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A SINGLE NIGHT LIGHT CURVE OF 44i Boo*

The W-Ursae Majoris type eclipsing binary 44 i Boo was observed on the 7-8 April 1982. The observations were obtained with the 40 cm reflector of the Rothney Astrophysical Observatory near Calgary, Canada, using an uncooled RCA 1P21 and a V filter closely matching the standard Johnson system.

Sky conditions were non-photometric necessitating the use of Calgary's Rapid Alternate Detection System, (Robb, et. al., 1982). This system allows the measurement of the variable star, comparison star and the appropriate sky values within a period of 1 second. Sixty of the 1-second periods were added appropriately to give 1-minute integrations. Each integration has been reduced to give differential magnitudes and comparison star observed magnitudes. The largest variation of successive comparison star measurements was 0.015 magnitudes per minute or 0.00025 magnitudes per second. This is the first use of this system to observe a variable star and an analysis of the errors of the system is in preparation.

The comparison star used was SAO 45347, which has V = 8.1 mag and G5 spectral type. Since the difference in (B-V) of the comparison and variable is 0.066 magnitude and the (B-V) color variation of 44 i Boo is small (0.013), (H. W. Duerbeck, 1978), the differential magnitudes have been transformed to the Johnson system with a constant additive term of -

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0.002 magnitudes. A constant nightly correction of +0.020 magnitudes was added to the differential magnitudes to correct for the systematic differing aspect of the instrument. Because the differential airmass never exceeded 0.004, differential extinction is negligible.

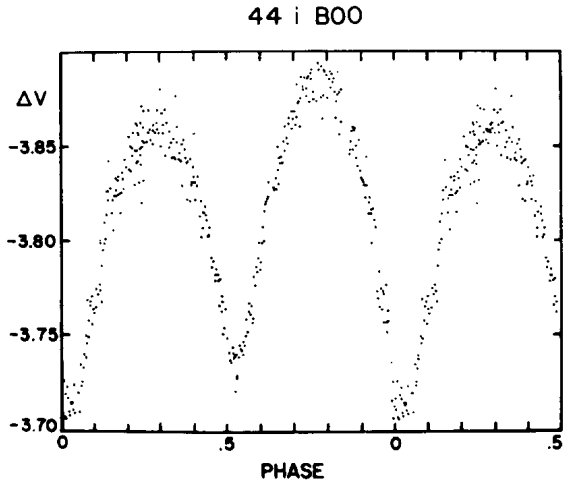

Figure 1. V light curve of 44 i Boo on JD 2445067

The differential V magnitudes are shown plotted in Figure 1 against heliocentric phase calculated with the ephemeris of Duerbeck, (1978). Overlap of consecutive cycles lies between phases 0.23 and 0.25, increasing the scatter of the data and emphasizing the need for single night light curves. Phases of minimum light were found by a computer program based on essentially the method of Kwee and Van Worden, (Chia, et. al., 1977), to be 0.0285 ± .0018 and 0.5232 ± .0014. A truncated four-term Fourier series was fit to the intensity data including the brighter component between phases 0.1 to 0.4 and 0.6 to 0.9. The coefficients normalized by A0 with their usual meaning are A0 = 1.0 ± .0009, A1 = -0.0052 ± 0.0012, A2 = -0.0395 ± .0014, B1 = -.0114 ± .0007, B2 = -0.0018 ± .0008. Assuming the primary of the triple system is 1.45 times brighter than the variable pair in V, as found by Bergeat, et. al. (1981), its effect can be removed

by dividing the non-A0 terms by 2.45. The A1 and A2 coefficients are then not significantly different from those reported by Duerbeck, (1978) for the years 1975, 1976 and 1977. The B1 term is very much larger, however, since the difference in maxima is 0.035 magnitudes. Thus one can see from the O-C's that the period has changed and from the light curve that 44 i Boo is again in the active phase.

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CORRIGENDUM

In I.B.V.S. No. 2166 the 2nd sentence "From uvby photometry obtained in 1970 ..." should read "From uvby photometry obtained in 1978, 1979 and 1980 ..." .

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