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THE PRINCIPAL FREQUENCY OF THE RAPIDLY OSCILLATING Ap STAR α Cir

We have obtained 47 hours of high speed photometric observations of the rapidly oscillating Ap star α Cir (Kurtz and Cropper 1981) with the 0.5-m, 0.75-m and 1.0-m telescopes of the South African Astronomical Observatory. A frequency analysis of these observations indicates that most of the light variability in α Cir can be described by a single frequency $f = 8.79130 \pm 0.00012$ hour^{-1} ($P = 6.82493 \pm 0.00009$ minutes) with a semi-amplitude of 1.9 m mag. Figure 1 shows the fit of that frequency to the light curve obtained on the night of 1981 June 08/09.

It is also clear that the amplitude of the principal frequency in α Cir is variable, but we have insufficient data to derive the secondary frequencies. In terms of the oblique pulsator model (Kurtz 1981) it should be possible to derive the rotation period of α Cir and place constraints on i, the inclination of the rotation axis to the line of sight, and β the inclination of the magnetic axis to the rotation axis, once the secondary frequencies and their amplitudes are known.

D.W KURTZ
S. ALLEN
M.S. CROPPER
Department of Astronomy
University of Cape Town
South Africa

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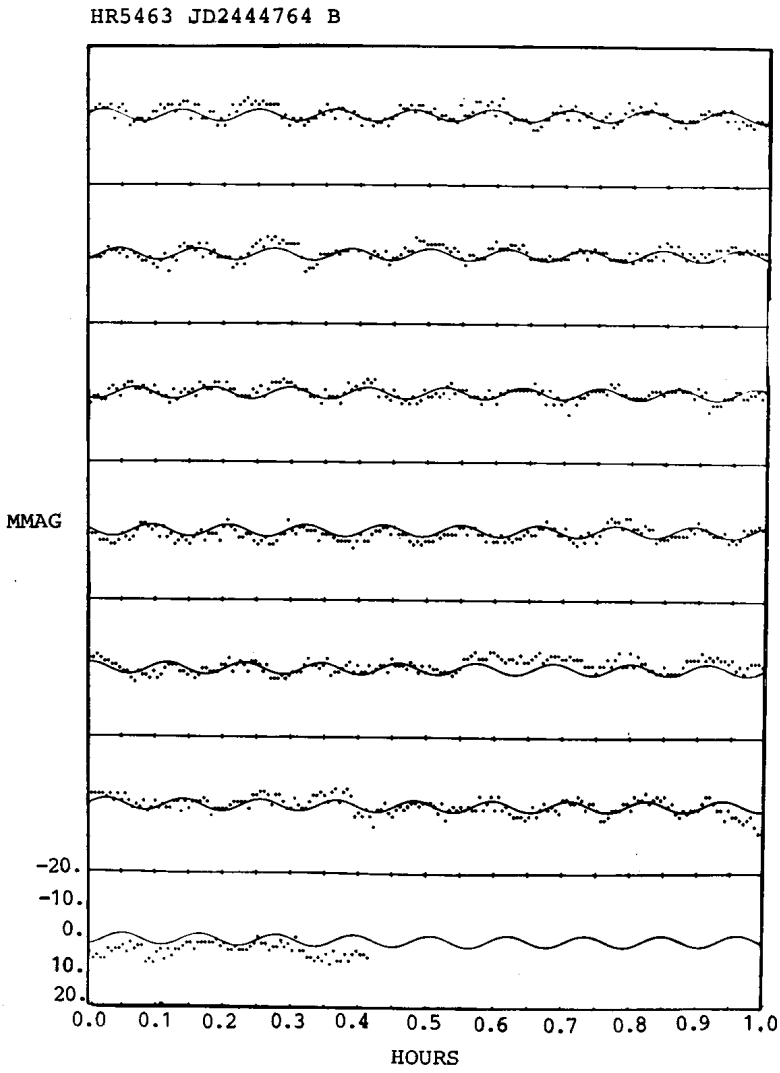

Figure 1: The fit of the principal frequency to the light curve for the night of 1981 June 08/09. The light curve should be read like lines of print with the right edge of each panel connecting directly to the left edge of the panel beneath. Each panel is 1 hour long and 0.04 mag high. The data points represent 20-s integrations. In comparing the solid line fit to the data points, one should compare only the amplitude and phase. Small vertical shifts of sections of the light curve (as in the bottom panel) are due to sky transparency variations and should be ignored.