

H ALPHA VARIATIONS IN TWO MASS LOSING STARS

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The aim of this paper is to report quite preliminary results obtained with a new multichannel detector put into operation at the Haute Provence Observatory. The observations have been made at the Cassegrain focus of the 1.93 m. The dispersion of the spectrograph was $17 \text{ \AA} \cdot \text{mm}^{-1}$ at H_{α} and the slit was 300μ wide. The detector was a cooled SIT TV camera tube commercially available under the name of "Nocticon". Details on the observing technique have been given elsewhere (Adrianzyk and al., 1978). We will only point out that all the wavelengths are recorded simultaneously : this recording technique is different from the scanning technique the result of which have been recently reviewed by Lacy (1977).

The first result we will report concerns HD 60848 : (figure 1).

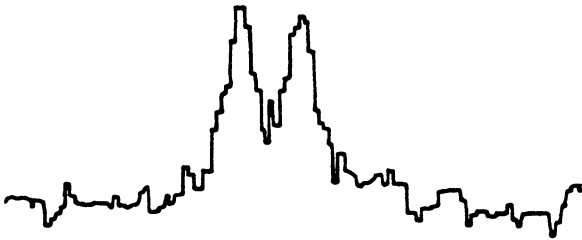


Figure 1. H_{α} profile in HD 60848 ($v = 7.7$)
Integration time : 180 sec.

The profile of H_{α} is double peaked as expected in this Oe star (Conti and Leep, 1974), the separation between the peaks is of the order of

4.3 Å. This profile has been observed during half an hour (interval between two successive integrations : 1 min) and no variation has been detected.

The next result concerns BD +40° 4220. This is a binary (O7+O6) on its way to become a Wolf Rayet (Bohannon and Conti, 1976). This 9.1 magnitude star is strongly reddened, and the spectra given in figure 2 have been obtained with an integration time of 200 sec.

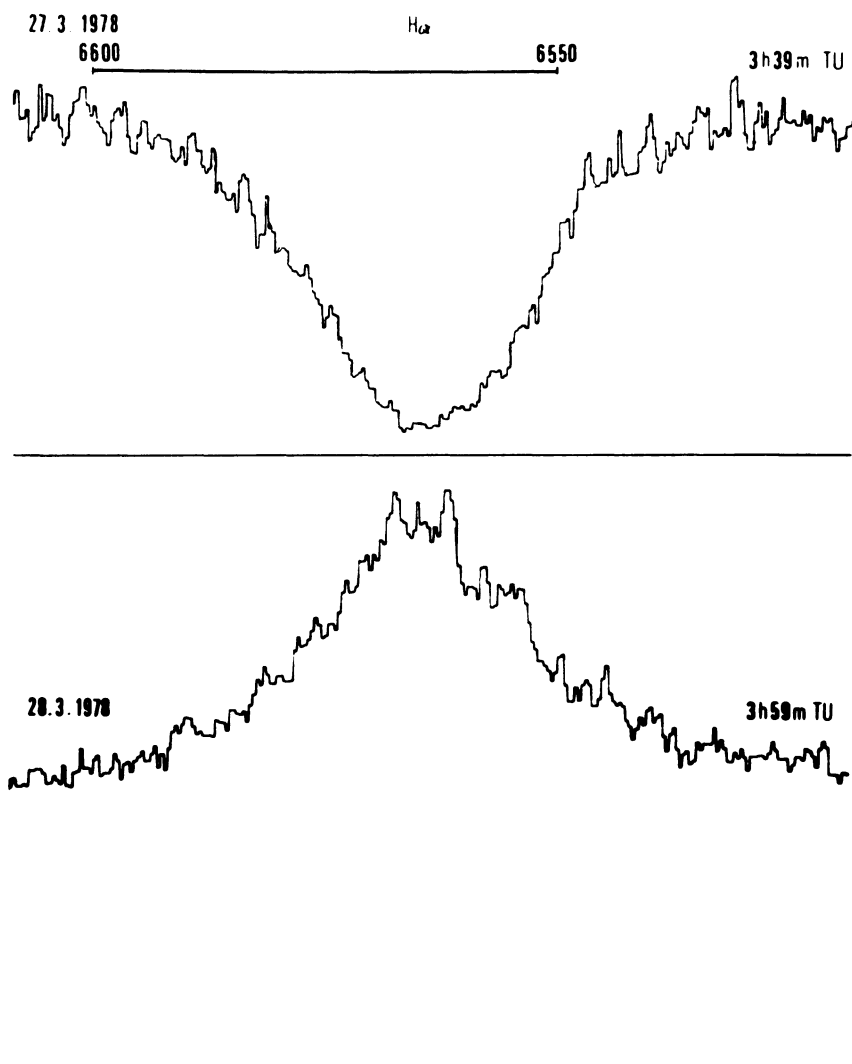


Figure 2. Variations of H_{α} profile in BD +40° 4220.

Each of them is a sample of the night : during each night the profile was stable during the observations (about half an hour). The emission observed during the second night (28/03/78) is compatible with the few photographic observations of Bohannan and Conti (1976). The result of the first night (27/03/78) is new : the frequency of appearance of these pure absorption profiles will be investigated in the near future due to its importance on the mass loss rate ($10^{-5} M_{\odot} \text{ yr}^{-1}$) derived by Bohannan and Conti (1976).

The last result concerns HD 190603. This is a B 1.5 supergiant with a mass loss rate of $5.10^{-5} M_{\odot} \text{ yr}^{-1}$ (Hutchings, 1976). According to Hutchings (1971) the spectrum of this star is variable "P Cygni type emission is seen at H_{β} and occasionally at H_{γ} . There is a definitive activity in both these lines". We have observed this star during about one hour, the integration time of each spectra being of the order of 120 sec. Large variations of the H_{α} profile on a time scale of a few minutes have been recorded. However these results have been obtained near the saturation level of the detection system and they could be purely instrumental. This point will be checked as soon as possible.

REFERENCES.

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Editor's Note: Considerable discussion ensued at the meeting concerning the consequences of a "rapid" change in the H_{α} profile of HD 190603. The participants were not fully aware of the very tentative nature of the result, as presented in this written contribution.

Note added in proof : variations of H_{α} in the spectra of HD 190603 were no longer observed on November 20 and 22 (different instrument, integration time : 600 sec.)

DISCUSSION FOLLOWING VREUX AND ANDRILLAT

Thomas: I agree with Hutchings' caution in his previous paper that such new short term variability observations should be greatly extended. This is being done. But please note that the behavior of the H α line exhibited in this paper has very strong significance on the question of "deep chromosphere" vs. "extended atmosphere -- cold or hot" models. I assume we will discuss all this in Session 4 tomorrow; but I am glad this paper, these data, by Andrillat and Vreux came so early in this Symposium. As Hutchings knows well, from his own work, the evidence for such variability in H α -- and other -- emission line profiles is widespread: the whole question is the frequency of occurrence and the amplitude. I assert that current theoretical models tell us nothing -- indeed there is really no theory, at most certain broad thermodynamic characteristics. So -- these kinds of observations are really what is guiding us in modeling.

Conti: How common are the short time scale variations demonstrated in this B type supergiant? Are they typical or atypical for such stars?

Vreux: So far we only have observations for five objects. You have seen the results for three of them. The two others have a noisy spectra: We can only say that there are no dramatic variations. For HD 190603 we have many spectra and the variations you have seen are typical. But for this object we are near the saturation of the system and we have no idea about the amplitude of the variations you have seen; the ordinate of the graph (intensity scale) is not linear and it could be that the amplitude of the variations is quite small. This point will be investigated as soon as possible. As I said these results are quite preliminary and more than anybody here we regret we have not had time enough to perform all the tests and calibrations before this meeting.