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CORRELATION OF PERIODIC VARIABILITY  
 WITH ROTATIONAL PERIODS OF AP STARS  
 (Preliminary communication)

For 31 of the 32 Ap stars with known periods (variability of magnetic field, spectrum and magnitude) (1), (2), (3), (6), the rotational velocity  $v \cdot \sin i$  was obtained from Boyarchuk's and Kopylov's catalogue (4) or from line widths in Babcock's catalogue (5), calibrated by stars of the catalogue (4).

If the variability is caused by rotation (e.g. oblique rotator model), the  $v \cdot \sin i$  for shorter periods should be larger than for longer periods. The  $v \cdot \sin i$  cannot become larger than the value corresponding to an inclination of the axis of rotation  $i = 90^\circ$ .

The following rough estimate shows, that the distribution of inclinations of the axis of rotation points to random distribution.

Table 1

	Number of stars	From random distribution
$\sin i \geq \frac{2}{3}$	20	22.1
$\frac{2}{3} > \sin i \geq \frac{1}{3}$	7	6.6
$\frac{1}{3} > \sin i$	4	2.2

There is a good agreement qualitatively as well as quantitatively with the results expected from the above-mentioned model.

**Conclusions:**

- 1) The variability of periodic Ap variables is caused by rotation.
- 2) Ap stars are slower rotators than normal B and A stars.
- 3) The maximal radius of Ap stars is about  $3 R_{\odot}$ . This is in agreement with the expected value.

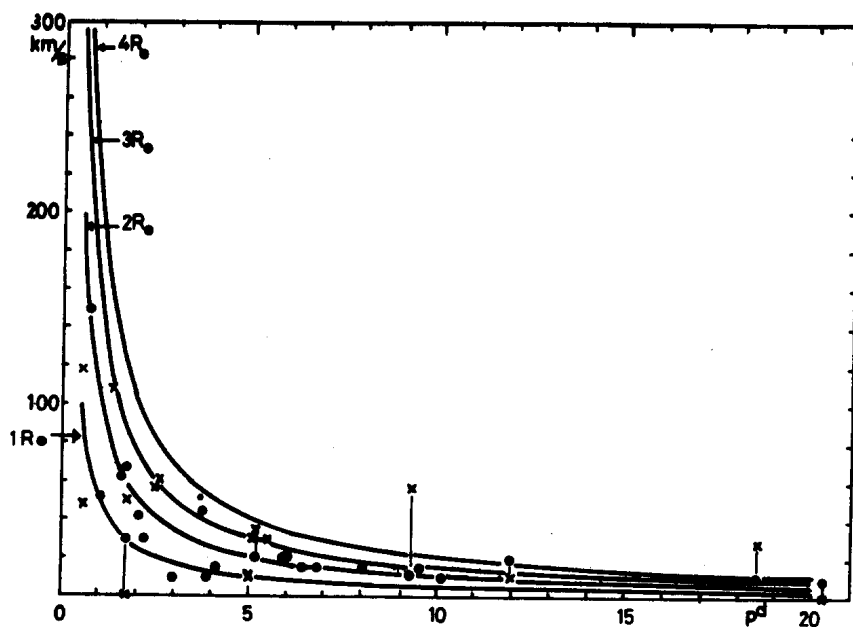


Fig.1  $v \cdot \sin i$  versus period of variability.

x -  $v \cdot \sin i$  from /4/, . - from line widths.

The curves show the rotational velocities for rotation periods of stars with radii of 1,2,3 and  $4R_{\odot}$ .

References:

- 1) Kam-Ching Leung:  $H_{\gamma}$  Intensities of Ap-Stars with known Periods; The Magnetic and Related Stars, p.449, ed. by Robert C.Cameron: Mono Book Corporation, Baltimore, 1967
- 2) Observatory Reports, Lick Obs.: AJ 72, Nr.9, 1967
- 3) Wehlau: PASP 74, 286, (1962)
- 4) Boyarchuk and Kopylow: Isw. Krimskoi Astroph. Obs. 31, 44, 1967
- 5) Babcock: ApJ Suppl. 3, 141, (1958)
- 6) Rakos: Bull.Lowell Obs. 6, No.121, 91, (1963).

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