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ON THE NON-VARIABILITY OF BD +74°877

Since Archer's (1959) observations in 1958, BD +74°877 (HD197617) was thought to be the brightest (m_{pv}=8.5), ultrashort period eclipsing binary known. In the Finding List by Koch et al. (1963) it is assigned a period of $0^d.1846$, a spectral type of A2, and primary and secondary depths of $0^m.3$ and $0^m.2$, respectively. Koch (1963), van Agt and van Genderen (1963), and Hall (1967) observed BD +74°877 photoelectrically but were unable to find any significant variability. Although these negative results are moderately convincing, interest in the star has been renewed because of the superficial resemblance to some post nova or neutron star systems. Further, the light curve observed by Archer (1959), shown in Figure 1, is compelling. The purpose of this note is to exhibit the most convincing set of observations, showing BD+74°877 to be nonvariable, and to develop an argument that Archer's observations were spurious.

This writer obtained simultaneous yellow and blue photoelectric observations of the system on October 4-5, 1976 with the Pennsylvania State University 60-inch reflector. Measurements were made with a 1 second time constant for a duration ($0^d.20$) somewhat longer than the listed period of the system, and alternated between BD +74°877 and the comparison star BD +74°878.The 56 observations of BD +74°877, shown in Figure 2, and BD +74°878 exhibit no variations greater than $0^m.02$.

A detailed examination of Archer's observations (Figure 3) reveals that almost all the observational weight is in the data for March 16-17, 1958. The remaining two nights show no convincing variations, and if it were not for six observations, minima would not be describe at all.

It is interesting to reconsider the evidence which caused BD +74°877 to be described as a variable in the first place. Archer (1958,1959) had been observing several short period variable stars around the time of his observations of BD +74°877, namely VW Cep ($P = 0^d.2783$) and VY Leo ($P = 0^d.1288$). The data for March 16-17 show an unusual circumstance. On March 14-15 and March 19-20 observations of BD +74°877 were interlaced with VW Cep and their common nearby comparison star, BD +75°7553. However, on March 16-17 no observations were published for VW Cep but yet there time slots interlaced for it. It is suggested that there may have been something unsuitable about the VW Cep data caused by instrumentation or sky problems, and that this also produced the largest scatter in the March 16-17 data of BD+74°877.

In view of all the evidence it seems certain that BD+74°877 should be relegated to the class of a normal, single A2 star.

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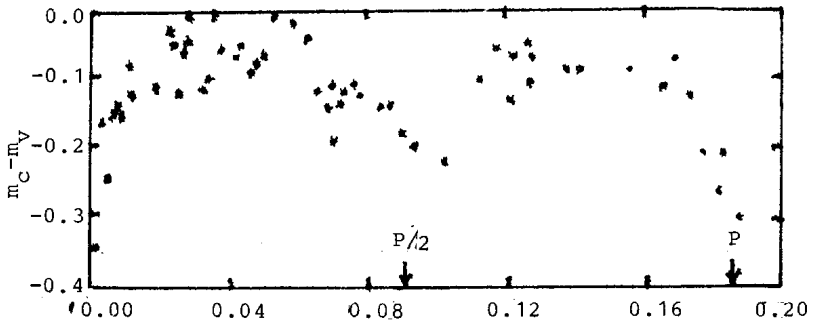

Figure 1: Archer's light curve of 1958

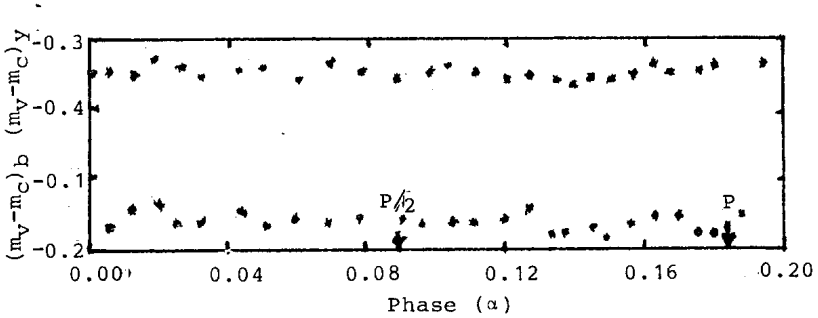

Figure 2 : Observations in 1976

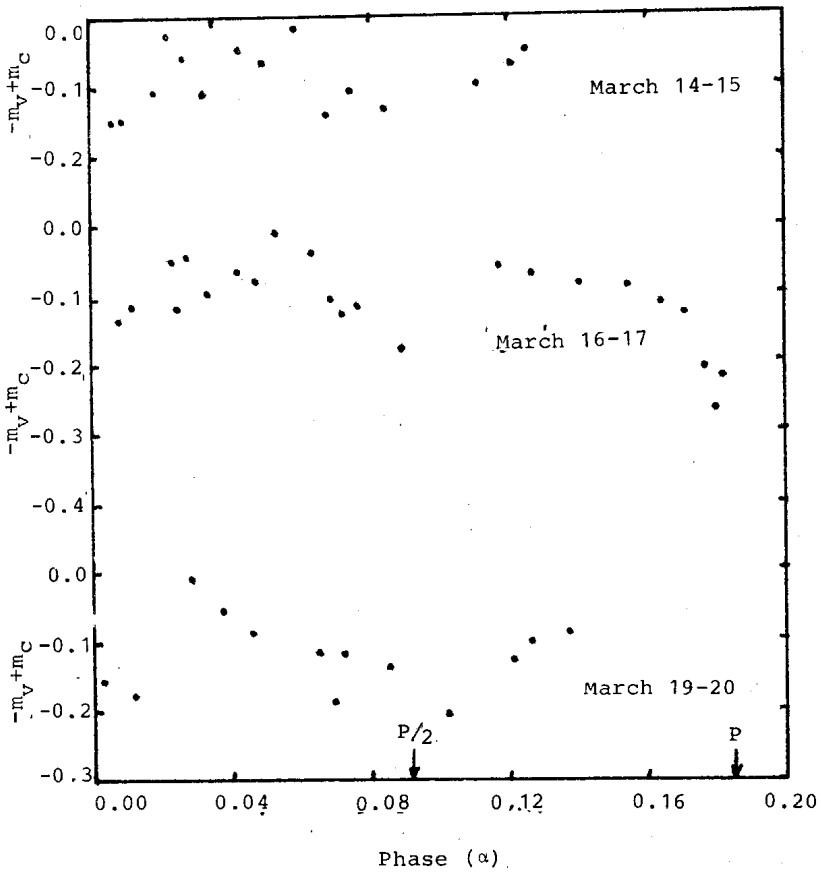

Figure 3: Archer's individual nights