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NEW PERIOD DETERMINATION FOR EY Cyg

EY Cyg is a U Gem-type dwarf nova. The brightness during outburst and minimum are respectively 11.4 mag. and 15.5 mag. (Ritter, 1990). The interval between two subsequent outbursts is about 240 days and the duration of the outburst is typically around 30 days. More details about the spectroscopic observations are given by Smith, Sarna & Jones (1995). The first orbital period determination was made by Hacke & Andronov (1988) from photographic observations. They found:

$$\text{Min. JD} = 2446595.323 + 0.181228 \times E$$

This is the period quoted in the catalogue by Ritter (1990), but in our opinion this determination is very uncertain because of the poor quality of the data.

We obtained CCD photometry in V, R, I of EY Cyg during two nights in 1993 (August 17 and October 13), using the 60-cm Cassegrain telescope located at the Warsaw University Observatory at Ostrowik. Exposure times of 60 and 120 sec were used for different colours and nights. We used the standard reduction procedure available in Warsaw, which is based on the IRAF reduction package.

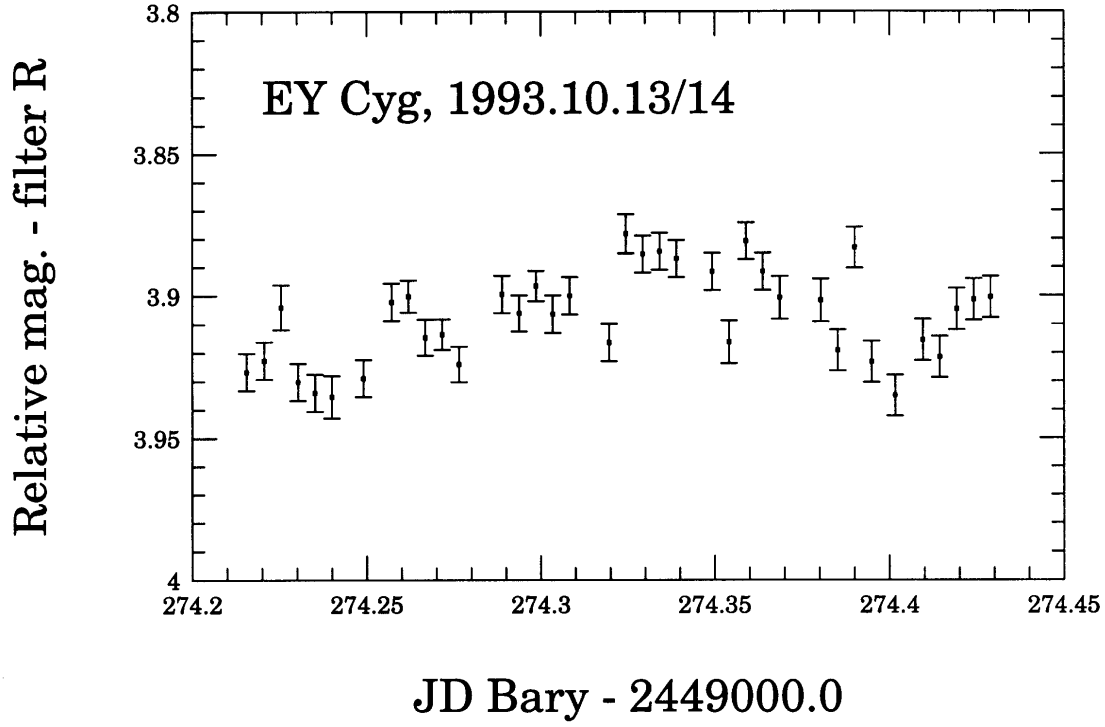

Figure 1

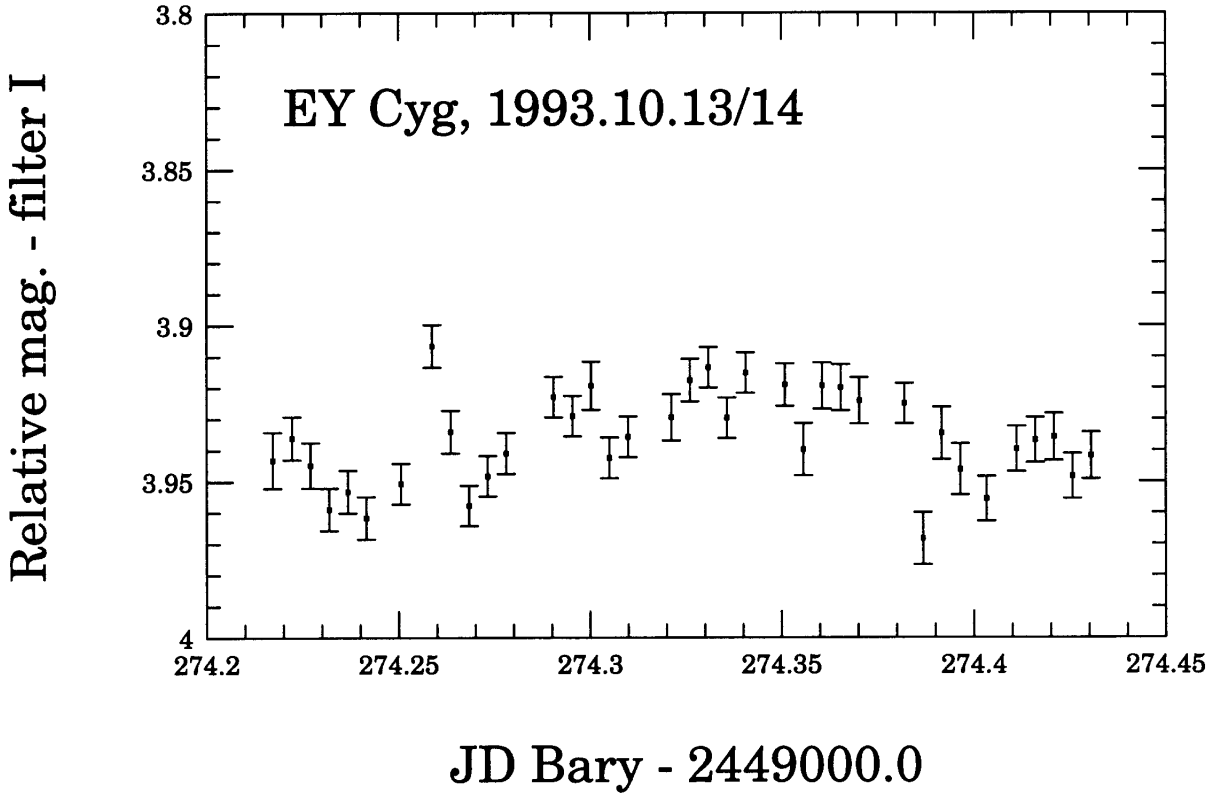

Figure 2

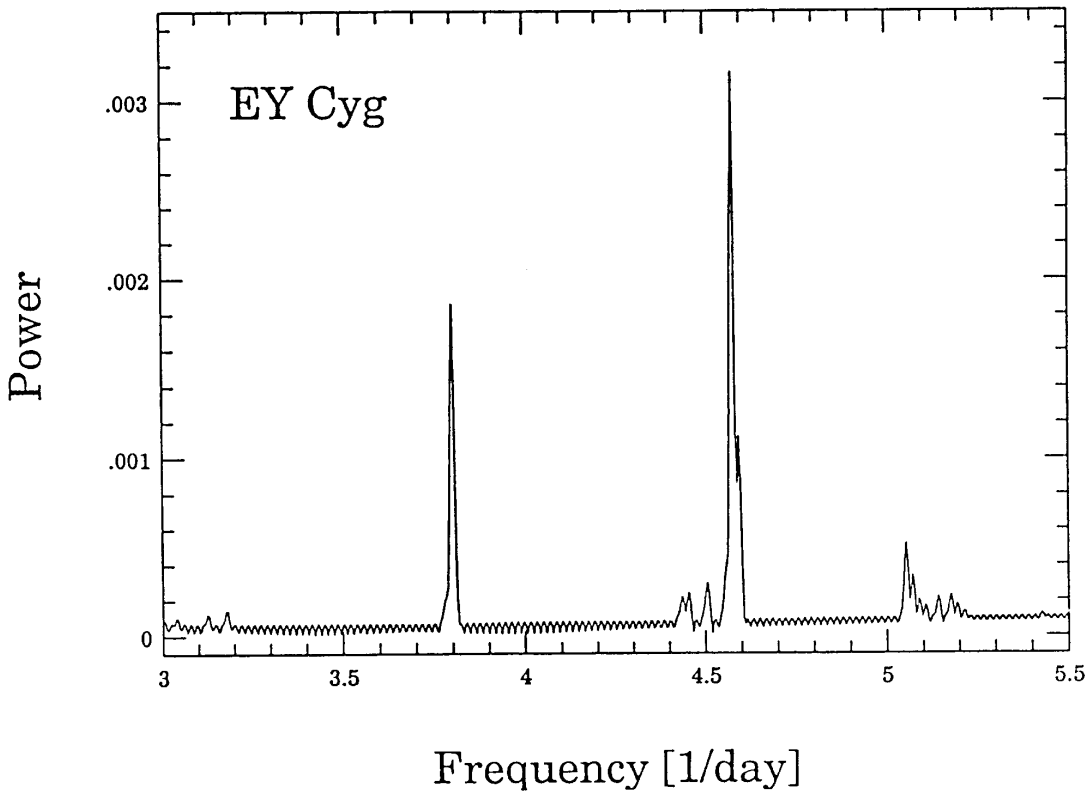

Figure 3

The R and I observations are presented in Figures 1 and 2 respectively. We show only relative magnitudes in both colours, because the majority of bright stars in our field of view are variable. We detected a very smooth light curve modulation with an amplitude of about 0.05 mag. The formal error of observations is ± 0.01 mag.

The power spectrum periodogram is presented in Figure 3. Two peaks are seen at frequencies: $f_1 = 3.800 \pm 0.004$ day^{-1} and $f_2 = 4.576 \pm 0.004$ day^{-1}. These give orbital periods: $P_1 = 0.2630 \pm 0.0005$ and $P_2 = 0.2185 \pm 0.0005$ day, respectively. The second period has a higher statistical weight; further, there are evolutionary and spectroscopic arguments to support this value (see discussion below).

From the spectra of EY Cyg (Smith, Sarna & Jones, 1994) we can classify the red dwarf spectral type as dM2-dM3. From the calibration by Popper (1980) we found that the mass of the red dwarf component lies in the range 0.5-0.4 $M_\odot$. Next from Echevarría's (1983) mass-radius relationship, and assuming that the red dwarf main-sequence star fills its Roche lobe, we determined a possible range for the orbital period: 0.22-0.182 day. From the results of the period analysis only the second value

$$P = 0.2185 \pm 0.0005 \text{ day}$$

is consistent with this constraint.

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