

## CCD OBSERVATIONS OF DL DRA

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**ABSTRACT.** The CCD V-band photometry of variable Delta Sct-type star DL Dra have been carried out with aid of 0.5-m telescope-reflector. A CCD camera contains the virtual-phase CCD-chip ISDO15A. The light variation curves and power spectra are presented.

**Key words:** Variable stars, photometry, Delta Sct-type stars, CCD camera

DL Dra (HR 5492, HD 129798)- is the Delta Scuti-type star (F2IV) with non-radial pulsating. The observations by Guerrero et al. (1978) allow to find two sinusoidal components of period  $P_1 = 0.0825$  and  $P_2 = 0.0837$  days. The ratio between the two periods is  $P_1/P_2 = 0.986$ . A similar ratio was found by Shobrook and Stobie (1974) for 1 Mon (V474 Mon).

The CCD observations of DL Dra have been carried out during three nights of July-August 1997 with aid of 0.5-m reflector AZT-3 of Astronomical Observatory of Odessa State University. Our CCD-camera was created using the virtual-phase CCD ISDO15A produced by "Electron" (St. Petersburg, Russia). The camera has such parameters:  $520 \times 580$  pixels ( $18 \times 24$  microns), sensitive area  $9.4 \times 13.9$  mm, spectral band 0.2 - 1.0 micron. The Quantum Efficiency at different wavelengths is as follows: 15% at 0.2 microns, 28% at 0.4, 58% at 0.7 and 12% at 1 micron. The full well capacity is 220,000 e and dynamic range 6-7 mag. The readout noise is 10 e with high speed amplifier and 7 e with low noise amplifier. The camera has a gas-filled housing and thermoelectric (Peltier) cooler, which provides a temperature difference between the CCD and

that of the environment of about 40 C. An 10-grade analog-digital converter is used, a readout time 4 s (fast reading-clearing 1.5 s). An angular field of CCD with this telescope about 10 arcmin.

The observations obtained in band close to standart V photometric system. More 300 CCD-frames during three nights observations were measured and differential magnitudes in the sense variable minus comparison star were obtained. The times of the individual observations were reduced to the Sun's centre. The exposure time and the duty cycle were from 45 to 100 sec. The photometry have been made, using our program, which can perform CCD control, image processing and aperture photometry. The resulting observed light curves of DL Dra are shown in Fig.1-3, where the points denote the observed data. The comparison star (HD129798b) in the field are fainter than the variable, thus the variation light curve is noisier than own counts. The basic frequency 12.3416 c/d ( $0.08103^d$ ) and amplitude  $0.05^m$  from power spectra were found. The fit curve (solid line) were calculated using the Fourier mode of the program PERIOD (Breger, 1990).

### References

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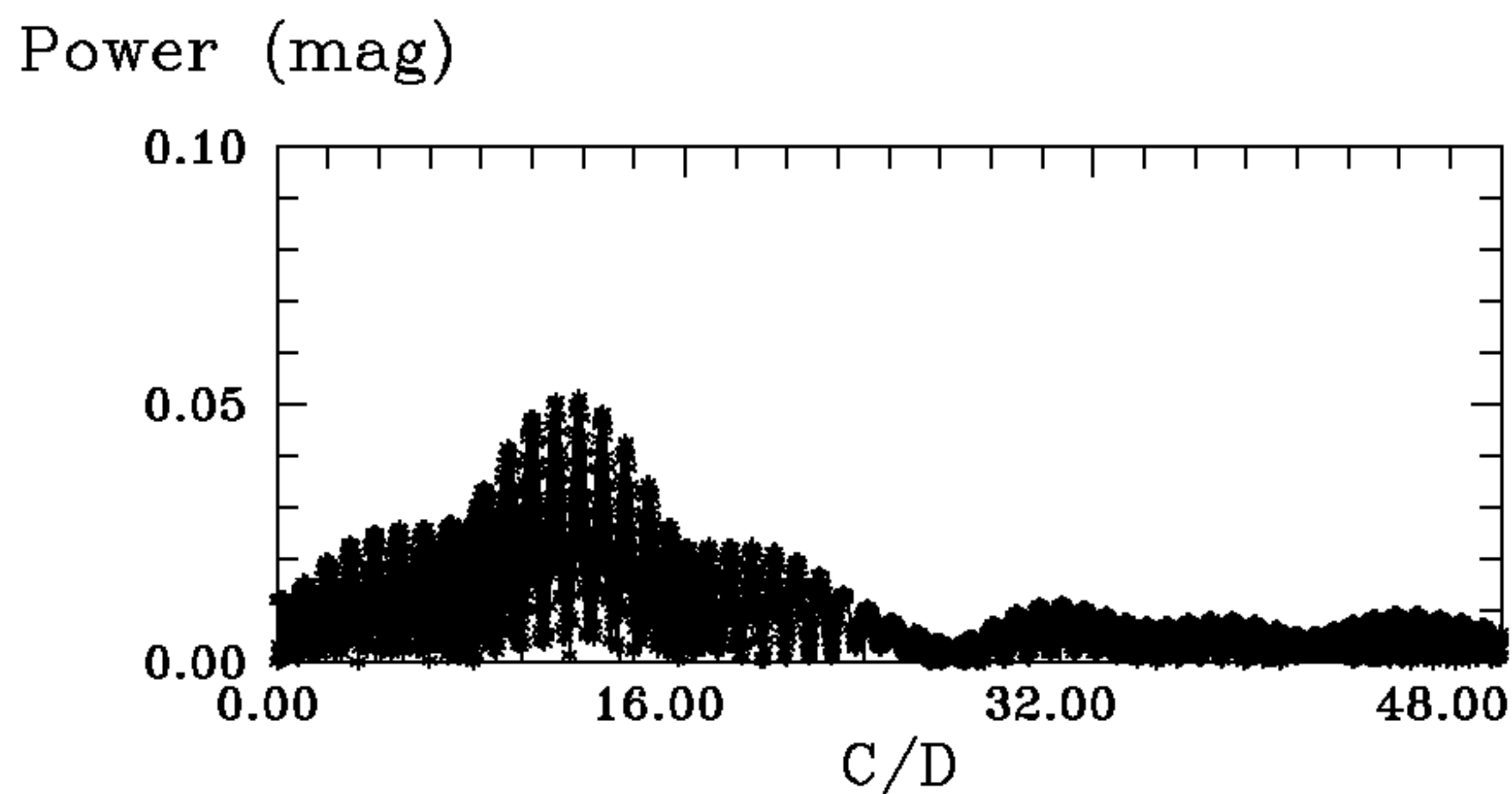
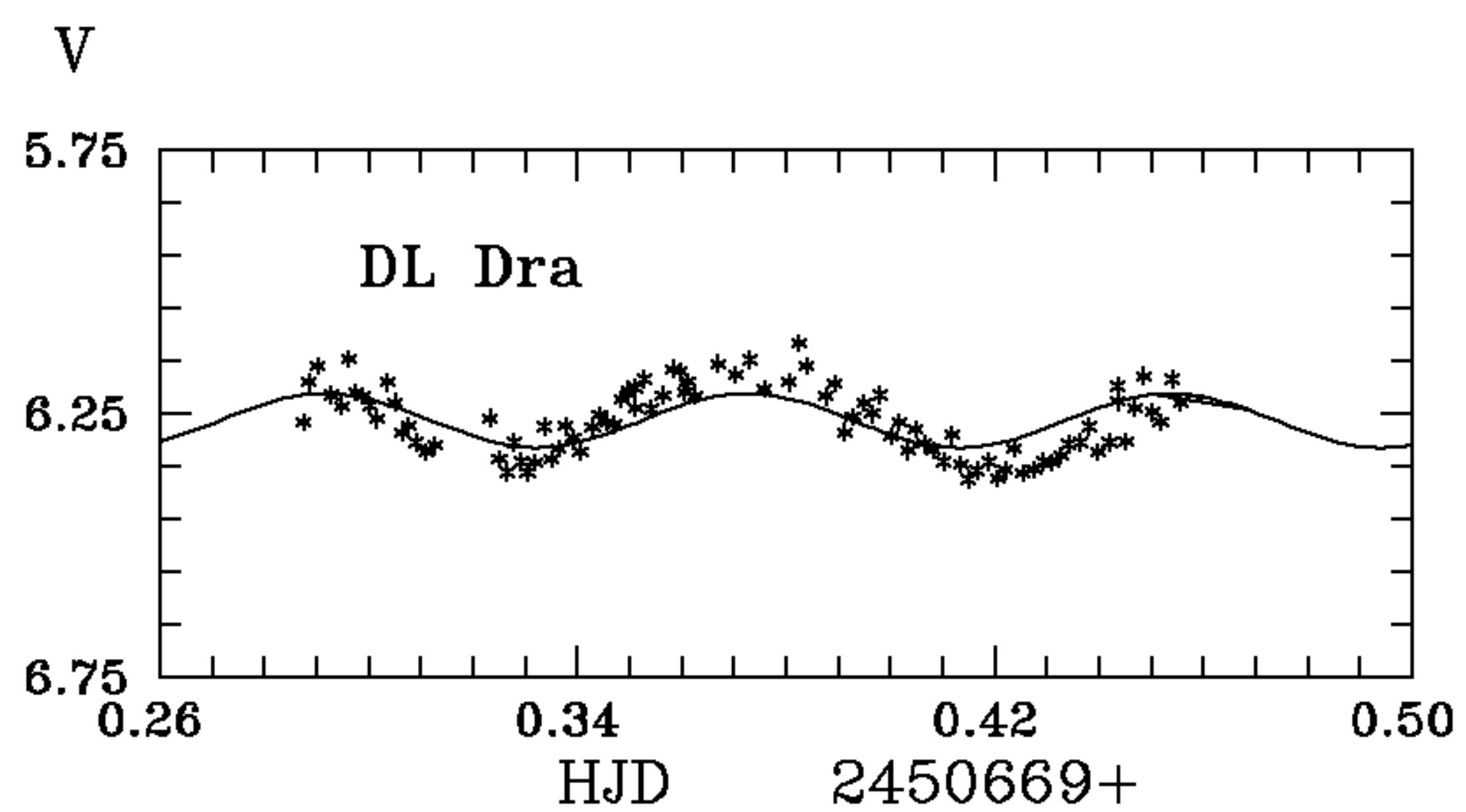
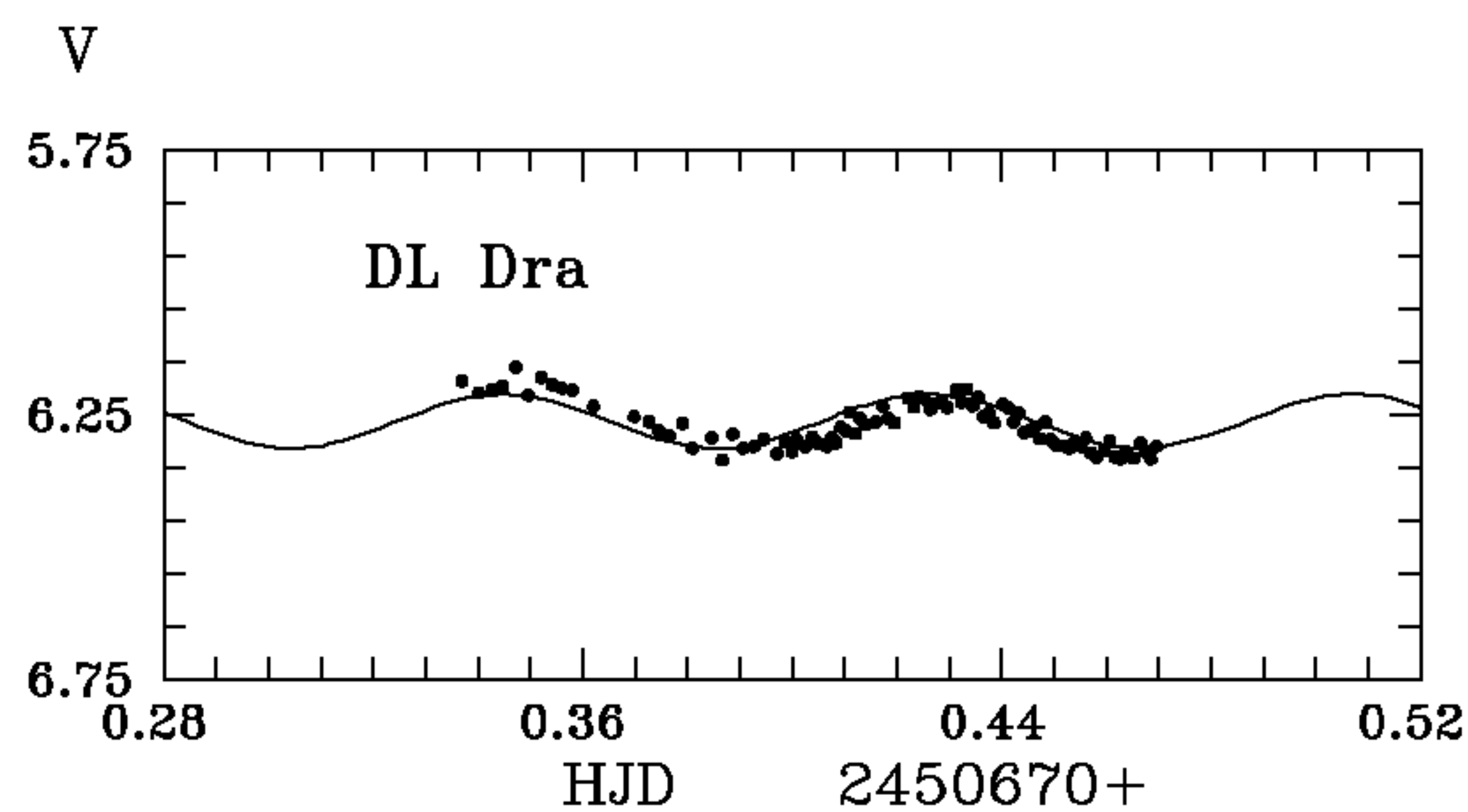
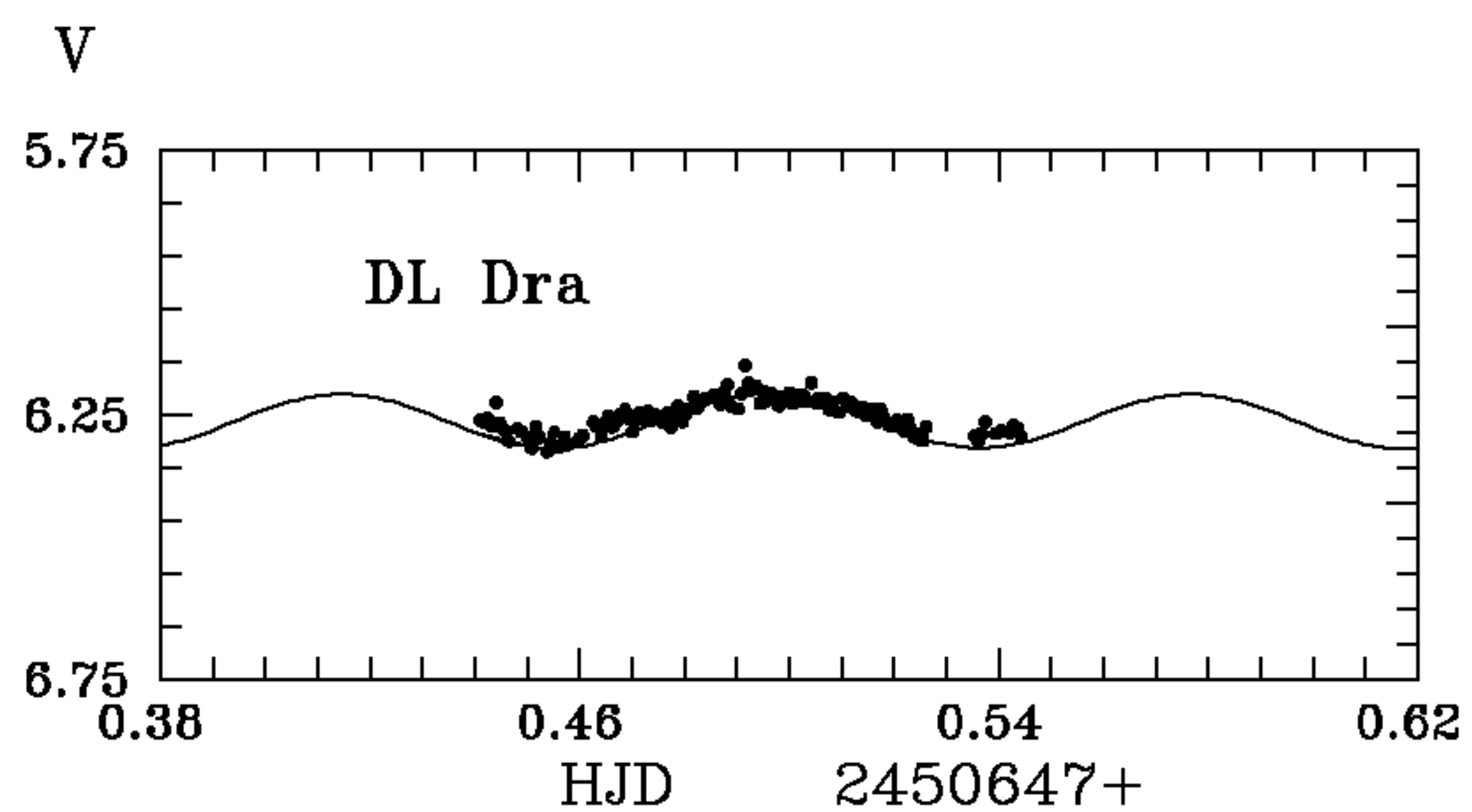


Figure 1-4. The V measurements and power spectra DL Dra. Solid lines represent the fit curve.