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A FURTHER SEARCH FOR THE  $\delta$ -Sct-LIKE VARIABILITY OF THE Ap STAR HD 10088

The Ap star HD 10088 (SAO 74848, sp=A0p,  $m_v=7.9$ ) was reported earlier by Weiss (1983) to show  $\delta$  Sct-like variability with a period of about  $1^h29^m$  and an amplitude of about  $0.^m03$  in Strömgen v.

A search by Kreidl (1984) failed to detect any such variability on three nights separated by many weeks. To see if the reported  $1^h29^m$  period was still absent, an effort was undertaken to obtain additional photometry.

Lowell Observatory's 1.1-m telescope, equipped with a dual-channel photometer utilizing cooled S-11 tubes and B and V filters, was employed. Alternating sets of three 10-second integrations were obtained on HD 10088 and the comparison star, HD 9985 (SAO 74837,  $m_v=8.0$ ). The observations are summarized in Table I, and the differential data are plotted in Figure 1. The differential data were obtained by subtracting from the observed HD 10088 magnitudes linearly interpolated HD 9985 data.

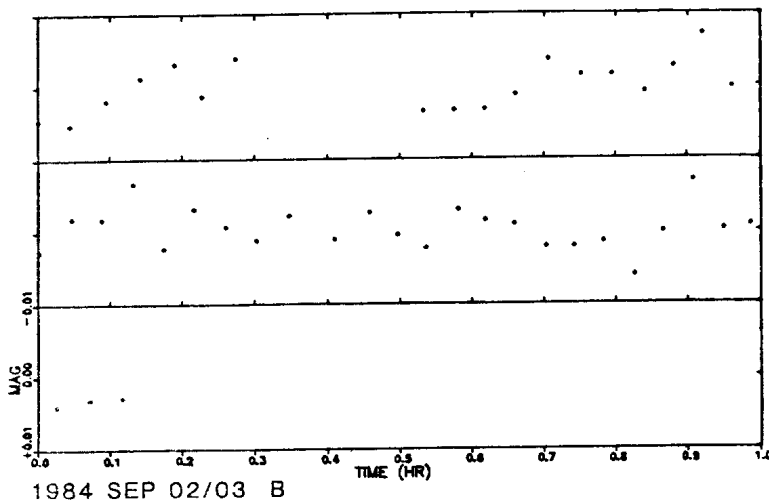


Figure 1. The differential data (HD 10088 - HD 9985), normalized to  $\Delta m=0.0$ . Each panel is one hour wide; the time series progresses left-to-right and top-down. The height of each vertical division is  $0.^m01$ . The gap in the Sep 02/03 B data was due to a temporary problem with a signal cable.

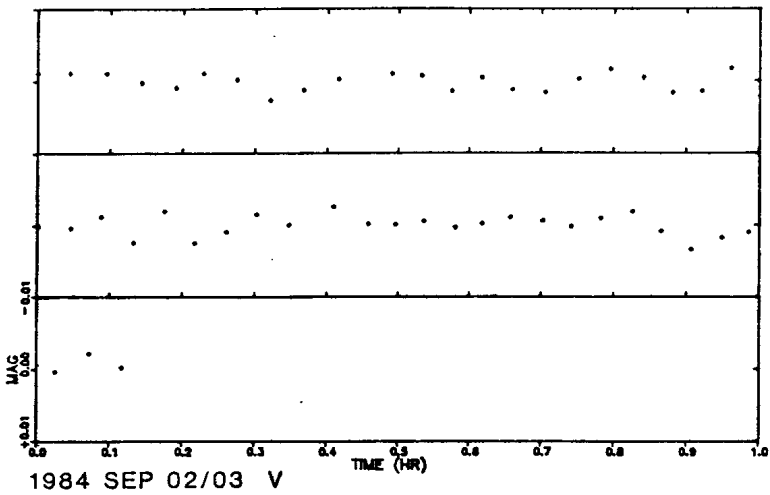
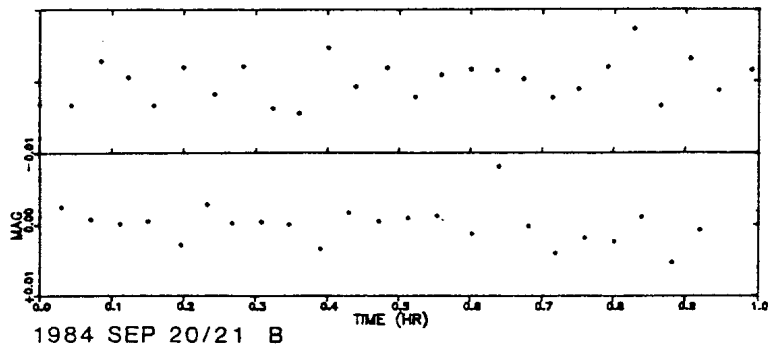
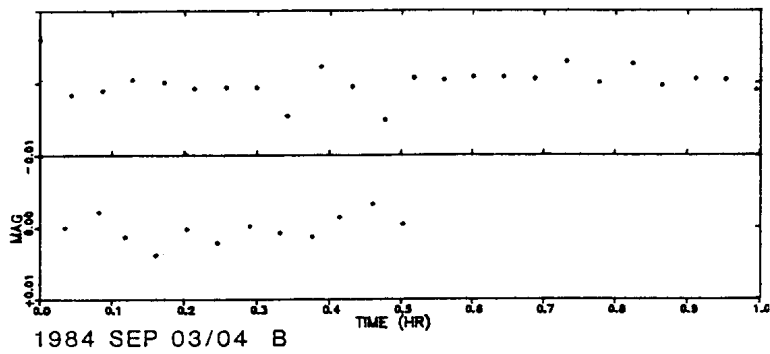


Figure 1 (cont.)

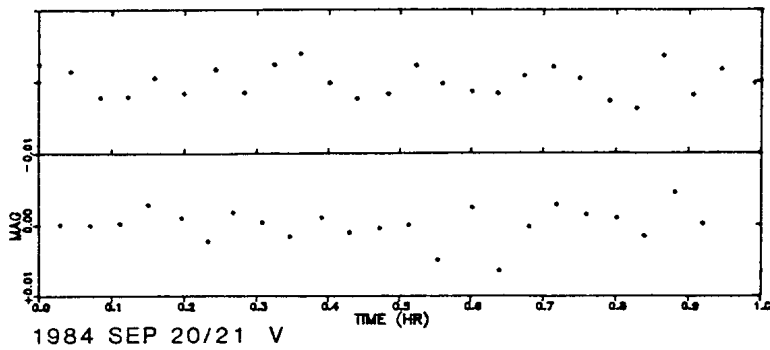
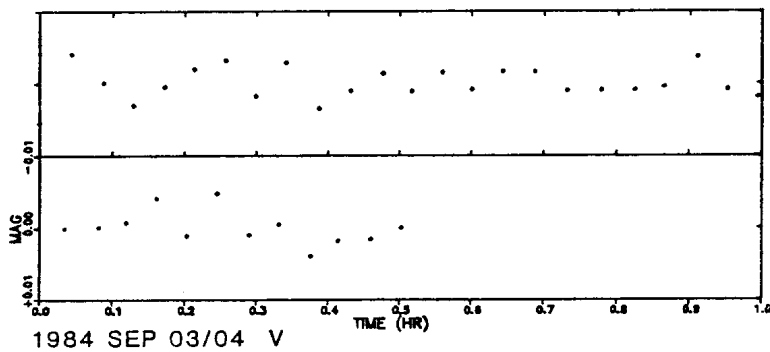


Figure 1 (cont.)

Table I. Journal of observations of HD 10088 (V) and HD 9985 (C).

Date 1984	t (hours)	$\sigma_B$	$\sigma_V$	HJD (at start) 2,445,900+	$\Delta m(V-C)$ (at start)	
					B	V
Sep 02/03	2.12	0. <sup>m</sup> 0031	0. <sup>m</sup> 0014	46.9110	-0.151	-0.072
Sep 03/04	1.50	0. 0023	0. 0021	47.9237	-0.151	-0.073
Sep 20/21	1.93	0. 0028	0. 0022	64.9311	-0.164	-0.072

Again, no evidence is present for low-harmonic pulsation. Combining the data presented in Kreidl (1984) with these, we obtain a total of ~13.5 hours of differential photometry, mainly in two simultaneous channels, on six nights. The chance that a beat phenomenon is responsible for the absence of  $\delta$  Sct-like pulsation is, therefore, very small. Although the possibility still cannot be ruled out that HD 10088 may pulsate rarely, the present evidence indicates the lack of such low-harmonic pulsation over long periods of time.

If HD 10088 (listed as A0p in the SAO catalog) and the hotter (viz. earlier than -A5) CP2 stars only show irregular pulsational activity, it speaks against low-harmonic pulsation as being the driving mechanism. Such hot stars should not even lie in the instability strip. Although over a dozen Ap stars have been claimed to show  $\delta$  Sct-like variability, most have also failed to show such  $\delta$  Sct-like variability in one or two sets of observations. The only Ap stars in which low-harmonic pulsation seems to be consistently present are HD 3326 (Kurtz 1982), HD 4849 (Weiss 1979, Kurtz 1982) and HD 185139 (Kurtz 1982), and these are all cooler. They have not, however, been monitored extensively.

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