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ON THE VARIABILITY OF VEGA

At present the question on the photometric stability of the radiation of Vega remains open. Investigators give contradictory results. For example, Johnson (1980), analysing the series of photometric observations, came to the conclusion that the V brightness changes with time in the range of $\pm 0^{m}.03$. However, Kozyrev et al. (1981) on the basis of measurements in B and V filters claim that the brightness of Vega is constant.

The most numerous spectrophotometric results are obtained in the visible spectral region and particularly at the wavelength of 5556 Å. In this spectral region the allowance for the atmospheric radiation attenuation is made the most correctly, and the estimated errors σ of the value of the spectral irradiance density E_{λ} are of the order of 1 - 2%.

Figure 1 shows the values of the spectral irradiance density E_{λ} produced by the emission of Vega, at the wavelength $\lambda = 5556$ Å at the outer limit of the Earth's atmosphere, published from 1960 to 1987 by Code (1) (1963); Wilstrop (2) (1965); Kharitonov et al. (3) (1967); Oke et al. (4) (1970); Hayes et al. (5) (1975); Terez et al. (6) (1976); Terez et al. (7) (1979); Mal'zev et al. (8) (1979); Tüg et al. (9) (1977); Boiko et al. (10) (1979); Arkharov (11) (1985); Vasil'yev et al. (12) (1988), respectively. A number near each point is a reference to the paper from which the value of E_{5556} is taken. The errors σ are assumed to be ±1.5 %.

The difference between the highest and lowest values of E_{5556} is $0.34 \cdot 10^{-9}$ erg.cm^{-2}.s^{-1}.Å^{-1} or $0^{m}.10$ on the magnitude scale that makes an interval of 5-6 σ width which cannot be accounted for by pure photometric measurement errors.

In the first approximation the data can be fitted by a cosine curve with a period of about 23 years (see Figure 1). The maximum deviation is 5 % of an average $3.52 \cdot 10^{-9}$ erg·cm^{-2}·s^{-1}·Å^{-1} value. There is little information after 1983 but the available data show a tendency of reducing the brightness of the star.

In our opinion, the resulting curve is of interest. The continuum variability of Vega either characterizes the intrinsic stellar variability or is due

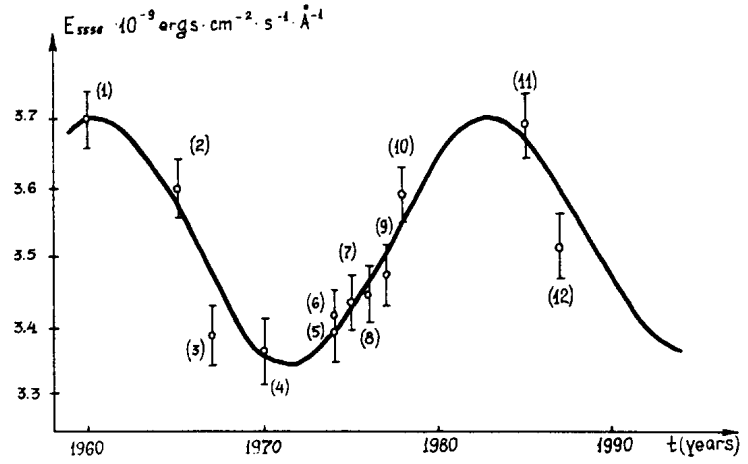

Figure 1

to the effect of systematic measurement errors not allowed for in using reference radiators. It is worthwhile to notice that there are some other data showing instability in Vega's radiation (Johnson and Wisniewski, 1979).

The interpretation of the curve shown in Figure 1 is given in the paper by Vasil'yev et al.(1988).

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