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ULTRAVIOLET FLARE IN FK Ser

In the course of analysing the data returned by the S2/68 ultraviolet sky-survey experiment aboard the TD-1 satellite in 1972-4, a systematic check for transient sources was undertaken. All known transient sources (e.g., novae) observed at other wavelengths between February 1972 and May 1974 were specifically examined, along with known flare stars within 25 pc of the Sun (Kunkel 1975). No previously observed transient phenomena were confirmed in the ultraviolet, but one apparent flare not known to have been observed elsewhere was recorded from the variable star discovered by Stienon (1971) and designated FK Ser (Kukarkin et al. 1976).

In view of the sensitivity limits of the S2/68 instrument (Boksenberg et al. 1973), there would have been little chance of detecting FK Ser, whose m_{pg} ranges from 10.9 (Hoffleit 1972) to 11.5 (Stienon 1971), save in the near-UV photometric channel A1 with FWHM 310 Å centred on 2740 Å. Indeed, no signal was detectable in the three spectrophotometric channels blueward of A1 in any of the 14 orbital passes, 5 of which were in any case contaminated by the nearby $8^{m}.50$ A3 star HD 168392. Two of the remaining (unblended) scans, both with the target well-centred, manifest a measurable signal in A1, a strong indisputable one on 27 September 1972 (J.D. 2441588.46243) and a weak probable one on 25 March 1974 (J.D. 2442132.44088). The respective fluxes were 1.9 ± 0.2 and 0.4 ± 0.1 in units of 10^{-12} erg $cm^{-2}s^{-1}Å^{-1}$. One orbital revolution (95 min) later, the 1974 flare becomes lost in background noise; the subsequent history of the 1972 flare is inconclusive because the target is too far displaced by the next scan.

The nature of FK Ser remains enigmatic: it has been likened to the BY Draconis variables by Stienon (1971), Hidajat (1971), and Chugainov (1974) although certain spectroscopic anomalies (Herbig 1973) and the infrared excess (Zappala 1974, Hackwell et al.

1974) suggest that it may be a post-T Tauri star at least 3 mag above the main sequence. Moreover, the conjecture that the nearby B2 IV-V star HD 170740 and FK Ser were coeval, on the basis of their proper motions which can be extrapolated back to a dark interstellar cloud, lends additional weight to the latter interpretation. Balmer emission lines have been reported by Stienon (1971), Hidajat (1971), MacConnell (1971), Herbig (1973), and Zappala (1974), while the latter two have also pointed out the strong Li I line at 6707 $\mathring{A}$ and Ca II H and K emission lines. MacConnell (1971) first identified FK Ser as BD-10°4662, but Herbig found it to be a close visual binary of similar magnitude ($\Delta m = 0\overset{m}{.}5$) and spectroscopic characteristics (about K5p V for component A and K7p V for component B).

It is quite conceivable that the ultraviolet variability is greater than that in the visible on the following grounds: (1) the "strong ultraviolet continuum" reported by Stienon (1971); (2) the discrepancy between the (U-B) measures on two nights by N.K. Rao (Herbig 1973) and a value by R.J. Brucato (Zappala 1974) despite the agreement among all three (B-V) measures; and (3) the absence of infrared variability over timescales $\gtrsim$ known timescales of variability at shorter wavelenghts. Nevertheless, it would be instructive to examine any visible or infrared observations made simultaneously or contemporaneously with the two S2/68 observations, which are thought to represent the first mid-UV record of a stellar flare. Any such observations are earnestly solicited.

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