COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1592

Konkoly Observatory
Budapest
1979 April 27

OBSERVATIONS OF TWO LOW-AMPLITUDE DELTA SCUTI STARS: HD 23156 AND HD 73763

We have recently begun a new observational programme at the Konkoly Observatory with the aim of studying low-amplitude short-periodic variables (Delta Scuti and magnetic stars).In the frame of this programme we observed HD 23156 and HD 73763 on January 4,5 and 6,1979(UT) by a one-channel uncooled EMI 9502S photomultiplier attached to the 100 cm Ritchey-Chretien telescope at the mountain station on Piszkéstetõ.The observational process was controlled by a TPA/i computer.All the observations were made only in yellow light close to the V band of the UBV system.Though the differential magnitudes were left in the instrumental system,the average deviation of these from the standard V values should not be greater than the accuracy of the individual observations,which is about 0.001-0.003 magnitudes.The observed light-curves are shown in Figure 1.

HD 23156 was discovered and classified as a Delta Scuti star by Breger (1972).According to him,it has the shortest period among the Delta Scuti variables.Recently Seeds and Stephens (1977) observed this star and found a period of 0.0205 days against Breger's period of 0.024 days.Using the technique of Fourier analysis of unequally spaced data as developed by Deeming (1975) we did not find any sign of long lived oscillation which would be present throughout the three nights (see Figure 2.). The frequencies and amplitudes of the most prominent oscillations are given in Table 1.

Breger (1969) also reported HD 73763 as a Delta Scuti star with a period of 0.038 days and an amplitude of 0.012 magnitudes in V.The power spectra for the individual nights of observation display a great similarity (see Figure 3.).The data were prewhitened by subtracting out the sinusoid corresponding to the frequency of the main peak.The spectra of the prewhitened data of the individual nights are shown in Figure 4.Altogether five

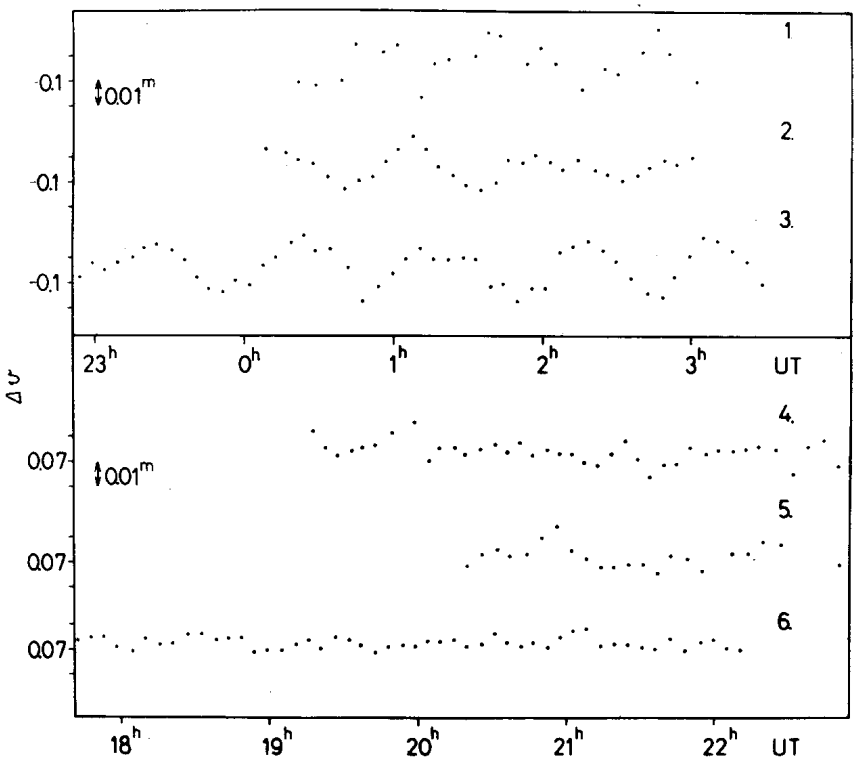

Figure 1: Differential magnitudes (m(var.)-m(comp.) in the instrumental system for HD 73763 (Run 1,2,3,comparison star HD 7389o) and HD 23156 (Run 4,5,6,comparison star HD 23246).The following run numbers were used:1,4 for January 4,1979 (UT),2,5 for January 5,1979 (UT) and 3,6 for January 6,1979 (UT).

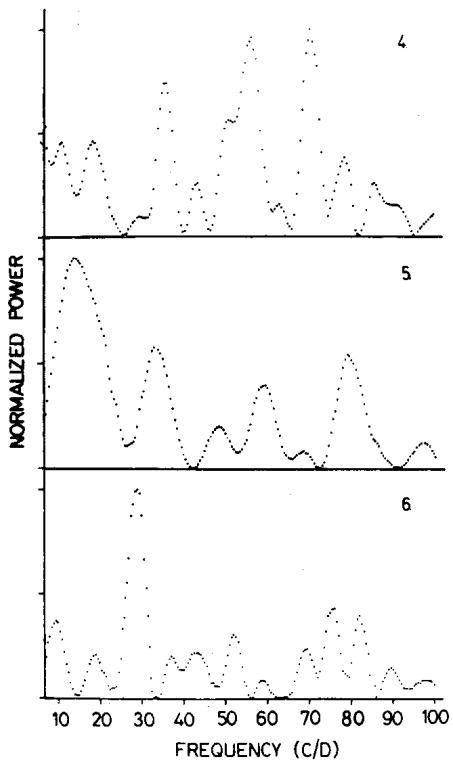

Figure 2: Power spectra of HD 23156 for the individual nights of observation.The power was normalized in each spectrum according to the main peak of the given spectra.

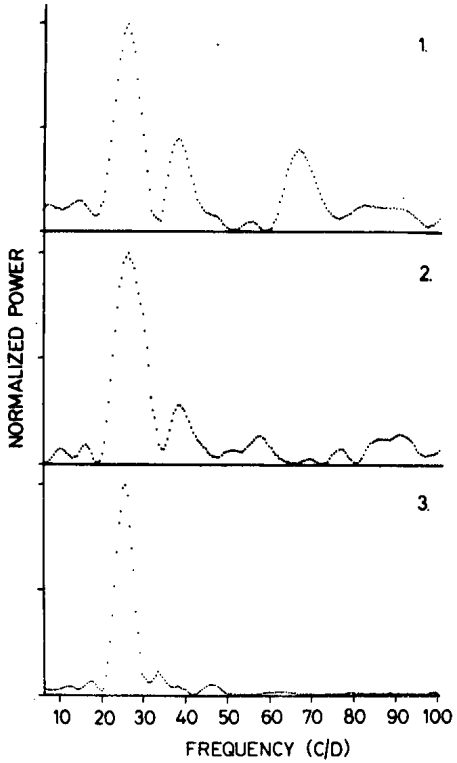

Figure 3: Power spectra of HD 73763 for the individual nights of observation.The power was normalized in each spectrum according to the main peak of the given spectra.

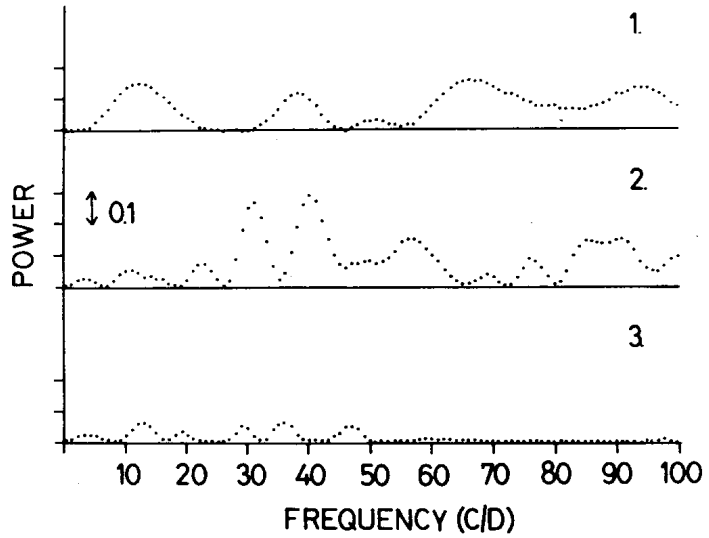

Figure 4: Power spectra of the prewhitened data of HD 73763 for the individual nights of observation.The ordinate is the power relative to the main peak of the spectra of the given original data.

Table 1

Frequencies for HD 23156.The frequencies at which the power was lower than one half of the power at the main peak in the given spectra,were omitted.

Run	Frequency (C/D)	Amplitude (mag.)
4.	35.71	0.0024
	56.18	0.0026
	70.42	0.0026
5.	14.29	0.0040
	33.44	0.0030
	79.37	0.0029
6.	29.01	0.0017
Whole data	8.850	0.0018
	18.920	0.0014
	30.758	0.0014
	35.593	0.0013

Table 2

Frequencies for HD 73763.

Run	Frequency (C/D)	Amplitude (mag.)
Original data		
1.	25.92	0.0072
2.	26.01	0.0055
3.	25.355	0.0092
Whole data	25.7596	0.0071
Prewhitened data		
1.	11.75	0.0033
	38.14	0.0032
	50.70	0.0013
2.	10.70	0.0011
	30.80	0.0031
	40.03	0.0028
	49.26	0.0011
3.	12.70	0.0019
	29.30	0.0016
	35.65	0.0017
	46.60	0.0017
Whole data	13.2050	0.0016
	31.4475	0.0011
	38.8140	0.0018
	46.7270	0.0013

frequencies were identified occuring nearly at the same places in the individual spectra.The frequencies and the amplitudes of these waves are listed in Table 2.,together with the frequencies obtained by the analysis of the whole data.
In addition we performed a MEM analysis using Burg's (1975) and Ulrych and Clayton's (1976) algorithm,and a least-squares fit of two sinusoids with arbitrary frequencies.Because of the high noise level both of these methods gave very questionable results, so we leave these frequencies out of consideration.
Finally,for checking the stability of the main period of 0.0388205 days we ordered Breger's and our observations in phase according to this period.Breger's observations fitted very well to our data,showing the stability of this mode.
The multiple periods can not be interpreted as being periods of different modes of radial pulsation.More observations should be made at low noise level in order to test the stability of the frequencies we have found.

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