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### PHOTOMETRIC VARIATION OF DELTA SAGITTAE

Delta Sagittae is a well known long period spectroscopic binary of VV Cephei type. It consists of a cool M2 supergiant and a hot B9 dwarf which passes periodically behind the supergiant in every 10.2 years and shines through its extended atmosphere. The system must have an orbital inclination greater than  $70^\circ$ , since atmospheric eclipses have been observed. The last eclipse occurred around the beginning of March 1980 and lasted about 40 days. The last eclipse was observed with IUE by Reimers and Kudritzki (1980), and Reimers and Schröder (1983). The spectroscopic properties of the system have been reviewed by Hack and Stickland (1987).

To investigate the nature of the photometric variations outside the eclipses in Delta Sagittae we have observed the system with UBV filters on 21 nights in 1988. The differential observations with respect to the comparison star  $\beta$  Sge were made by using an EMI 9789 QB photomultiplier attached to the 30 cm Maksutov telescope of Ankara University Observatory. The differential brightness measurements of  $\beta$  Sge with respect to the check star  $\alpha$  Sge were found to be sensibly constant during the observations:  $\Delta V = -0.001 \pm 0.0014$ ,  $\Delta B = -0.272 \pm 0.021$  and  $\Delta U = -0.748 \pm 0.036$ , where the errors are standard deviations of all measures from the means. Altogether 92 differential magnitudes of Delta Sge in each bandpass were obtained. The individual differential magnitude determinations with a number made on each night ranging from 2 to 14 were corrected for differential atmospheric extinction and light time effect. The observations in the sense variable minus comparison were plotted in Figure 1 against the heliocentric Julian date.

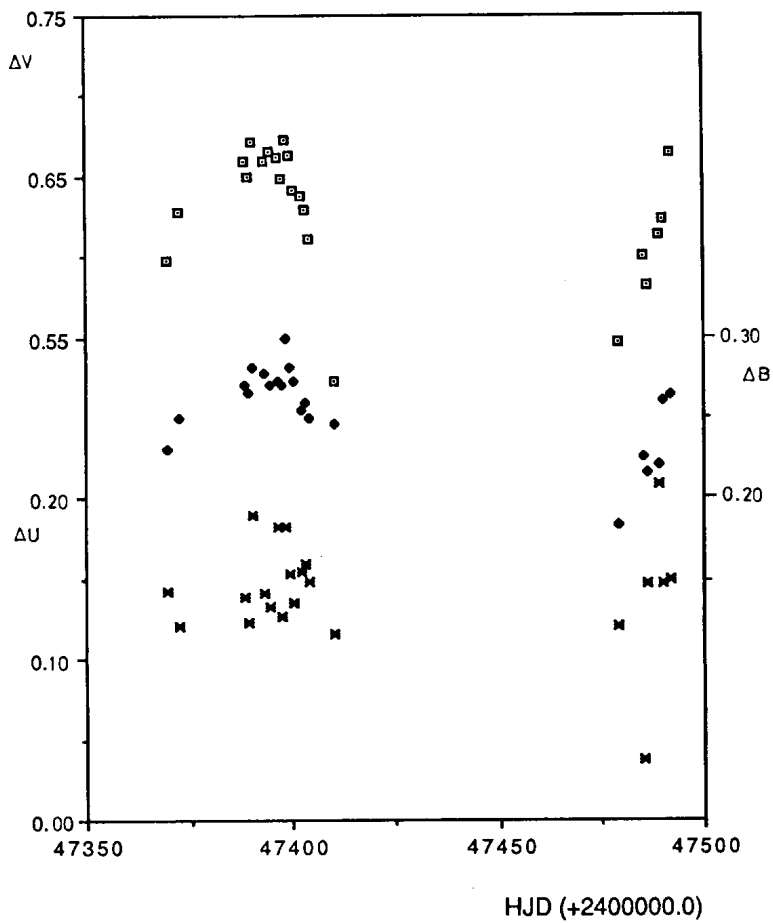


Figure 1. The UB observations of Delta Sagittae.

Although the observations are not complete, Figure 1 shows that Delta Sge has a photometric light variation with an amplitude at least  $0^m.15$  in all three bandpasses. The periodic nature of the variation is clearly seen especially in V and B observations. A preliminary period analysis yields two probable periods: 59 days and its double 118 days.

It is surprising that in VV Cephei, Baldinelli et al. (1970) found a semiregular variation with a period of approximately 58 days which is about half of the period of 118 days reported by Mc Cook and Guinan (1978) based on H-alpha observations. According to Hutchings and Wright (1971) such variations should come from the H-alpha emission region with a radius of  $150 R_{\odot}$ , surrounding the Be star. However, we believe it is more likely that a pulsation (radial or non-radial) of cool supergiants in these systems is involved in the observed photometric variations. Being in the instability strip, the M supergiant component of Delta Sge is most probably a semiregular red variable like  $\alpha$  Herculis with a pulsation period greater than 100 days. Thus the true photometric period of Delta Sge is expected to be around 118 days.

To derive the period of the low amplitude light variation more accurately, we continue the photometric observations.

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