

# A SEARCH FOR $\beta$ CEPHEI PULSATION IN EXTREME COMPOSITION MODELS

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**Abstract.** Following Davey (1973), we have considered the linear radial pulsational stability of stellar models in the region of the HR diagram populated by  $\beta$  Cephei stars. Instead of one composition, however, we have considered many compositions, some of them rather extreme. No consideration of composition changes for temperatures above a few-million degrees was given, and therefore the stellar structure and its pulsational stability may not be evaluated very accurately. Modulation of nuclear reactions was also neglected. In no case was radial pulsational instability found.

## Reference

Davey, W. R.: 1973, *Astrophys. J.* **179**, 235.

## DISCUSSION

*Iben:* It seems to me that the key to the solution of this thing is that the observations put the stars right in the overall contraction phase rather than at the end of the main sequence phase and during that overall contraction phase there's a huge convective shell. The star is contracting like mad and flinging out all sorts of flux that makes a real mess; there is a jagged composition profile. Hasn't anybody bothered to examine the pulsation of the complete star in that particular phase?

*Aizenman:* Davey carried out a linear non-adiabatic analysis in all phases of evolution of the star - the core burning stage, overall gravitational contraction phase, and thick shell phase. He found that the star was stable. I have carried out similar computations for stars of  $10 M_{\odot}$  and  $15 M_{\odot}$  during the same evolutionary stages and I obtain results similar to those of Davey.

*Iben:* But you didn't have time dependent convection, this thing will be jostling around all over the place. In fact it could be that fluctuation of convective motions act as the continual perturbation that drives the pulsation.