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**OBSERVATIONS OF FLARE STARS V577 Mon AND AD Leo**

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In spite of a large efforts devoted to the study of flare stars, their nature is not yet completely solved (Haisch, Strong & Rodonó 1991, Hawley & Pettersen, 1991, Hawley & Fisher 1992, Vlahos et al. 1995). Therefore, each new observational data may help resolve this very important problem. We carried out observations of flare stars V577 Mon and AD Leo with the two-channel (U and B) fast photometer (Zalinian & Tovmassian 1989) installed at the 2.1 m telescope of the Guillermo Haro Observatory (GHO) in Cananea, México. Earlier we detected with this photometer very short spiky flares of a duration less than a second (Zalinian & Tovmassian 1987, Tovmassian & Zalinian 1988, Tovmassian et al. 1997a, Zalinian & Tovmassian 1997). The rising time of spiky flares is less than 0.1 sec. We showed that the spiky flares generally occur after normal flares, and are bluer than normal flares (Tovmassian et al. 1997b).

The log of observations is presented in Table 1. The night sky background was measured regularly after  $\sim 15 - 20$  m of monitoring of the flare star. Therefore, the total time of observation of the star itself is less than the duration of the observing run. V577 Mon was observed with integration time 0.5 sec, and AD Leo with 0.2 sec.

The aim of our observations was to detect fast flares. Therefore, we measured the brightness of the observed stars in *U* and *B* in relation to their quiescent state. No regular variability of V577 Mon and AD Leo is known.

Table 1: The log of observations of V577 Mon and AD Leo in 2002.

Date	Start UT	End UT	Total duration h m
V577 Mon			
20 Feb	02 44	05 50	0 45
21 Feb	03 30	05 32	1 50
22 Feb	03 55	05 30	1 45
AD Leo			
21 Feb	07 11	10 08	2 20
22 Feb	06 46	10 15	2 35

Four flares were detected during 4<sup>h</sup>20<sup>m</sup> of monitoring of V577 Mon. During 4<sup>h</sup>55<sup>m</sup> of monitoring of AD Leo only one flare was detected. The light curves of the detected flares,

and also the variations of  $(U - B)$  magnitudes of the star during flare, are presented in Figures 1-5. In consecutive columns of Table 2 the date of the flare, the flare magnitudes  $\Delta U$  and  $\Delta B$ , the color of the star,  $(U - B)$  at the peak of the flare, and the total duration of the flare are given. No spiky flares have been registered in the reported observations. Light curves of the detected flares, and also the variations of  $U - B$  magnitudes of the star during flares, are presented in Figures 1-5. Each point on the  $U - B$  graph is the average of 5 preceding and 5 subsequent measurements. The colour  $U - B$  of the star during flare is deduced assuming that  $U - B$  of V577 Mon in quiescent state is equal to  $1^m2$  (Shvartsman et al. 1988), that of the AD Leo is  $1^m06$  (Johnson & Morgan 1953).

Table 2: The parameters of flares of V577 Mon and AD Leo.

Date	$\Delta U$	$\Delta B$	$(U - B)$	Total duration
V577 Mon				
20 Feb '02	$1^m0$	$0^m4$	$0^m6$	$2^m05^s$
20 Feb '02	$1^m5$	$0^m5$	$0^m2$	$7^m00^s$
21 Feb '02	$1^m1$	$0^m1$	$0^m2$	$2^m33^s$
22 Feb '02	$0^m4$	$0^m0$	$0^m8$	$6^m10^s$
AD Leo				
21 Feb '02	$0^m22$	$0^m09$	$0^m8$	$3^m50^s$

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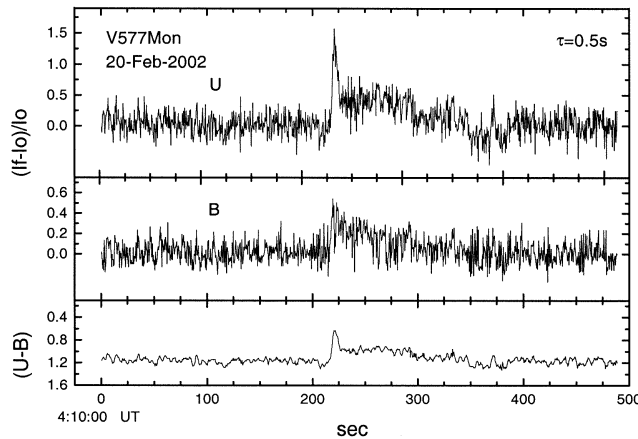
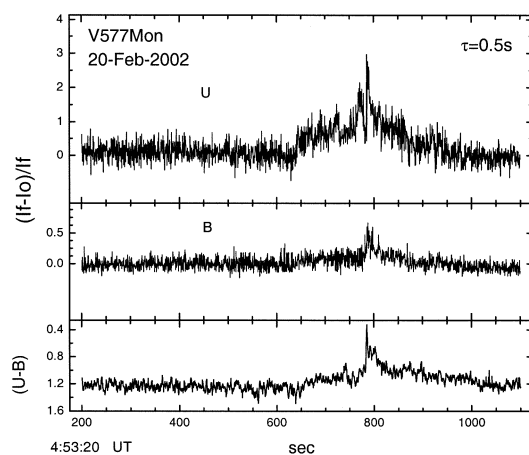
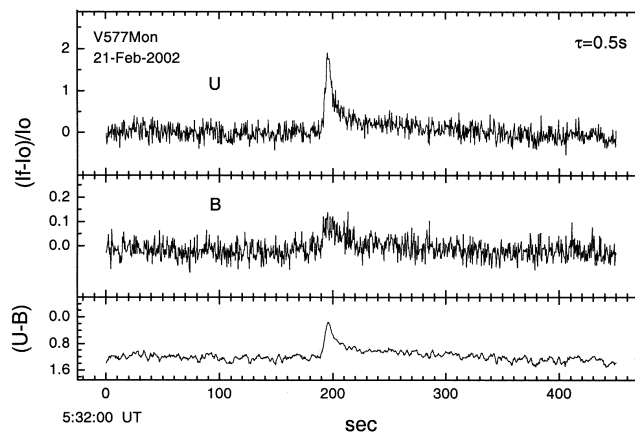


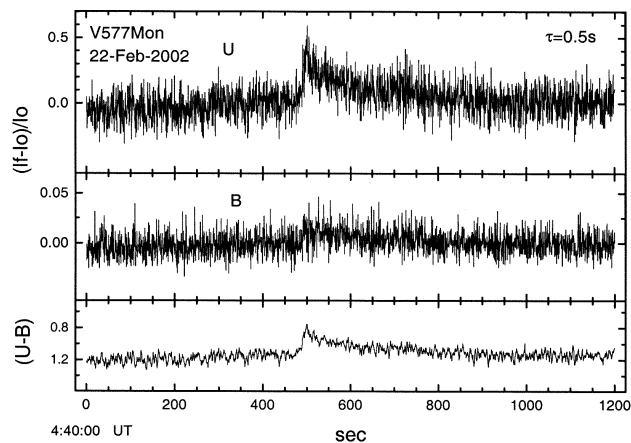
Figure 1. The flare of V577 Mon at  $4^h10^m$  UT on 20 February 2002.



**Figure 2.** The flare of V577 Mon at 4<sup>h</sup>50<sup>m</sup> UT on 20 February 2002.



**Figure 3.** The flare of V577 Mon at 5<sup>h</sup>32<sup>m</sup> UT on 21 February 2002.



**Figure 4.** The flare of V577 Mon at 4<sup>h</sup>40<sup>m</sup> UT on 22 February 2002.

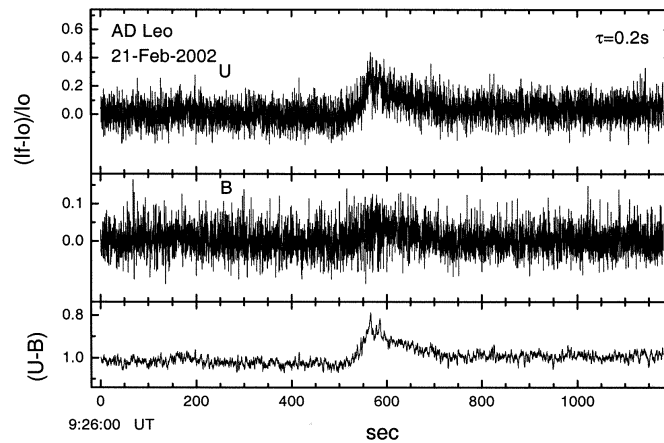


Figure 5. The flare of AD Leo at 9<sup>h</sup>26<sup>m</sup> UT on 21 February 2002.

#### References:

- Haisch, B., Strong, K.T., & Rodonó, M., 1991, *ARA&A*, **29**, 275  
 Hawley, S.L., & Fisher, G.H., 1992, *ApJS*, **81**, 885  
 Hawley, S.L., & Fisher, G.H., Simon, T., et al., 1995, *ApJ*, **453**, 464  
 Hawley, S.L., & Pettersen, B.R., 1991, *ApJ*, **378**, 725  
 Johnson, H.L., & Morgan, W.W., 1953, *ApJ*, **117**, 313  
 Shvartsman, V.F., Beskin, G.M., Gershberg, R. E., Neizvestni, S.I., Plakhotenkova, V.L., & Pustilnik, L.A., 1988, *Izv. Crimean AO*, **79**, 71  
 Tovmassian, H.M. & Zalinian, V.P., 1988, *Astrofizika*, **28**, 131  
 Tovmassian H.M., Recillas, E., Cardona, O., & Zalinian, V.P., 1997a, *IBVS*, No. 4465  
 Tovmassian H.M., Recillas, E., Cardona, O., & Zalinian, V.P., 1997b, *Rev. Mex. AA*, **33**, 107  
 Vlahos, L., Georgoulis, M., Kluiving, R., & Paschos, P., 1995, *A&A*, **299**, 897  
 Zalinian, V.P., & Tovmassian, H.M., 1987, *IBVS*, No. 2992  
 Zalinian, V.P., & Tovmassian, H.M., 1989, *Contr. Byurakan Obs.*, **61**, 142  
 Zalinian & Tovmassian 1997, *IBVS*, No. 4464