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LONG AND SHORT PERIOD VARIATIONS OF SOME Be STARS

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RESUMEN. Damos un resultado preliminar de las tendencias de cambios a largo plazo de algunas estrellas Be.

ABSTRACT. We give a preliminary report of some long term trends found on a few Be stars.

Key words: STARS Be — STARS-LIGHT CURVE

1.- Introduction.

From several years, we have followed a systematic spectroscopic and photometric survey of several Be stars. Photometry was done with the 13-color photometric system (Johnson and Mitchell, 1975) at San Pedro Mártir (SPM), observatory in México, and spectroscopy was obtained at the Observatoire de Haute-Provence (OHP), in France. One of the important results of this survey was to show that many (probably most) of the Be stars have a variable behaviour. More than 36 % of the Be stars, show large photometric changes and more than 78 % of them give some indications of variability (Alvarez and Schuster, 1981).

The natural extension of this program has lead us to start a 'detection' survey of the 'possible variable' stars. This has been done using mostly differential photometry, looking for short period and small amplitude variations, trying to consider at the same time its 'long' term variability.

2.- Results.

A few of the stars that we have observed are reported here: HD 109387 (Kapa Draconis, B5 IV /B7 p, V=3.87), shows an Hα variable line with an equivalent width between 5 A and 25 A and a characteristic time of seven years. There is a very clear correlation with the polarization measurements obtained at the Belgrado Observatory, as we can see from our Figure 1.

There is a short time spectral variations present also on the Hα line of the star, as we can see in some of the spectra obtained at the Haute-Provence Observatory with the Aurelie spectrograph. We show an example of it, where we can see evidence of the changes in the shape and intensity of the spectra. We are in the process of reduction and analysis of this data, that will be published elswhere.

During May 1988, we obtained diferential photometry of this star. Some preliminary results show a small amplitude variation of the order of 20 to 30 mmag., with a light modulation. The magnitude of the star decreases by more than 100 mmag. in about 10 days. Even more interesting to the possible physical mechanism of the star is the observation that the total amplitude of

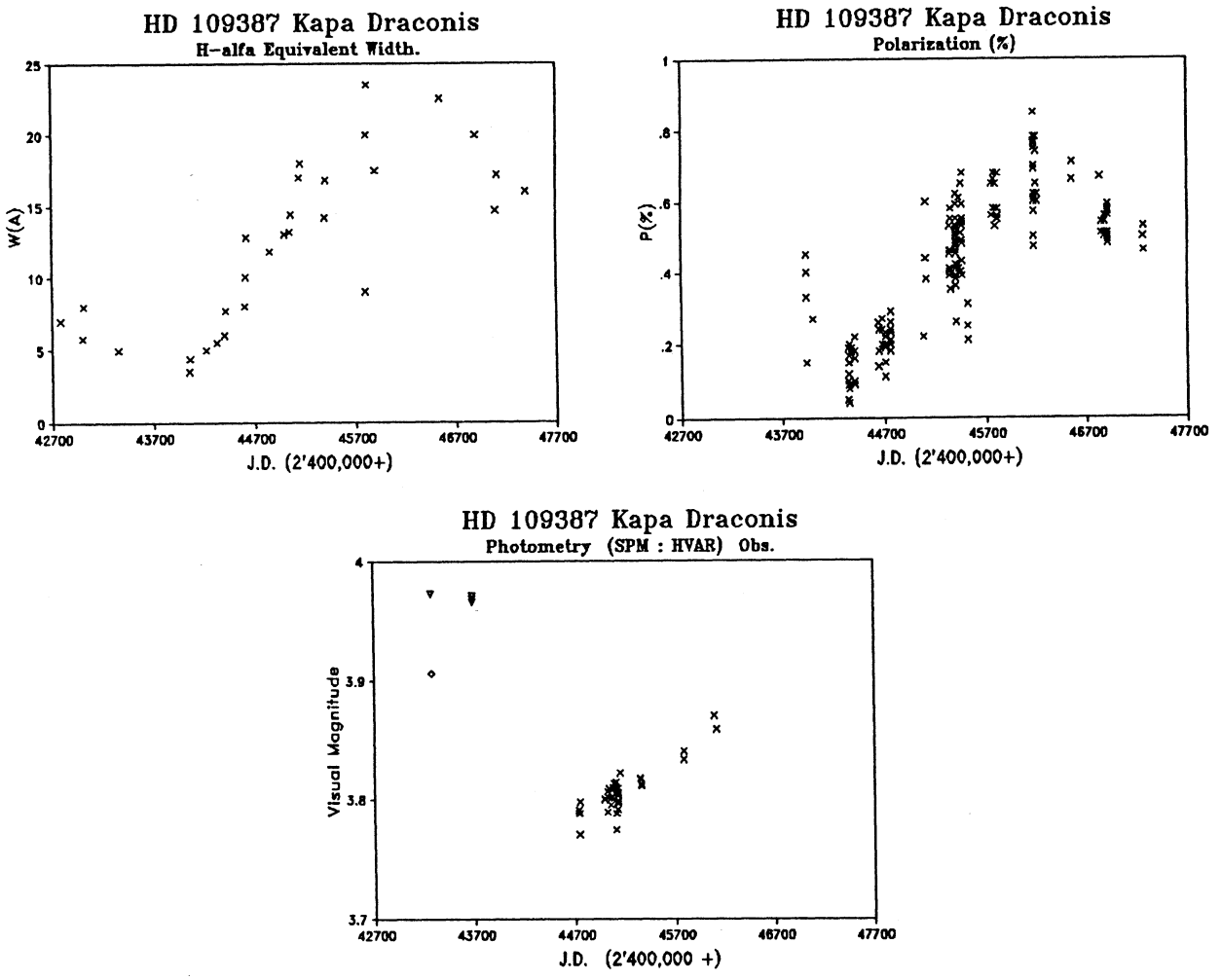

Figure 1. The long term correlation between the degree of polarization P(%) and the Hα equivalent width is very clear as we see from these two graphs that run from 1976 (JD 2'442.778+) to 1989 (JD 2'447,527+). The SPM and HVAR photometry shows a similar tendency.

he star, increases as the magnitude of the star decreases. This is also vident in other Be stars that we have observed, like Omicron Andromeda Gonzalez-Bedolla, this meeting). Also Bossi and Guerrero observing Zeta Tau, ound an oscillation of 0.6 mag. with a period of several days, superposed to nother short period of the order of one day. In all of these cases, we are in he real limit of detection and we are carefully analysing the data, trying to btain a periodicity (if any) of the daily variation and the mid-term odulation.

Another interesting object that has been the subject of a long term study s the star HD 184279 (V1294 AQL, B0.5 IV / V=7.05, ΔV=0.4), that has kept a pseudo-periodic' variation with a period of 5.0 years for the last 10 years proximately, after a long stage of irregular behaviour as has been described y Alvarez and Ballereau (1987), Alvarez et al. (1987).

Ballereau and Chauville (1989), after a detailed study of the evolution of the shell surrounding the star have developed a model of an ellongated disk of material that rotates with the observed period. The very large Hα line variations also support this model and the correlation found between the radial velocity and light curves, is giving us a better description of the evolution of this very thin envelope as shown by Alvarez et al. (1989).

There are also 'short' term and 'small' amplitude variations that will be investigated shortly. The simultaneous and continuous monitoring of these type of stars, is giving us some important clues to the understanding of the physical mechanism responsible of its behaviour.

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