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REVISED PHOTOMETRIC ELEMENTS OF ST Aqr

The eclipsing binary system ST Aqr is believed to consist of an A7 primary (brighter) star accompanied by a G8IV secondary companion (see Roman 1956). The light variation of this binary has been studied photoelectrically by Knipe (1971) in yellow light and later by Gleim (1973) in yellow, blue and ultraviolet light. As a follow-up to a series of works, which systematically rediscuss the photometric elements of numerous eclipsing binaries (see, e.g., Mardirossian et al. 1980), we have reanalyzed Gleim's (1973) three-colour observations by means of Wood's (1972, 1973-1978) lightcurve synthesis computer model. Our photometric solutions are listed in the table (for the explanation of the symbols the reader is referred to the paper by Mardirossian et al. (1980)).

The chief variable parameters are the orbital inclination angle i, the unperturbed radius r_h of the hotter component, the ratio of the unperturbed radii $k=r_c/r_h$, and the temperatures T_h and T_c of the two components. The mass ratio $q=M_c/M_h$ was also treated as a free parameter. Proximity effects probably give rise to some discordance among the temperatures T_h an T_c we have deduced for different lightcurves. However, no doubt the primary minimum is due to a transit and both components can be considered to be in contact with their Roche lobes, in substantial agreement with the results computed by Gleim (1973) by means of Russell and Merrill's (1952) method. It is remarkable that for our ratio of the radii $k\cong 0.5$ both components of ST Aqr may belong to the main sequence. Further spectrographic observations are needed for checking this possible view.

Table

λ	yellow	blue	ultraviolet
i	76.6±0.9	76.5±0.8	76.1±1.1
r_h	0.494±0.004	0.496±0.005	0.501±0.004
k	0.552±0.014	0.526±0.003	0.548±0.010
a_h	0.549±0.007	0.553±0.010	0.559±0.009
b_h	0.516±0.005	0.519±0.006	0.523±0.005
c_h	0.475±0.003	0.477±0.003	0.481±0.003
a_c	0.302±0.011	0.286±0.005	0.305±0.008
b_c	0.271±0.007	0.260±0.003	0.273±0.005
c_c	0.257±0.005	0.248±0.002	0.258±0.004
T_h(eq)	8100±200	7000±200	7000±300
T_h(pol)	8700	7500	7500
T_c(eq)	5200±100	4000±300	4500±200
T_c(pol)	5200	4100	4600
u_h	0.58	0.73	0.67
u_c	0.70	0.84	0.90
β_h	0.25	0.25	0.25
β_c	0.08	0.08	0.08
w_h	1	1	1
w_c	0.5	0.5	0.5
L_h	0.957	0.975	0.955
L_c	0.043	0.025	0.045
q	0.4±0.1	0.4±0.1	0.4±0.1

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