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THE OBSERVATION OF A STELLAR FLARE IN THE dM5 STAR ROSS 128

We report the observation of a probable stellar flare at 0558 U.T., 1972 May 12, in the dM5 star Ross 128 (Gliese 447 (1), Yale 2730 (2), Eggen 212 (3)). The flare was fortuitously recorded in the U filter-band during routine photoelectric monitoring of the star, and we show the UBV observations plotted against time in Figure 1. The flare is only marginally evident in the B and V observations but is clearly indicated in the U observations. Each U observation shown in Figure 1 is the resultant of 8 individual star and 7 individual sky measures, and in Figure 2 we show, versus time, the individual (star-sky) deflections which compose the U = +13.82 mag observation shown in Figure 1 at t = 44.0 min. The integration time for each star/sky measure was 15 sec. The flare is clearly time-resolved in Figure 2, and there seems to be little question as to its reality. It would appear that peak light occurred between the star measures at t = 150 sec and t = 192 sec in Figure 2.

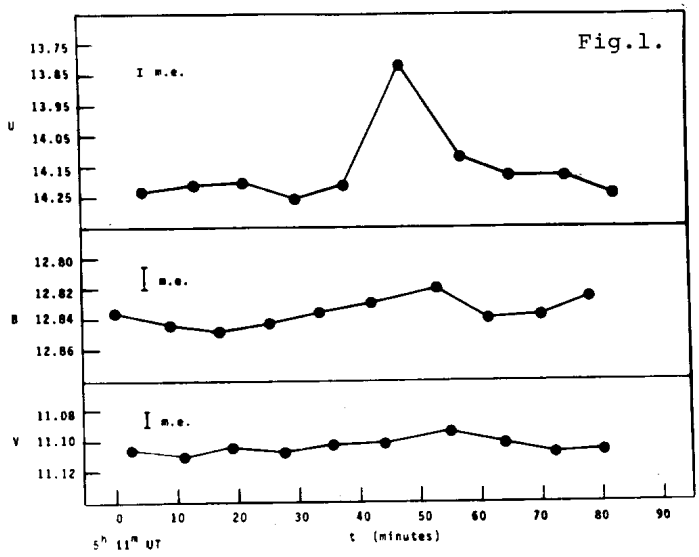
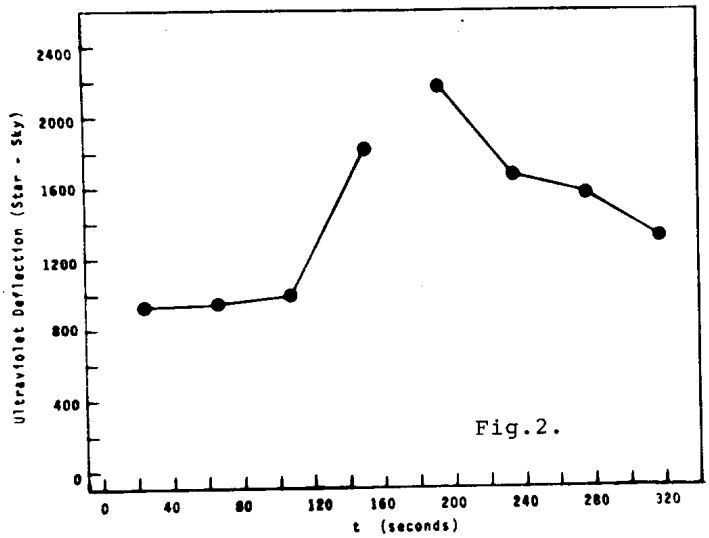


Fig.1.
13.75
13.85
13.95
14.05
14.15
14.25
U
1 m.e.
12.80
12.82
12.84
12.86
B
1 m.e.
11.08
11.10
11.12
V
1 m.e.
0
10
20
30
40
50
60
70
80
90
5h 11m UT
t (minutes)


Ultraviolet Deflection (Star - Sky)
2400
2000
1600
1200
800
400
0
Fig.2.
0
40
80
120
160
200
240
280
320
t (seconds)

These observations were made with the NASA 60-inch telescope at the Catalina Observatory of the Lunar and Planetary Observatory, University of Arizona, on a night of excellent photometric quality. Prior and subsequent photometric monitoring of this star by the authors has not revealed the occurrence of other flare events.

Ross 128 is not a known flare star (4), and we urge that further monitoring be undertaken in order to substantiate the occurrence of stellar flaring in this object. There is reason to believe that Ross 128 is an evolutionary "old" object. Kinematically Eggen (3) has classed Ross 128 as an old disk population object; although its space velocity vectors (UVW) = (+2,+27,+1 km sec^{-1}) do not render such classification clear-cut. The star is subluminous in the M_V,R-I and M_R,R-I planes (3,5), a characteristic of halo and some old disk population M dwarfs. Four old disk population flare stars have been recognized (6): Bd $+43^{o}44$ A and B, SZ UMa and Wolf 630, of which, however, only BD $+43^{o}44$ B is significantly subluminous in the M_V,R-I and M_R,R-I planes (3,5). Stellar flares have not been substantiated as occurring in the halo population M dwarfs; although van de Kamp (7) reports the possible occurrence of a

flare in a late-type companion to the well-known halo population subdwarf Grmb 1830. Stellar flares are usually associated with extreme evolutionary youth and/or pre-main-sequence contraction, and it is thus not clear what the occurrence of flares in presumably evolutionary old objects may imply. The discovery and study of flares in such objects is thus of considerable interest.

T.A. LEE
Lunar and Planetary Laboratory
University of Arizona

D.T. HOXIE*
Behlen Laboratory of Physics
University of Nebraska - Lincoln
(*Visiting Astronomer, Kitt Peak National Observatory)

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