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PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR AD Leo

The monitoring of AD Leo was carried out on March 27/28 1984 from 00^h51^m to 03^h29^m UT at La Palma Observatory (I.A.C.) on the Swedish 60 cm Cassegrain telescope with a single-channel photon counting photoelectric uvbyβ photometer. This was done within the framework of the Coordinated Program on Ultraviolet, Optical and Radio Observations of RS CVn and Flare Stars in March 1984 (Rodono 1983).

A complete set of measurements in u, $H_{\beta n}$, $H_{\beta w}$ filters were obtained with 15 sec resolution time.

During the monitoring time (Table I) a flare has been recorded. Its characteristics (Andrews et al. 1969) are given in Table II.

a.- UT at flare maximum.

b.- Flare duration t_a, t_b.

c.- Flow of the outbursts I_f/I_0, where I_f is the total intensity of the star plus flare minus sky background and I_0 is the quiet state intensity of the star minus sky background.

d.- Amplitude of the flare in instrumental magnitude Δm.

e.- Standard deviation of random noise fluctuations in magnitude $\sigma=2.5\log(I_0+\sigma)/I_0$, during the quiet state phase immediately preceding the beginning of the flare.

f.- Air mass at the flare maximum.

The flare is one of the best ever recorded, with a complete coverage from Radio to Ultraviolet wavelengths (Rodono et al. 1984).

Table I

Date	Monitoring Interval UT	Total Monitoring Time
March	$00^h51^m31^s$	$01^h42^m36^s$
27/28	01 47 53 02 08 49	
	02 29 00 03 02 35	
	03 12 36 03 29 59	

Table II

Filter	UT_{max}	t_a	t_b	Δt	I_f/I_0	Δm	$\sigma(m)$	Air mass
u	03^h23^m	6^m	30^s	7^m	9.8	2.6	0.47	1.44
$H_{\beta n}$	"	-	"	-	0.9	0.7	0.23	"
$H_{\beta w}$	"	-	"	-	0.6	0.5	0.14	"

From Figure 1 (lower panel), we can see a typical light curve with type I flare characteristic of UV Cet stars, with Δu of 2-3 magnitude. Following the distribution function of amplitudes (Gurzadyan 1980) it corresponds to the highest amplitude recorded for AD Leo, with a frequency of 10%.

The relative flux measurements through $H_{\beta n}$ and $H_{\beta w}$ filters show peak fluxes of 0.9 and 0.6 in good agreement with the H_γ and continuum (4400 A) behaviour during flare maximum reported by Rodono et al. (1984).

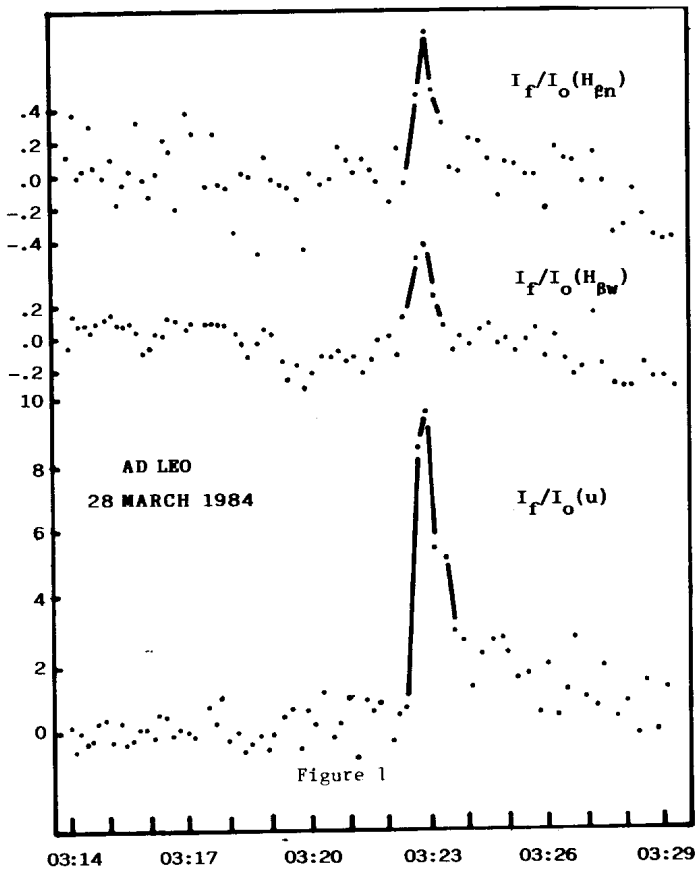

Figure 1

Figure 1

A noticeable increase of the scatter in the u filter in coincidence with a $H_{\beta w}$ deep a few minutes before the maximum could be inferred from the data shown in Figure 1. A faster flux decrease below the normalization value in H_{β} filters after the peak should be explained.

The emission line index H_{β} is formed by taking the ratio fluxes recorded in the narrow and wide filters. This quantity shows an amplitude of 0.03 at maximum. Due to the random fluctuations, no significant conclusions could be deduced from the H_{β} index.

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