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OBSERVATIONS OF THE FLARE STARS G3-33 AND G24-16

The stars G3-33 and G24-16 from the catalog of Giclas, Burnham, and Thomas (1963) were monitored with the sixty-inch reflector of the Cerro Tololo Inter-American Observatory in continuous U-band photoelectric photometry, with the following results.

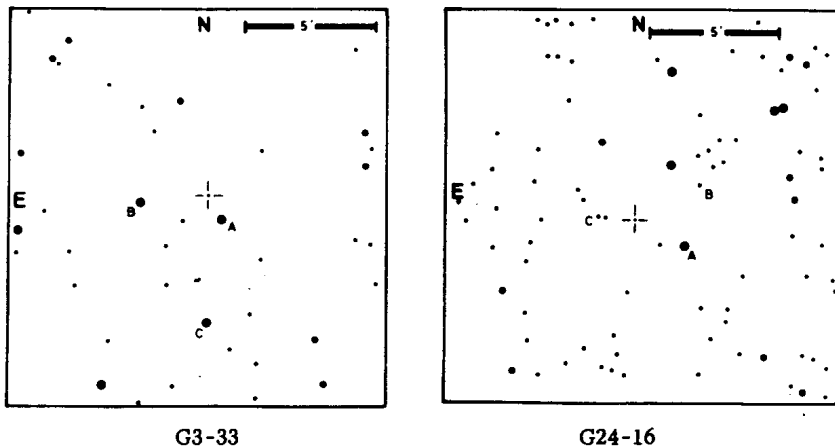
G3-33

This star, of spectral type dM5e (Eggen and Greenstein, 1965) was monitored on the night of 26 July, 1968 from 08^h29^m.4 to 09^h26^m.3 U. T. Against a detection threshold of $U_{\text{lim}} = 16.6$ (defined as a magnitude equal to three times the standard deviation of the noise during the quiescent state recorded with a one second time constant) an event was recorded at 08^h49^m.5 U. T. that reached a peak light $U_{\text{peak}} = 14.66$ ($\Delta U = 1.06$). The logarithms of the decay times measured at 1, 2, and 3 magnitudes below peak light are $\log t_1 = -0.11 \pm .10$, $\log t_2 = -0.81 \pm .10$, and $\log t_3 = -0.91 \pm .20$.^x

The decay parameters most nearly resemble those of the flare star AD Leo (Kunkel 1967), a star whose absolute magnitude is 11.07, or 2.83 magnitudes

^x The measurement of a slope 3 magnitudes below peak light, i. e., at $U = 17.66$, is not inconsistent with a detection threshold $U_{\text{lim}} = 16.6$. Measurement of flare decay rates are curve fitting problems. In this instance a straight line was fit to a four minute portion of the record, involving 240 independent sample points. The detection threshold is a statistic governing a single sample point.

brighter than G3-33 (Lippincott 1967). If the relation between flare decay times and stellar luminosity proposed by Kunkel (1968) applies, then the event observed on G3-33 was one of unusually long duration for this star.



G24-16

During the short interval in which this star was monitored, from $05^{\text{h}}45^{\text{m}}.0$ to $06^{\text{h}}53^{\text{m}}.6$ U.T. on 27 July, 1968, four flares were recorded against a detection threshold $U_{\text{lim}} = 16.7$. The flare data are summarized in table 1 below.

TABLE I. Flares of G24-16

Event U. T.	U_{peak}	ΔU	$\text{log}t_1$	$\text{log}t_2$	$\text{log}t_3$
$6^{\text{h}}36^{\text{m}}.72$	15.94	0.8	+0.64	+0.50	-
$6^{\text{h}}37^{\text{m}}.11$	15.60	1.0	+0.60	+0.43:	-0.54:
$6^{\text{h}}48^{\text{m}}.19$	16.41	0.6	+0.71	-	-
$6^{\text{h}}48^{\text{m}}.86$	15.11	1.2	+0.41	+0.06	-0.28

The probable error in $\text{log}t$ is 0.1 except where a colon is used to indicate 0.2.

The decay characteristics are those of a low luminosity star. They may be compared with those of UV Ceti, for which $\log t_1 = +0.55$, $\log t_2 = +0.13$, and $\log t_3 = -0.28$. The empirical relation between the flare decay parameter $\log t_3$ and the bolometric magnitude, together with Johnson's (1965) bolometric correction lead to an absolute magnitude of 14.24 for this star, and hence a parallax of $0''.17 \pm .04$. The example offered by the flare of G3-33 should serve as a warning that since only two flares yield the average of $\log t_3$, such a parallax should be considered as highly tentative.

Finding Charts and Comparison Stars

The finding charts were redrawn from Giclas et al (1963) to assist the identification of comparison stars. The photometry for all stars is based on a single observation, so that probable errors in V are $\pm .03$, in B-V they are $\pm .02$, and in U-B they are $\pm .04$.

TABLE 2. Photoelectric Measures

Star	V	B-V	U-B
G3-33	12.19	1.76	1.23
A	11.71	.53	+.03
B	13.88	.71	.24
C	13.25	1.15	.48
G24-16	13.07	1.70	1.25
A	11.60	.36	+.18
B	12.37	.34	+.30
C	12.43	1.50	2.07:

The U-B measure for G24-16/C is uncertain by 0.15 magnitudes.

References

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