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PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR YZ CMi

In this Bulletin we give preliminary results of our photoelectric observations of the flare star YZ CMi carried out at the Catania Astrophysical Observatory during the co-operative campaign organized by the Working Group on Flare Stars for the period January 31 to February 13, 1970 (Andrews and Chugainov, 1970).

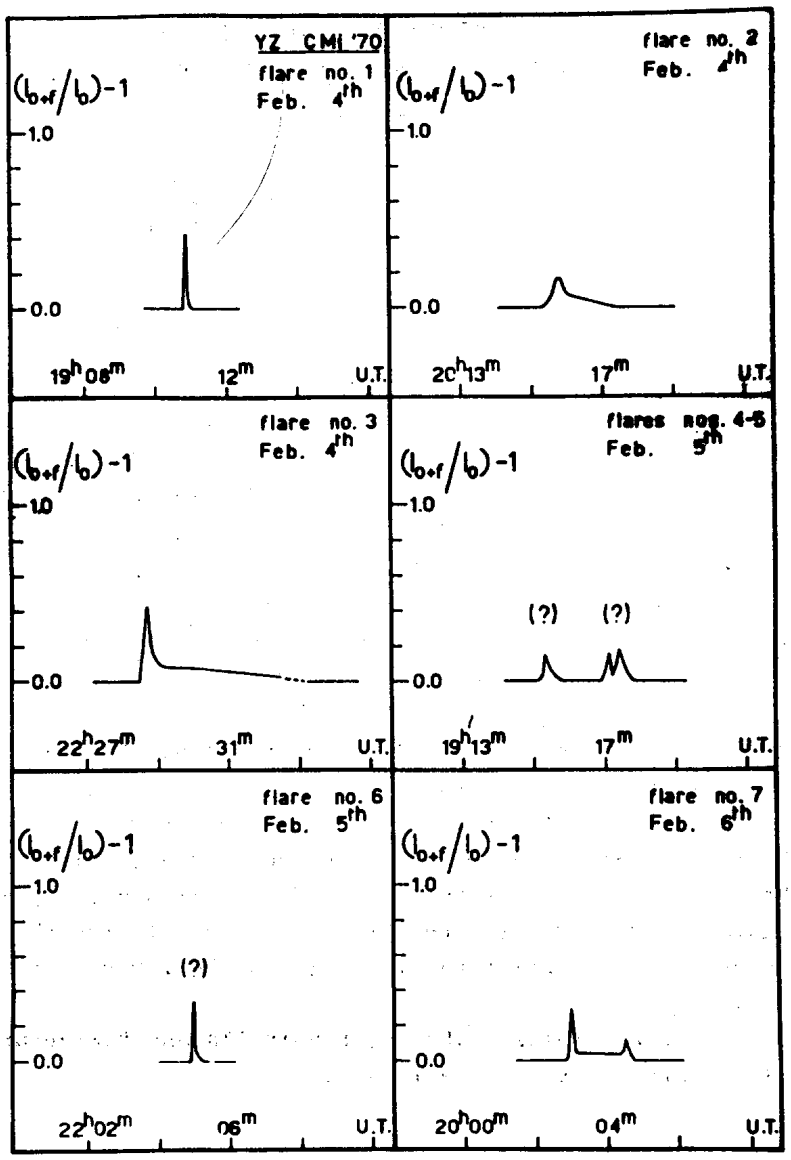
The observations were performed with an EMI 6156 A photomultiplier attached to a 61 cm of aperture quasi-cassegrain reflector. As a rule,a Schott filter combination (BG 12/1 + GG 13/2) was used. Some short V measurements, which were carried out in order to determine the colour index of YZ CMi are also included.

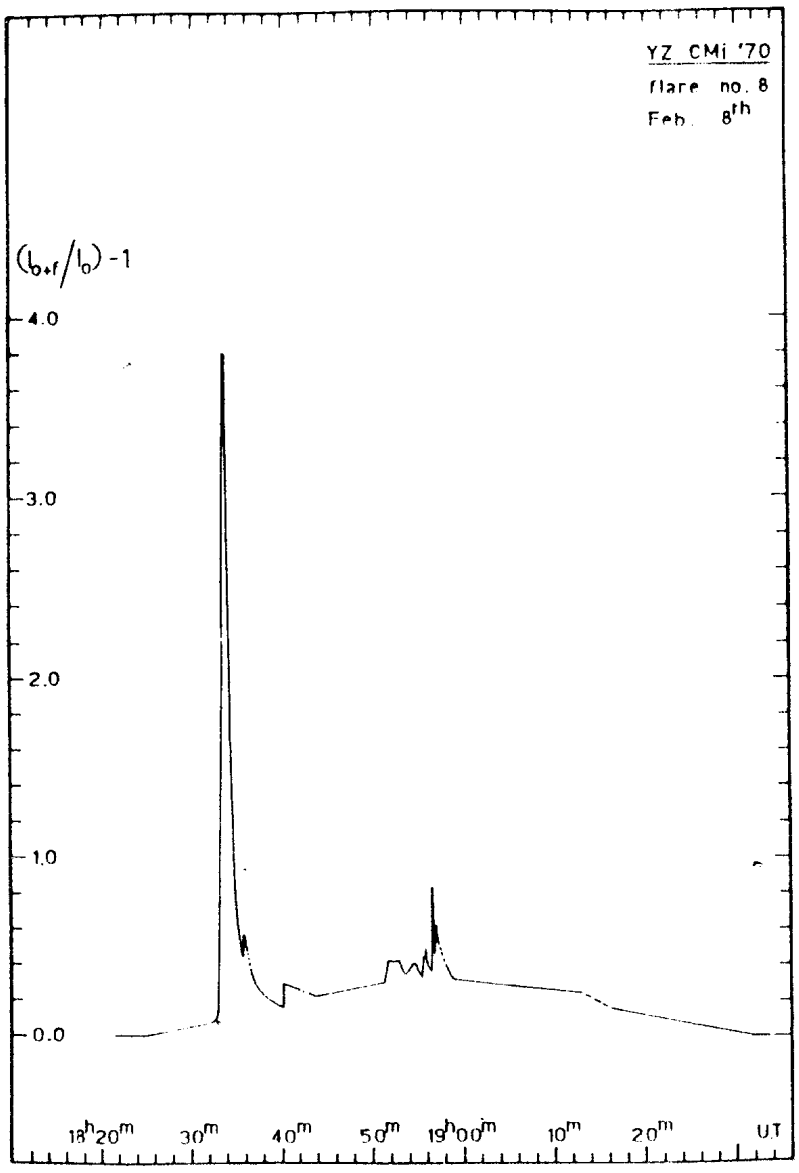
In Table 1 the effective time coverage is given. The total number of observation hours is 35.7. In Table 2 the characteristics of the 11 observed flares are reported. Figures 1, 2 and 3 give the light curves of the observed flares in the relative intensity scale versus Universal Time.

C. Lo Presti, G.Russo, F.Spinella and V.Stancanelli collaborated in the present work.

Reference

Andrews,A.D., Chugainov,P.F. 1970. Comm.27 IAU Inf.Bull. Var.Stars. No.416.


YZ CMi '70
flare no. 1
Feb. 4th
$(I_{o+f}/I_o)-1$
1.0
0.0
19h08m
12m
U.T.
flare no. 2
Feb. 4th
$(I_{o+f}/I_o)-1$
1.0
0.0
20h13m
17m
U.T.
flare no. 3
Feb. 4th
$(I_{o+f}/I_o)-1$
1.0
0.0
22h27m
31m
U.T.
flares nos. 4-5
Feb. 5th
$(I_{o+f}/I_o)-1$
1.0
(?)
(?)
0.0
19h13m
17m
U.T.
flare no. 6
Feb. 5th
$(I_{o+f}/I_o)-1$
1.0
(?)
0.0
22h02m
06m
U.T.
flare no. 7
Feb. 6th
$(I_{o+f}/I_o)-1$
1.0
0.0
20h00m
04m
U.T.


YZ CMi '70
flare no. 8
Feb. 8th
$(I_{o+f}/I_o)-1$
4.0
3.0
2.0
1.0
0.0
18^h20^m
30^m
40^m
50^m
19^h00^m
10^m
20^m
U.T

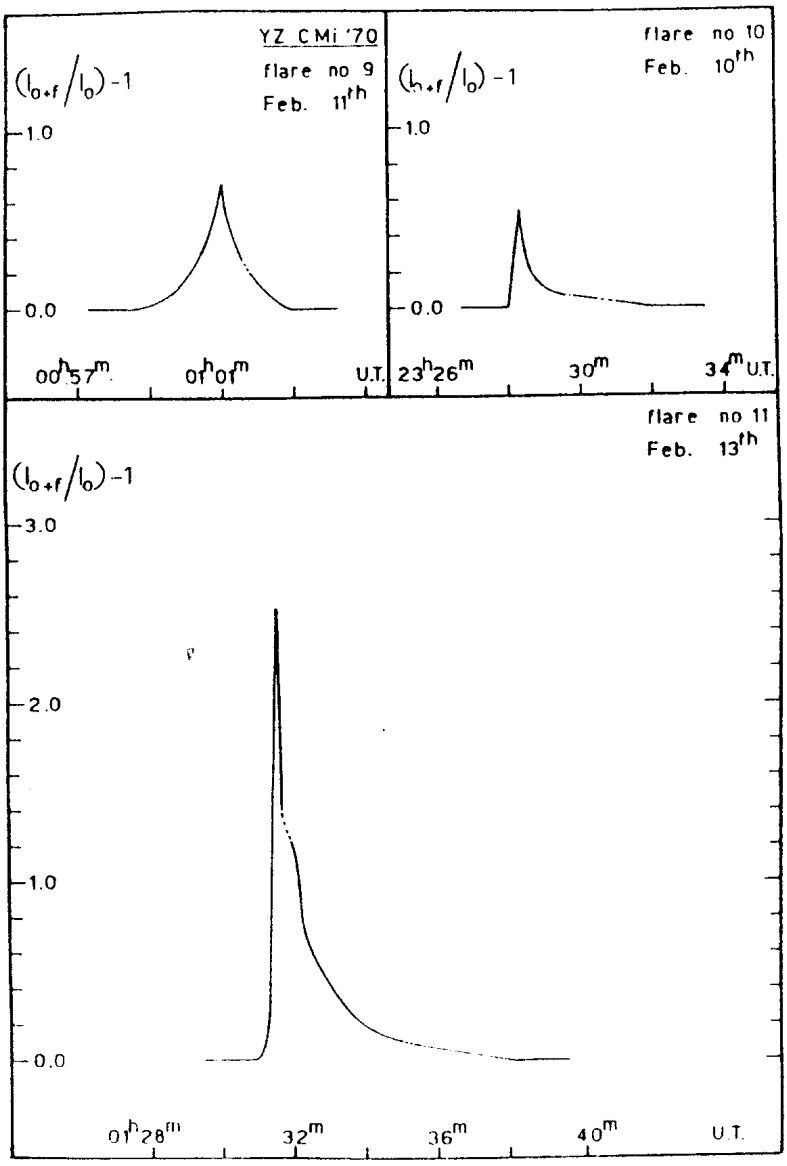

YZ CMi '70
flare no 9
Feb. 11th
$(I_{o+f}/I_o)-1$
1.0
0.0
00h57m
01h01m
U.T.
flare no 10
Feb. 10th
$(I_{o+f}/I_o)-1$
1.0
0.0
23h26m
30m
34m U.T.
flare no 11
Feb. 13th
$(I_{o+f}/I_o)-1$
3.0
2.0
1.0
0.0
01h28m
32m
36m
40m
U.T.

TABLE 1

Date 1970 Feb.	F	COVERAGE (U.T.)	$\overline{m_{lim}-m_o}$
2	B	19^h58^m–20^h02^m; 2004–2008; 2015–2016; 2017–2018; 2029–2039; 2040–2054; 2103–2108; 2117–2129; 2140–2144;	+ $3^m.02$
3	B	2254–2301; 2303–2314; 2320–2354; 2357–2359	+ 3.23
4	B	0000–0049; 0053–0137; 1823–1915; 1921–1932; 1957–2018; 2020–2039; 2041–2100; 2109–2130; 2132–2149; 2213–2242; 2243–2252; 2258–2348;	+ 3.23*
	V	1945–1946; 1947–1948; 2208–2209; 2210–2211	+ 3.54 + 4.61
5	B	0010–0020; 0022–0059; 0104–0118; 0130–0200; 1832–1928; 1955–1959; 2001–2012; 2014–2120; 2156–2241; 2256–2352	+ 3.54*
	V	0006–0007; 0008–0009; 1950–1953; 2140–2143	+ 3.89 + 4.61
6	B	0023–0050; 0052–0144; 1915–1919; 1936–2015; 2033–2116; 2118–2212; 2215–2230; 2233–2245	+ 3.89* + 3.74
	V	0018–0022	+ 4.70
8	B	1803–1913; 1916–1932; 1956–2059; 2100–2236; 2243–2314; 2317–2353	+ 3.88
	V	1952–1953; 1954–1955	+ 4.72
9	B	0019–0116	+ 3.88
	V	0012–0013; 0014–0015; 0138–0139; 0140–0141	+ 4.72
10	B	2222–2243; 2303–2350; 2359–2400	+ 3.58
11	B	0000–0024; 0032–0044; 0102–0132. 2021–2041; 2107–2157; 2205–2225; 2227–2244; 2246–2304; 2305–2324; 2326–2400	+ 3.58* + 3.35
12	B	0000–0003; 1934–1936; 1938–2037; 2041–2110; 2124–2233; 2243–2333; 2335–2400	+ 3.35* + 3.04
	V	1807–1906; 1913–1932	+ 3.62
13	B	0000–0007; 0009–0043; 0107–0202	+ 3.04*
		1802–1813; 1814–1852; 2359–2400	+ 2.82
14	B	0000–0015; 0017–0028; 0030–0045; 0106–0115; 0118–0128; 0129–0143	+ 2.82

F = Schott filters (B = BG 12/1 + GG13; V = GG 14/2) $\overline{m_{lim} - m_o} = -2.5 \log (3\bar{\sigma}/I_o)$, where $\bar{\sigma}$ represents the standard deviation of the mean random noise fluctuation for a night and I_o represents the mean intensity of the quite star during the same night.

*The underlined values of $\overline{m_{lim} - m_o}$ refer to the underlined coverage.

TABLE 2

no	t_{max} 1970 Feb	d_b	d_a	$m_{lim}-m_o$	$(m_f-m_o)_{max}$	P	a	b
1	4, 19h10.8m	0.01min	0.2min	+3m.36	+0m.92	0.03min	-	0
2	4, 20 15.8	0.3	1.6	+3.63	+1.92	0.11	4	0
3	4, 22 28.7	0.2	4.5	+3.45	+0.94	0.33	-	0
4	5, 19 15.3	0.05	0.5	+3.75	+2.06	0.03	1	0
5	5, 19 17.4	0.2	0.4	+3.75	+1.86	0.07	1	0
6	5, 22 05.0	0.1	0.2	+3.96	+1.20	0.02	1	0
7	6, 20 03.0	0.1	1.9	+3.73	+1.34	0.10	2	2
8	8, 18 33.5	0.7	59.0	+3.57	-1.45	16.99	3	1
9	9, 01 01.0	2.4	1.9	+3.37	+0.38	0.64	4	0
10	10, 23 28.3	0.3	3.6	+3.53	+0.67	0.38	-	1
11	13, 01.31.5	0.5	6.3	+3.70	-1.00	2.29	-	0

t_{max} = date and U.T. of the flare maximum; d_b = duration of the flare before maximum; d_a = duration of the flare after maximum including whatever post-maximum activity; $m_{lim} - m_o = -2.5 \log (3\sigma/I_o)$ where σ and I_o indicate the standard noise fluctuation and the mean intensity of the quiet star near the observed flare, respectively; $(m_f-m_o)_{max} = -2.5 \log [(I_{o+f} - I_o)/I_o]_{max}$, where I_{o+f} is the intensity deflection due to the quiet star (I_o) plus that of flare (I_f) at maximum; $P = \int (I_{o+f} - I_o)/I_o \, dt$, integrated intensity in minutes; a = flare feature: 1 - uncertain, 2 - double, 3 - multiple, 4 - complex structure; b = sky condition with the following standard: 0 - very clear, 1 - clear, 2 - with some cirrus.

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