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Structural Properties of s-Cepheid Velocity Curves: Constraining the Location of the $\omega_4 = 2\omega_1$ Resonance

F. Kienzle, F. Pont

Geneva Obs., Ch. des Maillettes 51, CH-1290 Sauverny, Switzerland

P. Moskalik

Copernicus Astron. Center, ul. Bartycka 18, 00-716 Warsaw, Poland

D. Bersier

Mt. Stromlo Obs., Weston Creek, ACT 2611 Canberra, Australia

Abstract. The light curves of the first overtone Pop I Cepheids (s-Cepheids) show a discontinuity in their ϕ_{21} vs. P diagram, near $P = 3.2$ d. This feature, commonly attributed to the 2:1 resonance between the first and the fourth overtones ($\omega_4 \approx 2\omega_1$), is not reproduced by the hydrodynamical models (Antonello & Aikawa 1995). With the goal of reexamining the resonance hypothesis, we have obtained new CORAVEL and CORALIE radial velocity curves for 17 overtone Cepheids. Together with 10 objects from Krzyt et al. (2000), the combined sample covers the whole range of overtone Cepheid periods. The velocity Fourier parameters display a strong characteristic resonant behavior. In striking contrast to photometric ones, they vary smoothly with the pulsation period and show no jump at 3.2 d. The existing radiative hydrodynamical models match very well the velocity parameters. The center of the $\omega_4 = 2\omega_1$ resonance is estimated to occur at $P_r = 4.58 \pm 0.04$ d, i.e. at a period considerably longer than previously assumed (3.2 d). Five new s-Cepheids, with periods above 5 d, have been identified from the radial velocity curves morphology: V419 Cen, V659 Cen, MY Pup, GH Car and V440 Per. The data and the discussion can be found in Kienzle et al. (1999). Preprints and the data are available at: `http://obswww.unige.ch/~kienzle/`.

References

Antonello, E. & Aikawa, T. 1995, A&A, 302, 105

Kienzle, F., Moskalik, P., Bersier, D., & Pont, F. 1999, A&A, 341, 818

Krzyt, T., Moskalik, P., Gorynya, N., & Samus, N. 2000, in preparation

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