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PULSATION OF HD 83041 AND HD 221756

We present two new variable λ Bootis stars as a result of our survey to detect variability among λ Bootis stars (Paunzen, 1995). The general properties of this group are described in Weiss et al. (1994).

HD 83041 was classified as A2II/III(w) by Houk (1982). The Strömgren and Geneva colors (Gray & Olsen, 1991 and Rufener, 1988) on the other hand are typical for a MS star and very similar to HD 142994 (Hauck, 1986 and Weiss et al., 1994). Recent spectroscopic observations seem to confirm the λ Bootis character of HD 83041. The photometric observations were performed in the night of 02/03 May 1995 with the 0.6 meter Lowell telescope at CTIO (observer: E. Paunzen). An integration time of 20 seconds in Strömgren v and b was chosen. We used HD 82709 (V = 7.7, A9V) as comparison star. Figure 1 shows the light curves of both stars in Strömgren b. Pulsation of HD 83041 is evident although the data set is rather short. We estimate a period of 95 minutes and an amplitude of 7 mmag in Strömgren b (Figure 2).

HD 221756 was classified by Gray (1988) as: "The K line and the metallic-line spectrum are similar to the A1 standards, except that Mg 4481 appears weak. The hydrogen lines show very broad wings with slightly weak cores". Stürenburg (1993) derived for the elements Mg, Ti, Cr, Fe and Ba an underabundance of a factor 5 compared to the Sun. Iliev & Barzova (1995) estimated the following stellar parameters:

$$\log Age = 8.65 \qquad T_{eff} = 9000 \text{ K} \qquad \log g = 3.9$$

The observations were made with the 0.9 meter telescope at McDonald observatory (observer: G. Handler) during the nights of 06/07 and 11/12 Aug 1995. An integration time of 50 seconds in Strömgren v and b was chosen. We used HD 220575 (V = 6.7, Hg-Mn star) and HD 223636 (V = 6.7, F8) as comparison stars. Both proved to be constant.

HD 221756 was suspected to be variable by Rufener & Bartholdi (1982). They gave an upper limit for constancy of 24 mmag in V. Figure 3 shows the light curves of all stars for the second night in Strömgren b. There are still some sky variations at the end of the night. The intrinsic light variations are very small, but there is no doubt about variability of HD 221756. We infer a period of 63 minutes and an amplitude of 6.6 mmag in Strömgen b. Figure 4 shows the amplitude spectra for HD 221756, HD 220575 and the differential data.

The periods determined for HD 83041 and HD 221756 are consistent with expected periods for A type stars at the MS (Stellingwerf, 1979). An age determination with the tools of asteroseismology would be very helpful to establish the evolutionary stage of λ Bootis stars.

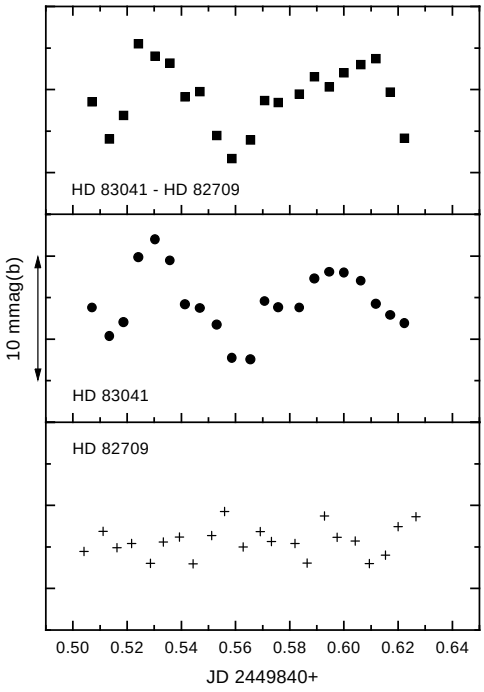

Figure 1. Light curves for HD 83041, HD 82709 and the differential data in Strömgren b

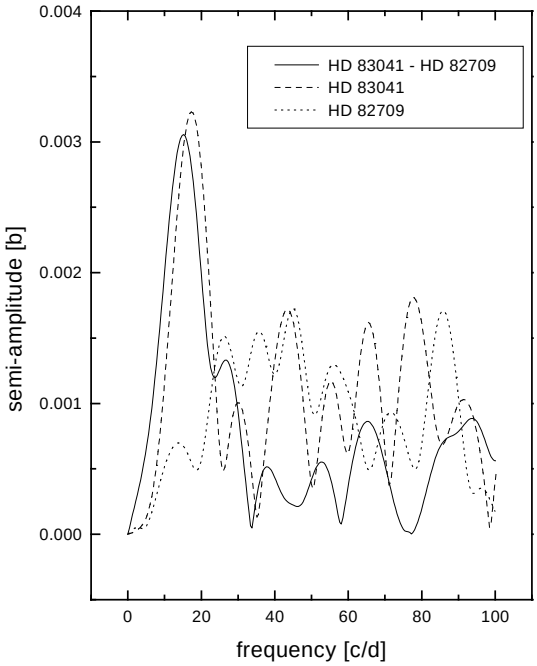

Figure 2. Amplitude spectrum for HD 83041, HD 82709 and the differential data as shown in Figure 1

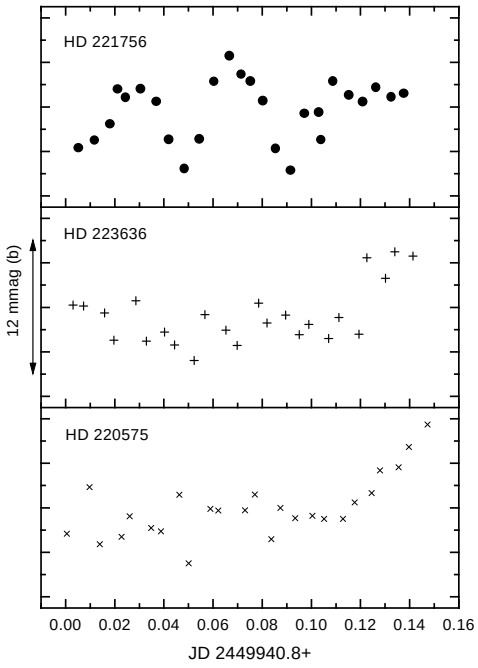

Figure 3. Light curves for HD 221756, HD 220575 and HD 223636 for the second night in Strömgren *b*

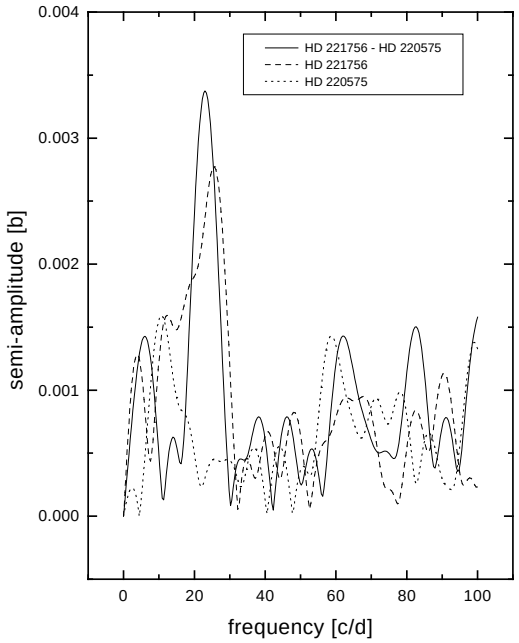

Figure 4. Amplitude spectrum for HD 221756, HD 220575 and the differential data as shown in Figure 3

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