HR 7308 (V473 Lyr): THE STRANGEST CEPHEID

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The variability of HR 7308 was discovered by Breger (1969), and Percy et al (1979) found this star to be a new cepheid. The correct period and the variation of amplitude were first recognized by Burki and Mayor (1980 a,b). Further studies of this star were published by Percy and Evans (1980), van Genderen (1981), Breger (1981), Fernie (1981), Burki et al (1982) and Henriksson (1983). Here the up-to-date radial velocity observations made with the spectrophotometer CORAVEL are presented.

Figures 1 and 2 clearly demonstrate the unique characteristic of HR 7308: the amplitude varies by over a factor of 15 in a time of about 1200 d. Note that the minimum of amplitude observed during July-September 1982 was about twice as small as the previous one. The essential results obtained for this star in Geneva are the following:

- The period is the shortest known for a classical cepheid: 1.49101 d.
- The amplitude is strongly variable.
- The mean radius is $34 \pm 5\ R_\odot$ (Wesselink analysis). The constancy of the period implies the constancy of the mean radius.
- The pulsation occurs in a radial mode, probably in the 2nd overtone. The variation of amplitude is not due to the beating of two modes.
- Apparently, HR 7308 is not a member of a binary system.

Concerning the physical interpretation of the variation of amplitude, it was suggested (Burki and Mayor, 1980 b) that HR 7308 could be a star which presently becomes a cepheid or leaves the cepheid instability strip. Indeed, what happens to a supergiant star when arriving into or getting out of the cepheid instability strip? Are there transition periods during which pulsation is successively initiated and stopped?

A. Maeder and A. Renzini (eds.), Observational Tests of the Stellar Evolution Theory, 453–455.

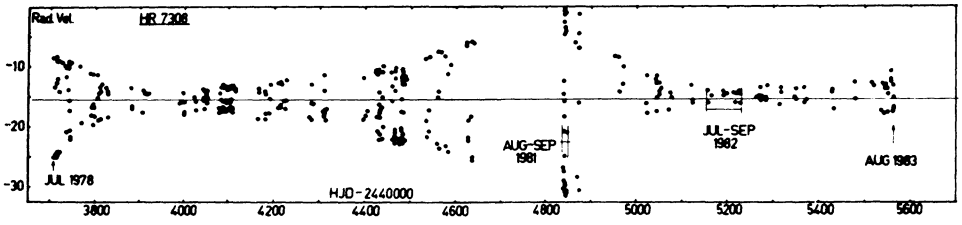

Figure 1

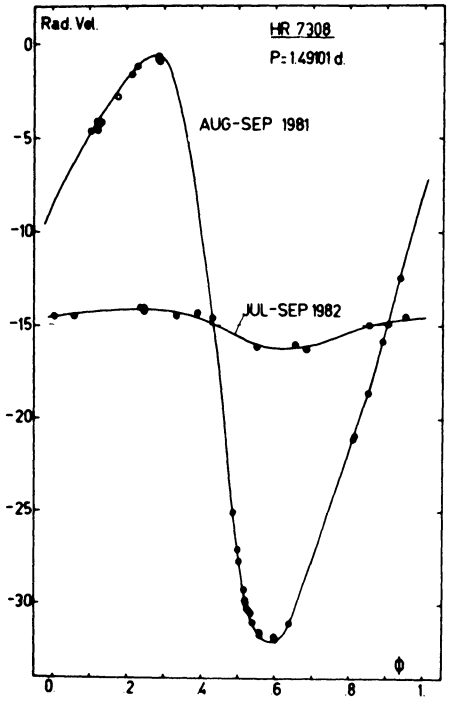

Figure 2

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DISCUSSION

Cox: When one gets strange behaviour such as a second overtone, as in δ Sct stars, one suspects non-radial modes. Are you sure the pulsation of HR 7308 is radial?

Burki: The differences in phase between light, colour and velocity curves strongly indicate a radial pulsation. Moreover, no indication of a second mode of pulsation has been found.

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