

COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS

Number 4191

Konkoly Observatory
Budapest
10 May 1995

HU ISSN 0374 - 0676

**CONFIRMATION OF VARIABILITY IN THE λ BOOTIS STARS
HD 142994 AND HD 142703**

For the λ Bootis star HD 142994 two nights of differential photometry were obtained in the Strömngren photometric system. The observations were done by E. Paunzen with the ESO 50 cm telescope at La Silla during the nights of 25/26 and 27/28 July 1994. An integration time of 15 seconds was chosen. HD 143181 ($m_V=7.4$, B9V) and HD 143232 ($m_V=6.8$, F0) were used as comparison stars. The second comparison star was detected as a new δ Scuti star, which will be presented in a forthcoming IBVS-note (Paunzen et al., unpublished).

The variability of HD 142994 has been investigated by Weiss et al. (1994), where a semi-amplitude of 0.03 mag in Strömngren b with a period of about 4 hours had been derived. This photometry was not differential because at that time we were mainly interested in roAp-type variability. Hence we had to rely in our analysis on a constant sky transparency. Furthermore, the data sets obtained during the three nights were rather short, on the order of 2.5 hours each.

As part of our survey of pulsation among λ Bootis stars we decided to reobserve HD 142994 in two colors with the classical technique using two comparison stars (Fig. 1). Our new observations confirm the semi-amplitude of 0.031 mag in Strömngren b and of 0.037 in Strömngren v . However, the maximum amplitude in the frequency spectrum is found at a shorter period of about 3 hours (7.9 c/d, Fig. 2). This difference may be caused by the fact that our earlier data sets have an extremely poor duty cycle as well as a short time base, which did not allow us to resolve multiperiodicity and hence may have led us to a different period. HD 142994 obviously pulsates in more than one frequency, because amplitude modulation is evident already in our rather limited data set.

The periods of pulsating λ Bootis stars usually are in the range of 0.8 to 2.1 hours. These values satisfy the PLC-relation of Stellingwerf (1979) for early A-type stars at the ZAMS. Effective temperature and gravity of HD 142994 indeed are typical for an early A-type star. But this λ Bootis star pulsates with a period which is too long for a star at the ZAMS. This evidence may indicate that HD 142994 is evolved. An extensive observing campaign is required to investigate the evolutionary status of this star.

Two additional nights of differential photometry in the Strömngren system were obtained by the same observer for the λ Bootis star HD 142703 with the ESO 50 cm telescope (23/24 and 24/25 July 1994). The integration time was 15 seconds. HD 142640 ($m_V=6.4$, F6V) and HD 143333 ($m_V=5.5$, F7V) were used as comparison stars (Fig. 3).

HD 142703 was previously observed in 1993 (Paunzen and Weiss, 1994) and found to be variable. The amplitude was much smaller (5 mmag) than in the case of HD 142994 and in addition the photometric quality of the nights was not excellent. To corroborate the variability of HD 142703, we reobserved this star in 1994.

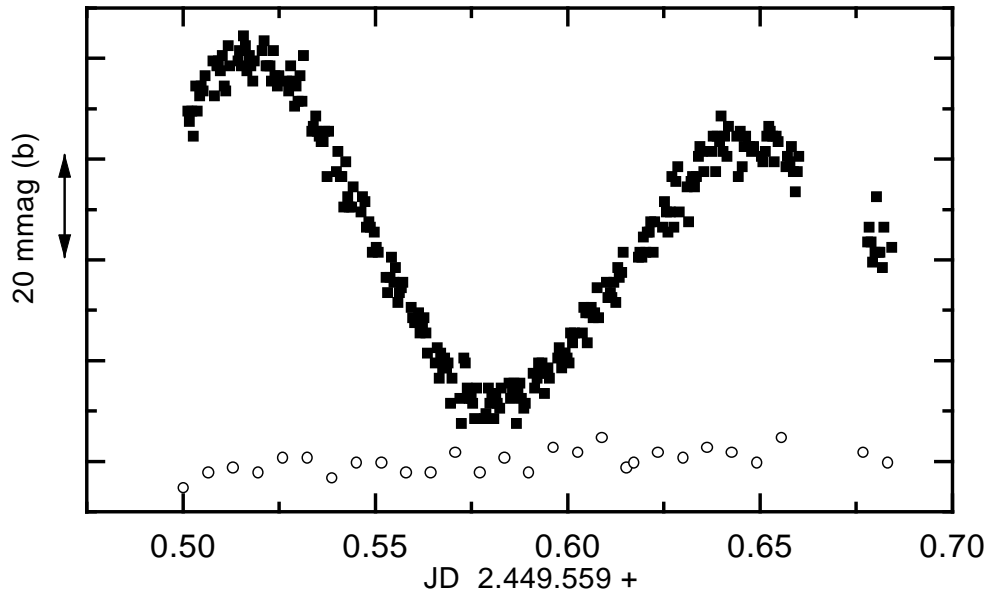


Figure 1. Light curves for Strömgren b of HD 142994 (top) and HD 143181 (bottom) for the night of 25/26 July 1994

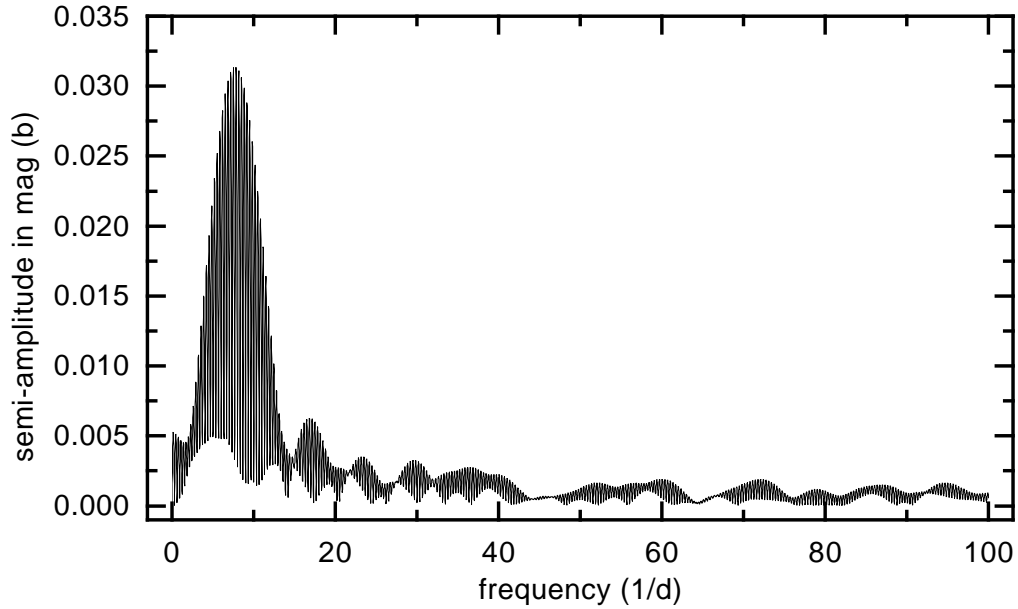


Figure 2. Amplitude spectrum of the differential data (HD 142994 – HD 143181) for both nights and for Strömgren b

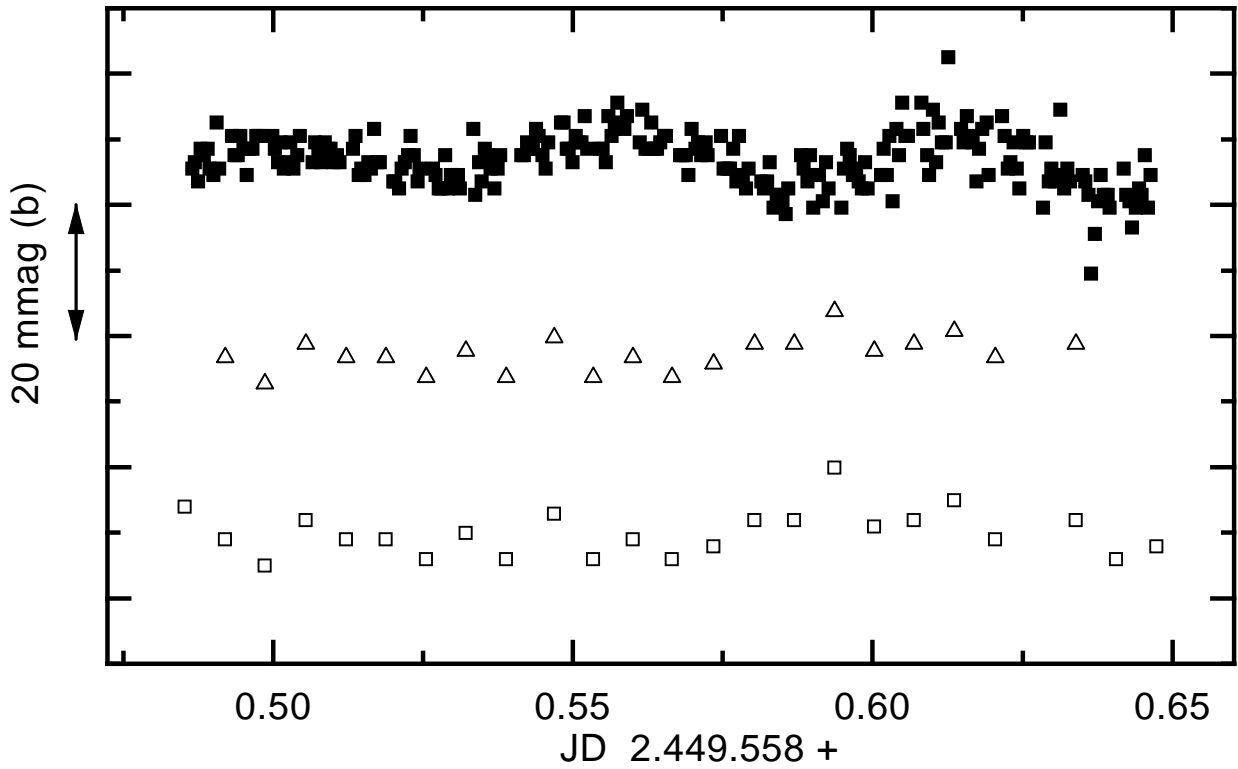


Figure 3. Light curves for Strömgren b of HD 142703 (top), HD 142640 (center) and HD 143333 (bottom) for the night of 23/24, July 1994

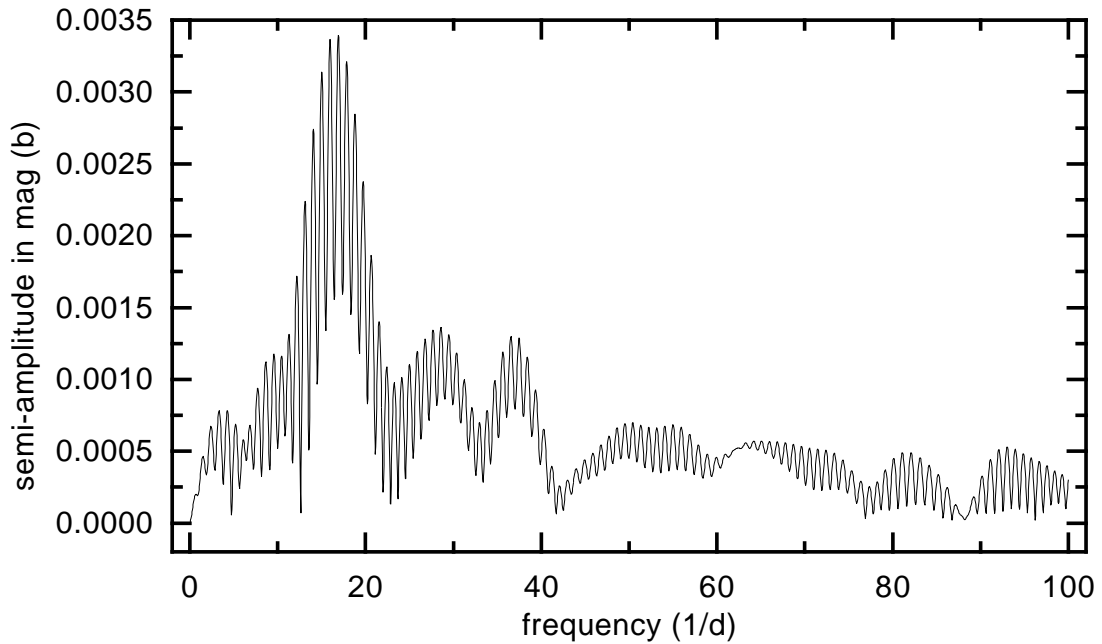


Figure 4. Amplitude spectrum of the differential data (HD 142703 – HD 142640) for both nights and for Strömgren b

Our new observations result in a frequency of about 16.5 c/d ($P=87$ minutes) for b and a semi-amplitude of slightly more than 3 mmag for b and v , which is less than what we found in 1993. The derived period happens to be about twice the period found in 1993 ($P=46$ min) which again may be caused by inadequate data sets aggravated by multiperiodicity. Presently, we can only state that there is no doubt about the photometric variability of HD 142703. A full analysis of this variable star can only be based on improved data, preferably obtained within a multi-site observing campaign.

Acknowledgement: This research was done within the working group *Asteroseismology-AMS* and was supported by the Hochschuljubiläumsstiftung der Stadt Wien and the International Office of the University of Vienna.

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