EFFECTIVE TEMPERATURES OF STARS WITH "STANDARD" ANGULAR DIAMETERS

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ABSTRACT. For 12 stars from the list of stars with "standard" angular diameters (Fracassini et al. 1983), effective temperatures, bolometric corrections, radii and luminosities were determined. These stars are included in the stellar spectrophotometric catalog of the Sternberg Astronomical Institute and three of them were used as spectrophotometric standards. A comparison was made of T_{eff} obtained directly using angular diameters from the list of Fracassini et al. (1983) and by means of joint determination of T_{eff} and Θ (Blackwell and Shallis 1977). For 7 stars the differences in T_{eff} values don't exceed 1-1.5% and the maximum discrepancies are about 6% for BS 2294, 2943 and 4% for the spectrophotometric standard α Aql (BS 7557). Effective temperature values of α Lyr obtained by these two methods are in the agreement within 0.5%.

Fracassini, Pasinetti and Valentini (1983) published a preliminary list of standard stars for the determination of apparent diameters and absolute radii. This list includes stars with reliable values of angular diameters obtained with different methods of determination. There are 22 stars in the list and 12 of them are in the stellar spectrophotometric catalog of the Sternberg State Astronomical Institute (Glushneva et al. 1982). Three stars, α Lyr, γ Ori and α Aql, were used as spectrophotometric standards and T_{eff} and other parameters for these stars were obtained (Glushneva 1983).

It is possible to compare the angular diameters Θ and the effective temperatures T_{eff} obtained by means of approximations (Blackwell and Shallis 1977) with those obtained directly, using the values of Θ from the list by Fracassini, et al. (1983). In both cases, the total flux is obtained from ultraviolet spectrophotometry from TD-1 (Jamar, et al. 1976) and OAO-2 (Code and Meade 1979), data from the stellar spectrophotometric catalog in the region 3200-10800Å (Glushneva, et al. 1982), and infrared photometry by Johnson, et al. (1966).

Values of Θ_{UD} from the list by Fracassini et al. were transformed into Θ_{LD} using the coefficients for these stars from Code et al. (1976).

TABLE I

Angular diameters, effective temperatures and total fluxes for stars with "standard" angular diameters.

BS	HD	Θ''	Θ^*	T_{eff},K	T^*_{eff},K	F,erg. $cm^{-2}sec^{-1}$
1543	30652	1.45×10^{-3}	1.70×10^{-3}	6660	6151	1.39×10^{-6}
1713	34085	2.85	2.64	11023	11453	40.1
1790	35468	0.707	0.741	21204	20909	35.1
2294	44743	0.482	0.541	25903	24470	35.1
2421	47105	1.36	1.39	9440	9346	4.93
2943	61421	5.22	5.87	6660	6278	17.9
4534	102647	1.34	1.37	8854	8726	3.64
4662	106625	0.781	0.782	12317	12313	4.70
5056	116658	0.876	0.860	24837	25070	97.7
6556	159561	1.65	1.68	7855	7781	3.46
7001	172167	3.25	3.23	9546	9581	29.4
7557	187642	3.04	2.82	7952	8263	12.4

The results of determinations of Θ and T_{eff} are presented in Table I, where the data obtained using Θ_{UD} from the list by Fracassini et al. are marked by asterisks. For BS 1543 we used $\pi = 0''.137$.

The comparison of the values T_{eff} and T^*_{eff} for stars with "standard" angular diameters shows that there are no significant systematic differences among them. The average difference is about 1.5% as a rule. For most of the stars $T_{eff} > T^*_{eff}$, but for two stars the differences are about 6% (α CMi, β CMa) and for α Aql they are 4%. However, for some stars (for example, γ Gem, α Oph, γ Crv) these differences do not exceed 1%. The agreement between T_{eff} and T^*_{eff} for α Lyr is better than 0.5%.

The comparison of effective temperatures obtained by means of the two methods presents an independent confirmation that the accuracy of the method of the joint determination of T_{eff} and Θ (Blackwell and Shallis 1977) may be not worse than 1%.

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DISCUSSION

GLUSHNEVA: This paper is a part of a rather large work on the determination of effective temperatures. We obtained values of T_{eff} for 73 stars of B – G spectral types and constructed a new scale of effective temperature. The differences between T_{eff} obtained by the two methods for two stars, out of the total number of twelve stars studied, are analyzed in the poster paper. The differences are connected with the accuracy of infrared flux measurements.