

# PERIOD VARIATIONS IN THE BETA CEP STAR $\alpha$ LUP

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$\alpha$  Lup (HR 5469) is a multiperiodic beta Cep star. According to Shobbrook (1979) and Lampers & Goossens (1982) the main period ( $P=0.25985$  day) corresponding to the radial mode is constant. The amplitude of the secondary period, attributed to a non radial mode, is so small that it does not affect the determination of maximum dates.

In order to determine the phase lag between light and radial velocity, we compared the photometric observations from Van Hoof, analysed by Lampers & Goossens (1982) with the radial velocity measurements from Rodgers & Bell (1962). We obtained a phase lag of 0.0579 day (0.22 period).

The O–C diagram shows clearly a period increase of 0.28 sec. around the year 1974.

The observations can be fitted by two ephemeris:

$$1955 - 1974 : M1 = 2435000.0082 + 0.25984595 E$$

$$1974 - 1982 : M1 = 2442000.2593 + 0.25984916 E$$

In some beta Cep stars, period changes have been explained by a binarity effect. Although  $\alpha$  Lup is not considered as a binary, some variations of the gamma axis exist. In 1955 the value of the  $\gamma$ -axis measured on 80 lines by Pagel (1956) was 4 km/s while the 9 lines measured by Mathias et al (1993) in 1989 ranged from 5.3 to 9.5 km/s with a mean value of 7.25 km/s. Such a 3.25 km/s difference would involve a 0.25 sec. increase of the pulsational period which is consistent with the observed variation.

$\alpha$  Lup is only 200 parsecs away, so it should be interesting to check by interferometry the existence of a companion. If the binary hypothesis is the good one, the orbital period should be greater than 50 years with large eccentricity.

## References

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Hutchings J.B., Hill G. : 1980, *Astronomy and Astrophysics, Supplement Series* **42**, 135  
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Pagel, B.E.J. : 1956, *Monthly Notices of the RAS* **116**, 10  
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DATE	Nights	O - C	References
35297.2722	14	0.0002	Pagel (1956)
37511.9398	1	0.0008	Rodgers & Bell (1962)
38931.2155	3	-0.0021	Breger (1967)
41713.1290	1	0.0007	Lesh (1978)
42882.4400	2	0.0049	Hutchings & Hill (1980)
43602.2294	13	0.0210	Shobbrook (1979)
47224.7865	12	0.0657	Heyndericks (1992)

O-C diagram of  $\alpha$  Lup