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Pulsation among λ Bootis Stars

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Abstract. We report on the pulsation characteristics of λ Bootis stars as a result of a survey initiated to increase the number of known λ Bootis stars and to improve the definition of this group of peculiar stars.

No conclusive theory yet can explain the origin and evolutionary status of λ Boo stars, which are metal poor (except of C, N, O and S) Pop I stars (Paunzen 1997; Weiss & Paunzen 1998). Pulsation allows the investigation of the internal stellar structure and we therefore initiated an extensive survey for variability (Paunzen & Gray 1997; Paunzen et al. 1997, 1998). With 22 pulsating and 30 "constant" stars, we derive a ratio of at least 50% for variable to nonvariable members *inside* the classical instability strip. (Fig. 1).

The location of all known pulsating program stars in a $\log \overline{\rho}/\overline{\rho}_{\odot}$ vs. $\log P$ diagram is consistent with those of solar abundance δ Scuti stars. This supports the hypothesis that the λ Boo abundance peculiarities are restricted to the stellar surface. The modes possibly excited range from the fundamental mode up to high overtones. With respect to pulsation, we do not find a difference between the groups of λ Boo and δ Scuti stars. However, one of the main evolutionary theories requires λ Boo stars to be pre-main sequence objects. We also investigated, therefore, the difference in the pulsation frequency spectra of pre-main sequence and post-ZAMS stars with otherwise the same $T_{\rm eff}$ and $\log g$.

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References

Paunzen, E. 1997, A&A, 326, L29

Paunzen, E. & Gray, R. O. 1997, A&AS, 126, 407

Paunzen, E., Kuschnig, R., Handler, G., Gelbmann, M., & Weiss, W. W. 1997, A&AS, 124, 23

Paunzen, E., Weiss, W. W., Kuschnig, R., Handler, G., Strassmeier, K. G., et al. 1998, A&A, 335, 533

Weiss, W. W. & Paunzen, E. 1998, in Highlights of Astronomy, Vol. 11B, ed. J. Andersen (Dordrecht: Kluwer), 682

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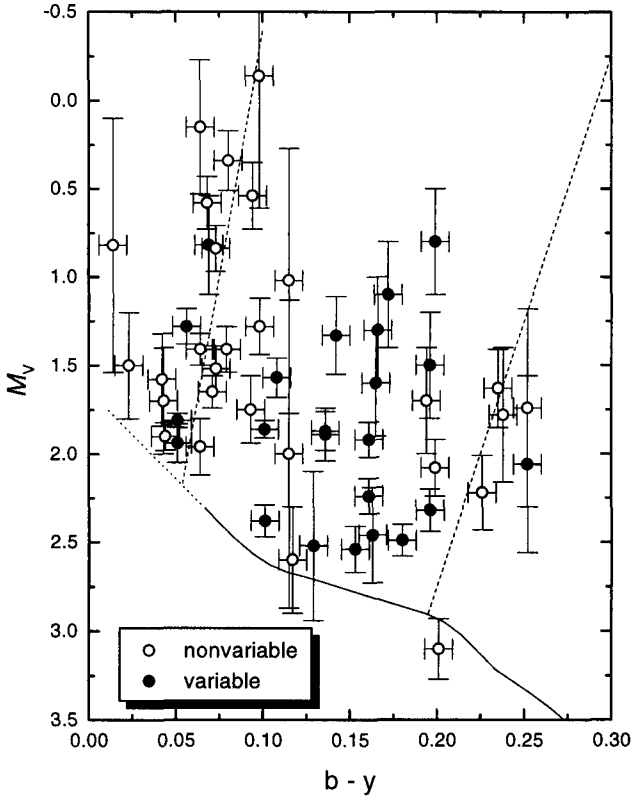

Figure 1. Full symbols: pulsating λ Bootis stars, open symbols: 'constant' λ Bootis stars. Dotted line: observational instability strip for δ Scuti stars.

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