

HD 24975 : A NEW DELTA SCUTI STAR ?
(OR A MILD Ap STAR WITH SHORT PHOTOMETRIC VARIATIONS ?)

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INTRODUCTION

Looking in the literature for short period variations of Ap stars, we found the puzzling case of HD 24975. Used as a comparison star by Weiss (1978), it had been found then to present variations with a peak-to-peak amplitude of 0.01 in U, B and V with a period of about 45mn, but with no clear correlation between the three passbands.

HD 24975 has the same spectral type A2 as 21 Com which seems to present photometric variations with $P \approx 31\text{mn}$ and $\Delta V < 0,02\text{m}$ (Percy, 1973, 1975). Both stars are near the blue edge of the δ Scuti instability strip in the HR diagram. The lack of photometric data, however, prevented the precise location of HD 24975 from being found on the HR diagram.

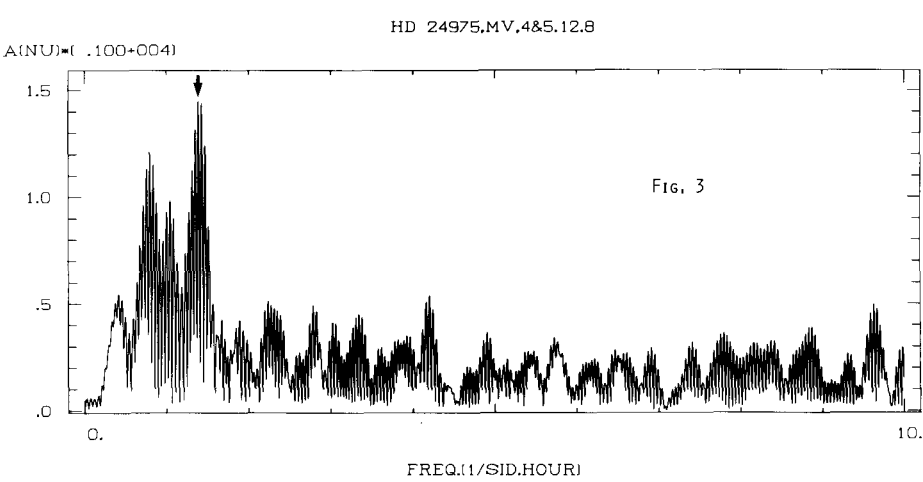
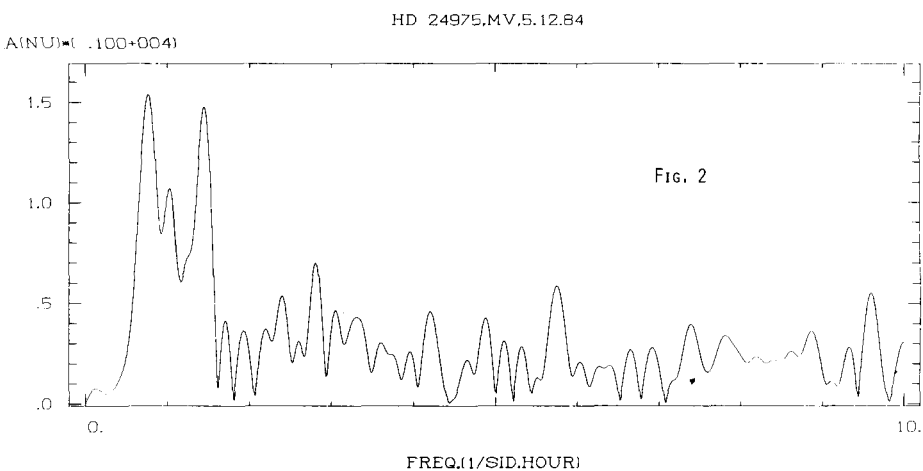
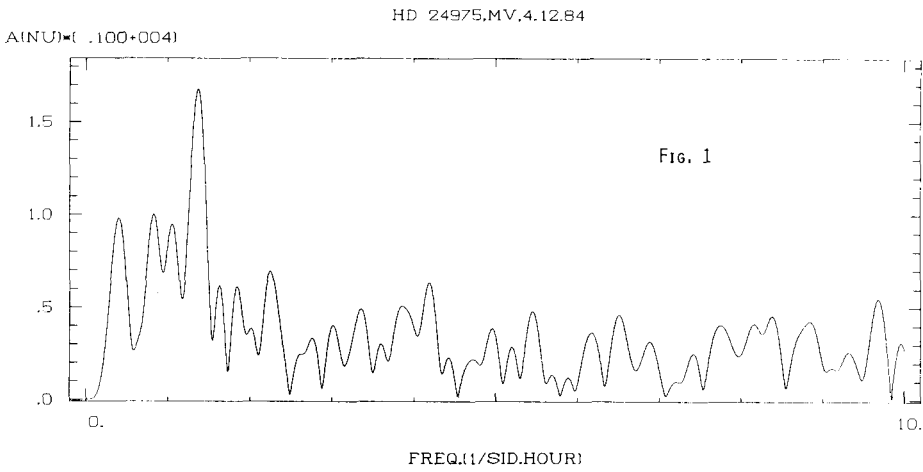
OBSERVATIONS

We decided to observe this star in the Geneva photometric system in order to confirm its variability and have a better idea of its temperature and luminosity.

It has been monitored by one of us (MB) during two consecutive nights, on the 4-5th and 5-6th December 1984 at the 70cm Swiss telescope at La Silla. 72 measurements have been obtained each

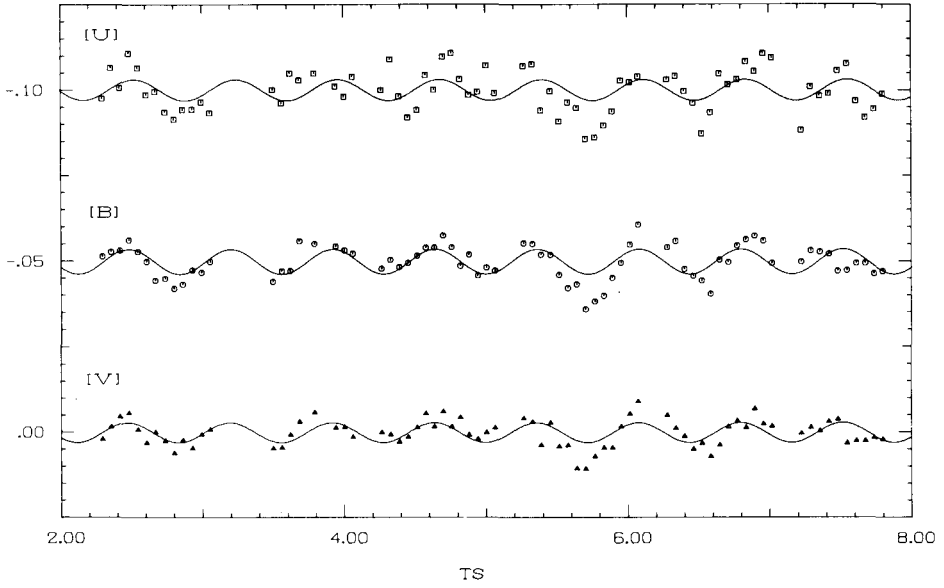
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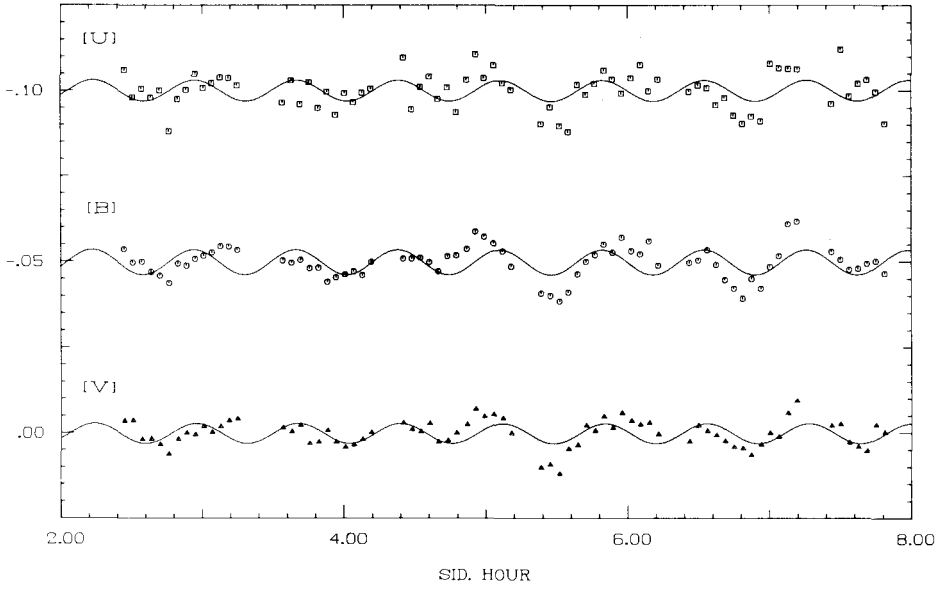
HD 24975, 4-5.12.84

FIG. 4



HD 24975, 5-6.12.84

FIG. 5



night. Standard stars have been observed at the same airmass about each hour, totalising 14 measures each night.

RESULTS

Discrete Fourier transform analysis (Deeming, 1975) performed with preliminary [U], [B] and [V] magnitudes in the normal system shows a significant peak at about 1.4h^{-1} on each night and in each colour. On the second night another peak appears near 0.8h^{-1} , whose meaning is not yet clear. The periodograms of the [V] magnitude are shown for each night in fig.1 and 2. Analysis of both nights together (fig.3) yields two or three possible frequencies near 1.4, the most probable one being $1.394 \pm 0.002\text{h}^{-1}$. The most probable period is thus

$$P = 0.02989 \pm .00004 \text{ d.} = 0.717 \pm .001 \text{ h} = 43.05 \pm .06 \text{ mn}$$

The amplitudes are about the same ($\sim 0.003\text{m}$) in all three passbands and no significant phase shift appears (fig.4 and 5).

Preliminary, approximate values of the main photometric parameters are the following : $B2-V1 = 0.021$, $d = 1.22$, $m2 = -0.49$, $X = 1.38$, $Y = -0.16$, $Z = -0.02$. These values imply the following physical characteristics (Hauck, 1985 and references therein) of HD 24975 : $T_e = 7800 \text{ K}$, $M_V = 2.1$, $F_e/H = -0.07$.

CONCLUSION

The preliminary Geneva colours show that HD 24975 very probably has an A9V spectral type rather than A2. Thus it is probably a quite classical Scuti star, although it has one of the shortest periods known. A spectrum of this star would be interesting to confirm the spectral type and to look for any possible peculiarity.

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