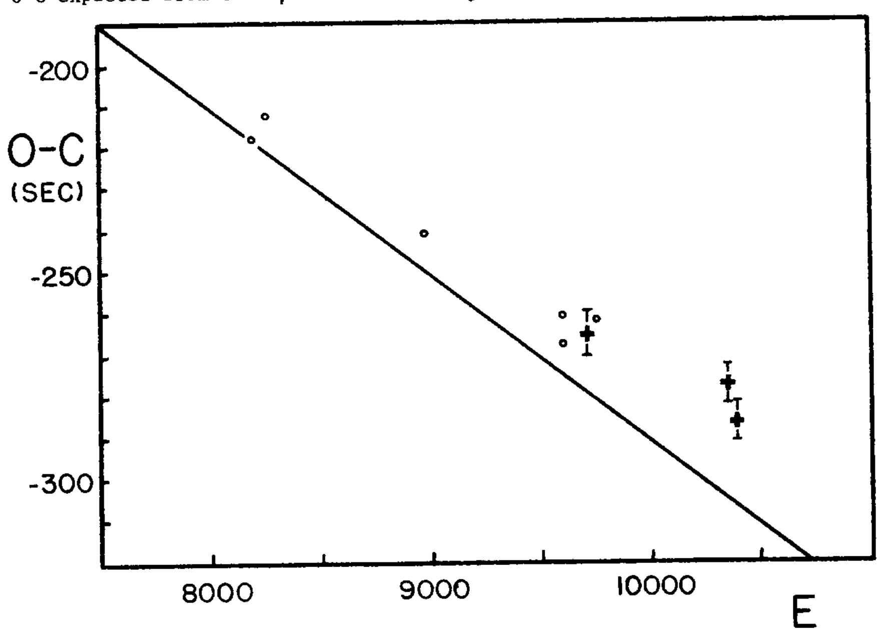

Figure 1 : $O-C_1$ vs. Epoch.

Oliver and Rucinski (1978) suggested that observations between epochs 3000 and 5000 were best fit with a linear O-C ephemeris. Linear O-C fits were subsequently used to calculate ephemerids by Young et al. (1983) for observations between epochs 3000 and 7500, and by Ibanoglu and Evren (1984) for observations between epochs 2700 and 10000. We notice that as later observations are included, the implied period increases. The observations presented here diverge from the linear O-C fit, as can be seen in Figure 1.

It appears that the period has been increasing slowly since epoch 7000, and the last two observations indicate the rate of change is increasing.

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