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Binary Slowly Pulsating B Stars[1]

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Abstract. The satellite Hipparcos led to the discovery of 267 new variable B-type stars. Some 100 of them were classified as candidate slowly pulsating B stars (SPBs) by Waelkens et al. (1998). Twelve of the brightest southern candidate SPBs were selected together with 5 confirmed SPBs to start a long-term follow-up study (Aerts et al. 1999). From 1996 up to 1998, numerous high-resolution, high signal-to-noise spectra were taken with the CAT/CES combination at La Silla in order to study the line profile variations of the Si II-doublet centered at 4130 Å.

We report our finding that at least 8 of 17 targets turn out to be spectroscopic binaries. We have found a large variety in the obtained orbits. HD 123515 and HD 140873 were known as single-lined spectroscopic binaries, but both turn out to be double-lined. All the others binaries are single-lined. For HD 140873 and HD 177863, we find orbits with large eccentricities of respectively $e = 0.731 \pm 0.006$ and $e = 0.603 \pm 0.007$. HD 69144, HD 92287 and HD 169978 are three binaries with circular orbits and very short orbital periods (a few days). Since their photometric measurements are dominated by (close to) sinusoidal variations with twice the orbital frequency, these stars are ellipsoidal variables. Their orbital periods are of the same order of magnitude as the expected periods of pulsation.

After removing the orbit, we find the same first frequency in the residual radial velocities as in the gathered photometric measurements for 6 stars. For HD 69144 and HD 169978 we did not yet succeed in deriving an intrinsic period, although HD 69144 has prominent line profile variations. For HD 169978, we have serious doubts about the SPB nature.

For a detailed description, we refer to De Cat et al. (1999).

References

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Waelkens, C., Aerts, C., Kestens, E., et al. 1998, A&A, 330, 215

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