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VARIABILITY OF KAPPA CASSIOPEIAE

Following the communication by Elst (1979) on the variability in κ Cas with a period of ~ $0^d.09$, we followed the star during fall 1980. Using the 36 cm reflector of the U.P. State Observatory (UPSO), Nainital, we observed κ Cas (HR 130, B1 Ia, V = 4.15) for four nights in October and December, 1980. The UPSO telescope was equipped with a single channel photometer, with one RCA 1P21 water cooled to $-20^{\circ}C$. The observations were made through a B filter. The magnitudes were corrected for extinction using nightly extinction coefficients. However, the magnitudes have not been transformed to the standard UBV system.

We used HD 2011 (HR93, B8, V = 5.36) as a comparison star and HD 144 (HR7, B8, V = 5.44) as a check star, but the latter being more than 4° away from the comparison star was not used often. However, at the same time, no other suitable star was available to be used as a check star according to the criterion given by Baglin et al. (1972). Percy (1981) also observed the star during November 1980. He used HD 3283 (HR146, A2n, V = 5.82) as a comparison star and HD5015 (HR244, F8, V = 4.86) as a check star.

We have plotted the differential instrumental magnitudes i.e. the magnitudes of the variable minus that of the comparison star vs time in JD, in Figure 1. The complexity of the light curves of κ Cas shows the variations of non-periodic character and suggest a beat phenomenon. The light amplitude varies from cycle to cycle. Therefore, the light curves cannot be represented by a single period. A periodogram analysis (Gupta, 1971) and a least squares analysis have been carried out to determine the frequencies present in the light variations of κ Cas. The periodogram analysis gave two periods. The largest peaks were found to correspond to a primary period of P_0 ~ $0^d.072$ and to a secondary period of P_1 ~ $0^d.058$. The values of the periods were found to be the same as those determined by the method of least

squares where we have also incorporated the observations by Elst (1979). The latter method also shows that the light variations are repeated at an interval of ~ $0^d.16$ which should be the beat period between P_0 and P_1. The semi-amplitude of the light curves is ~ $0^m.015$. Interestingly, the ratio P_1/P_0 comes out to be ~ 0.8. Further analysis, in progress, shows that the ratio P_1/P_0 is nearer to 0.77.

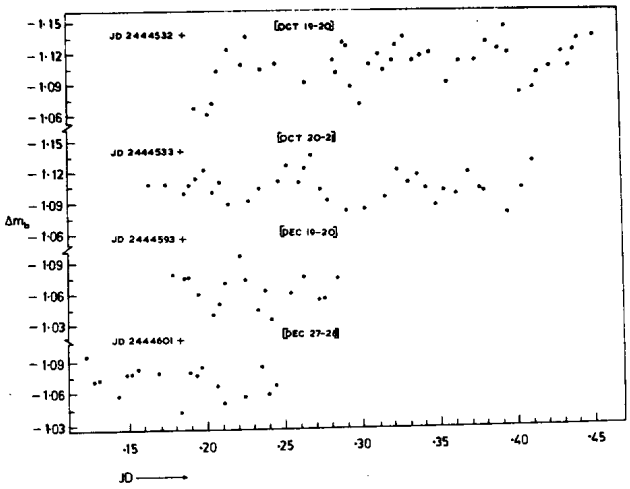

Figure 1

Our observations do not agree with those of Percy (1981) who does not find hour to hour variability in κ Cas, whereas they agree with Elst's observations as far as the short term variability is concerned, although our calculated periods are different from those of Elst's. κ Cas being a supergiant, its short-term variability raises some interesting questions about the theoretical implications, such as the cause of variability, the implied Q_0 value for a possible pulsation mechanism at work, the ratio P_1/P_0 (~ 0.77) implying radial pulsations, etc.

The star needs further extensive observations both photometric and spectroscopic, as the present situation is for most of the supergiants.

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