

**OBSERVATIONS OF THREE λ BOOTIS STARS
 BY USING DUAL CHANNEL PHOTOMETER**

A small group of λ Boo stars attracts astrophysicists' attention owing to their controversial evolutionary status. These stars related apparently to a short-lived evolutionary phase are available for the development and control of the modern stellar atmosphere theories (Gray & Corbally, 1993). The discovery of the λ Boo stars' pulsations (Weiss et al., 1994) gives the opportunity to apply the tools of asteroseismology for their profound investigation. Observations of the variability of λ Boo stars with different equipments are widely presented in IBVS by the Vienna working group *Asteroseismology - AMS*. It should be noted, that a high quality of sky seeing and instrumentation, and long time data series are needed for such observations because the stars with relatively long periods, from 0.5 up to 4 hours, have very low amplitudes, from 0.004 mag to 0.07 mag.

During 1994-1995 we have observed 3 stars from the list of Gray & Corbally (1993) by using the dual-channel photometer (Dorokhov & Dorokhova, 1994) attached to the 0.8m Ritchey-Chretien telescope, situated in Central Asia, at the Mt. Dushak-Erekdag station of Odessa Astronomical Observatory.

HD 204041 was observed in Strömgren v-filter on two nights, 11 and 12 Oct., 1994, and **HD 38545** (C1 HD 39098, C2 HD 39019) was observed in Johnson B-filter on 20 and 22 Nov., 1995 in single channel by using 3-star mode (see Breger, 1992). Our observations confirm nonvariability of both stars within the upper limits which are higher by 0.001 mag than presented in the papers by Paunzen et al. (1996) and by Kuschnig et al. (1996).

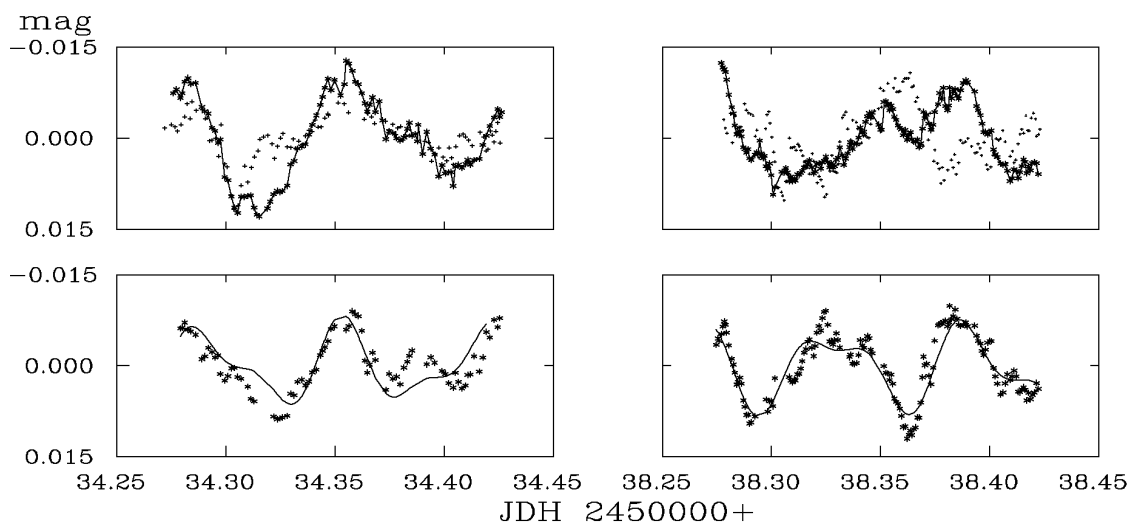


Figure 1. On the top panel: light curves for HD 221756 and comparison star HD 221903 in Johnson's B, on the bottom panel: the VAR – COM curves for two nights 12 and 16 Nov 1995. All the curves are presented as residuals to the corresponding night-means. The solid line is a least squares fit of f_1 and f_2 frequencies

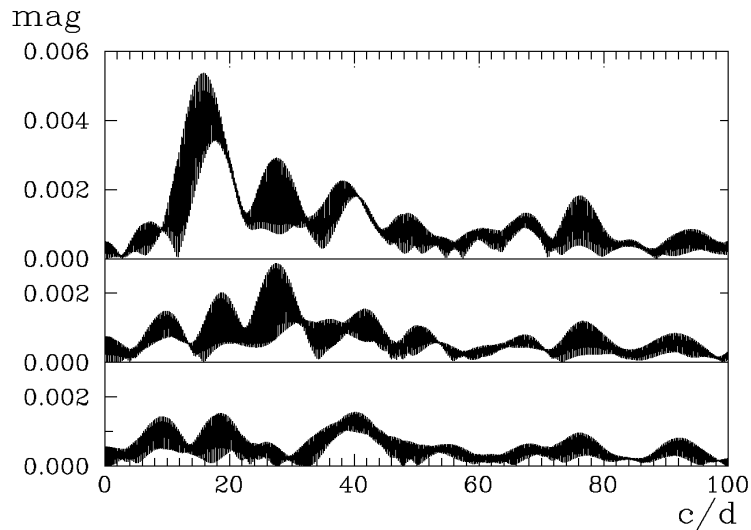


Figure 2. Fourier spectrum of both nights data. The middle panel shows the same after removal for $f_1=15.85$ c/d, the lower panel – the result of the prewhitening for $f_1=15.85$ c/d and $f_2=27.54$ c/d

HD 221756 was tested by Paunzen & Handler (1996) in August 1995. They obtained a period of 63 min and amplitude 6.6 mmag in Strömgren b. We observed HD 221756 and a comparison star HD 221903 ($m=8.3$ mag, A0) simultaneously in dual channel mode of the photometer on the nights 12/13 and 16/17 Nov 1995. The data were acquired as continuous 10 sec integrations in Johnson's B filter, interrupted by the channel reductions about one time per hour.

Then the counts of the comparison star in channel 2 were reduced to the sensitivity level of channel 1, the data were corrected for coincidence counting losses, the sky background contribution and the atmospheric extinction, and were binned to 2 min integrations by taking 12-point averages. Figure 1 shows the light curves of HD 221756 and the comparison star, and the differential data as residuals to the nightly means for each date. In order to decrease the differential data noise level, comparison star's observations were smoothed by a rectangle filter with window size=3. The solid line in Figure 1 is a least squares fit of two frequencies, which were revealed from subsequently prewhitened amplitude Fourier spectrum of common series of data (Figure 2). The packaged program PERIOD (Breger, 1990) was used for Fourier analysis. Two peaks at frequencies $f_1=15.85$ c/d ($P=1.51$ hour, $A=0.011$ mag) and $f_2=27.54$ c/d ($P=52$ min, $A=0.006$ mag) could be influenced by a 1 c/d aliasing. The result needs in further control because the variations of sky transparency may affect the such low-amplitude light curves even in the case of dual-channel photometry. Here we can only suppose that HD 221756, as well as already known HD 210111 (Paunzen et al., 1994) and 29 Cyg (Kusakin & Mkrtichian, 1996) is another example of the multiperiodicity of λ Bootis stars like that taking place in δ Scuti stars.

T.N. DOROKHOVA
 N.I. DOROKHOV
 Astronomical Observatory
 Odessa State University
 Shevchenko Park, Odessa 270014
 Ukraine

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