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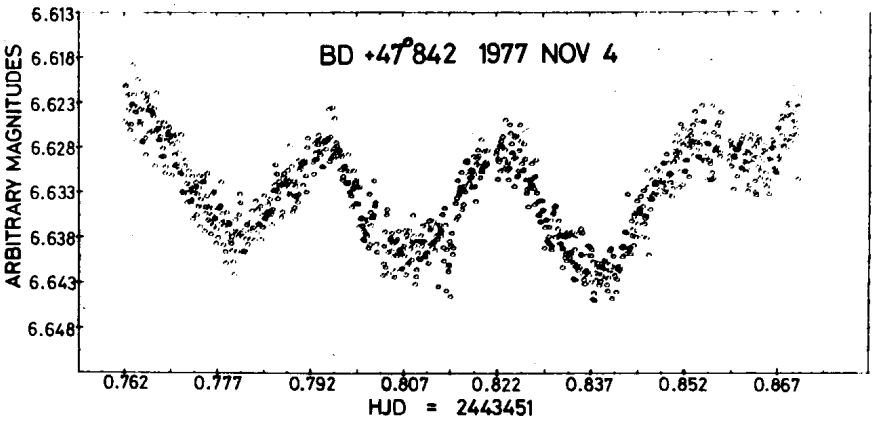
BD+47°842 - AN ULTRASHORT PERIOD δ SCUTI VARIABLE

In a recent survey of the α Persei cluster to detect small amplitude variables, three new such variables were discovered which are members of the cluster, as reported by Slovak (1978). These variables were classified as δ Scuti pulsators, falling within the confines of the δ Scuti instability strip and displaying the short period, small amplitude variations which characterize the class. Of particular interest is BD+47°842 (V = 8.78, B-V = +0.28; A3V), the hottest pulsator to be discovered in the α Persei cluster, which is found to fall nearly on the blue edge of the instability strip. An analysis of the 1975 -1976 differential data has revealed this variable to be multi-periodic, having a "fundamental" period of $P_o \approx 0^d.070$ and an "overtone" period of $P_1 \approx 0^d.030$.

In order to achieve higher time resolution, BD+47°842 was examined in 1977 November using a two channel high speed photometer which continuously samples the program star in the first channel and a suitable comparison star in the second channel. The light curve obtained in this fashion on 1977 Nov 4 is shown in the accompaning figure. The data were obtained on the 76-cm telescope of the McDonald Observatory; each point represents the average counting rate (in instrumental magnitudes) obtained in unfiltered light over a 10 s integration period. The data have been corrected for the sky background and extinction, using a mean coefficient of $\bar{k}_{vis} = 0.350$. Clearly visible in the light curve are two nearly symmetrical pulsations with a peak-to-peak amplitude of ≈ 0.017 mag, having a mean period of $0^d.0295 = 42.5$ minutes. Thus, the "overtone" period P_1 has



been present in BD+47°842 for at least two years, revealing it to be a remarkably stable pulsator. For study of similar short period δ Scuti variables, the application of the technique of high speed photometry , as opposed to the classical method of differential photometry, promises to be a powerful tool for defining the exact nature of the complicated light curves of these complex stars.

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Reference:

Slovak, M. H. 1978, Ap. J., in press.