

# PERIOD VARIATIONS IN THE BETA CEP STAR $\beta$ CRU

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$\beta$  Cru (HR 4853) is a multiperiodic  $\beta$  Cep star. The main period has been found constant between 1958 and 1973 by Cuypers (1982). In order to extend the basis of the ephemeris, we computed two values of radial velocity maxima from individual measurements published by Campbell & Moore (1928) and Sahade & Albarracin (1952). In lack of simultaneous spectroscopic and photometric observations, we used an arbitrary value equal to 0.25 period for the phase lag.

The ephemeris (assuming a constant main period) :

$M1 = 2422000.0177 + 0.19118464 E$  takes roughly into account all the spectroscopic and photometric observations from 1921 to 1973.

The figure shows the corresponding O–C diagram for the data published by Cuypers. Most of the dispersion is due to the multiperiodicity of  $\beta$  Cru, nevertheless a clear oscillation is present around the mean value. The corresponding period seems to be around 7 or around 14 years with an amplitude of 0.02 day.

At the other hand  $\beta$  Cru was discovered as an interferometric binary (Popper 1968), and Heintz (1957) found gamma axis variations with a period of 7 or 8 years and a range of 15 km/s.

Assuming that  $\beta$  Cru is a member of a binary system with an approximately circular orbit, and using the values given by Heintz, the movement of the variable star around the center of gravity of the system would lead to a sinusoidal oscillation in the O–C diagram with an amplitude of 0.02 day.

Although more observations are necessary to precise the value of the orbital period, we can conclude that the observed oscillation in the O–C diagram is due to the binarity and that the intrinsic pulsational period of the star remained constant over half a century.

## References

- Campbell, W.W., Moore: 1928, *Publ. Lick Obs.* **16**, 188  
Cuypers, J.: 1987, *Astronomy and Astrophysics* **127**, 186  
Heintz, W.D.: 1957, *Observatory* **77**, 200  
Pagel, B.E.J.: 1956, *Monthly Notices of the RAS* **116**, 10  
Popper, D.M.: 1968, *Astrophysical Journal* **151**, 51

Sahade, J., Albarracin, J.: 1952, *Astrophysical Journal* 116, 654

Shobbrook, R.R.: 1979, *Monthly Notices of the RAS* 189, 571

Van Hoof, A. : 1962, *Zeitschrift fuer Astrophysik* 54, 244

Watson, R.D. : 1971, *Astrophysical Journal* 170, 345

DATE	Nights	O - C	References
22830.1400	-	-0.0014	Campbell & Moore (1928)
32200.1050	-	0.0044	Sahade & Albarracin (1952)
35225.5960	7	-0.0015	Pagel (1956)
36328.5328	3	-0.0089	Van Hoof (1962)
36651.4528	14	0.0002	Van Hoof (1962)
37028.2878	6	0.0103	Van Hoof (1962)
37414.2849	6	0.0056	Van Hoof (1962)
37738.5215	7	-0.0069	Van Hoof (1962)
40321.0480	3	-0.0026	Watson (1971)
41780.9379	5	0.0014	Shobbrook (1979)

O-C diagram of  $\beta$  Cru

