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PRECISE LIGHTCURVE ELEMENTS FOR HD 143213

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The variability of HD 143213 = SAO 121294 = GSC 353-301 was discovered by the TYCHO instrument of the HIPPARCOS satellite (Makarov et al., 1994). Among the 103 usable measurements in the B_T and V_T photometric channels there were a few discordant (fainter) ones which indicated a possible eclipsing binary. The small number and unsuitable temporal distribution of them made any more definite statement impossible. In IBVS No. 4536 we published a classification as Algol variable with a slightly offset secondary minimum and a preliminary period of 3.4500 days (± 0.0003 days). These results, derived from visual magnitude estimates by E. Born, were fully confirmed by the TYCHO data. However, there was a strong discrepancy in the phase of the lightcurve between the visual and the TYCHO data. No reason for the discrepancy could be found in checks of the original observations, and it was too large to be plausibly explained by a period change of the variable during the six years between the TYCHO and the visual observations.

Further observations by E. Born showed the period to be correct as well as constant, thus making a period change ever more implausible. More checks finally revealed an error in the epochs of the TYCHO data that we had used. The data had been extracted from the TYCHO-internal data base, and an obsolete routine for the computation of Julian dates had inadvertently been used in the process. All JDs given for the TYCHO observations in Table 1 of IBVS No. 4536 have to be increased by exactly 1.5 days. This correction gave a perfect agreement between the TYCHO and the visual data. A least-squares fit through all available timings of primary minima yielded

$$\text{JD}(\text{min}) = 2450304.357 (\pm 0.011) + 3.449896 (\pm 0.000062) \times E$$

For this computation, mean errors as given in Table 1 of IBVS No. 4536 were used for the visual timings, while 0.04 days were conservatively adopted for the isolated TYCHO observations at primary minima (corresponding to 1/4 of the total width of the primary minimum). An analogous, independent fit through the available timings of secondary minima yielded a fully consistent period of 3.449820 (± 0.000048) days and a mean phase of 0.541 ± 0.006 , i.e. a slight but highly significant offset from phase 0.5.

It should be pointed out that the epoch error reported here is only in the internal TYCHO data used for our preliminary analysis of HD 143213 in IBVS No. 4536. It is neither present in the already published Tycho Epoch Photometry Annex A of 34 000 stars, nor in the forthcoming Tycho Epoch Photometry Annex B of 480 000 stars.

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References:

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Makarov, V. et al. 1994, *IBVS*, No. 4118