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EFFECTIVE TEMPERATURES AND ANGULAR DIAMETERS OF A-G MAIN SEQUENCE STARS

I.N. GLUSHNEVA, I.B. VOLOSHINA
Sternberg Astronomical Institute, Moscow 119899, Russia

L.N. KNYAZEVA
Fessenkov Astrophysical Institute, Alma-Ata 480068, Kazakhstan

ABSTRACT For 9 stars of A5-G2 spectral type interval IV and V luminosity classes effective temperatures, bolometric corrections, radii, angular diameters and luminosities were obtained by means of the infrared flux method in the modification by Blackwell et al. (1980).

The infrared flux method (Blackwell and Shallis, 1977) is used often for determination of the stellar effective temperatures and angular diameters, when reliable spectrophotometric measurements in the ultraviolet and visible ranges and infrared photometry are at our disposal.
9 stars were chosen of A5-G2 spectral type interval IV and V luminosity classes which are the members of the catalogue of 238 secondary spectrophotometric standards (Glushneva et al. 1992). In this catalogue energy distribution data are the mean of monochromatic fluxes in the range 3200-7600 A obtained independently at the Sternberg Astronomical Institute and Fessenkov Astrophysical Institute, Alma-Ata. Besides this catalogue contains also near infrared (6300-10800 A) energy distribution data for 99 stars obtained at the Sternberg Institute Crimean Station. So the possibility is to have homogenuous spectrophotometric data for the range wide enough from 3200 to 10800 A and it is especially important for A5 - G2 stars where the fraction of the total flux in this range is about 70-75 %.
Total fluxes of the investigated stars were obtained by means of the integration of monochromatic fluxes in the UV, visual and IR ranges. In the ultraviolet for $\lambda < 3200$ A spectrophotometric data of IUE were used (Heck et al.,1984; Wu et al.,1991). For BS 21, BS 2943, BS 5986 and for BS 8162 (in the

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range 1720-3200 A),where IUE low-dispertion data are absent, OAO-2 measurements were taken (Code and Meade, 1979).In the range 3200-10800 A spectrophotometric data obtained at the Sternberg Institute Crimean Station and Alma-Ata Astrophysical Institute from the catalogue of 238 secondary spectrophotometric standards (Glushneva et al., 1992) were used. For BS 483, BS 4540, BS 5986 and BS 6561 in the near-infrared range 7650-11084 A 13- color photometry by Johnson and Mitchell (1975) was taken using calibration given in this paper. In more longwavelength region up to 4 mm the fluxes were calculated using trapezium formula and absolute fluxes obtained from J_n, K_n, L_n photometry by Selby et al. (1988) and calibration of J, K, L bands by Saxner and Hammarback (1985) for the stars BS 483, BS 1543 and BS 2943. This calibration is based on the model of a Lyr by Dreiling and Bell (1980). In the visible and infrared up to 1 mm the calibration of a Lyr by Hayes (1985) was used. For BS 6561 where infrared photometry data are absent the flux for 1 >11084 A was obtained using model atmospheres data by Kurucz (1979) for T_{eff}=7500 K, lg g=4.00.In this case monochromatic flux was taken for 1 11084 A from Johnson and Mitchell (1975). The effective temperatures were obtaned using infrared flux method in the modification by Blackwell et al. (1980) for the calibration at J, K, L bands by Koornneef (1983) and for the calibration at I band by Johnson (1966). For BS 483 T_L was excluded from the averaging because of too large differences with all the other T_{eff} determinations at I, J and K bands. Table 2 contains the main physical parameters of the investigated stars: total fluxes (W/m^2), bolometric correction B.C., angular diameters (milliarcsec), radii, luminosities and log g.

TABLE I. EFFECTIVE TEMPERATURES

BS	T_I	T_J	T_K	T_L	T_{mean}
21	6990	6900	6960	-	6950
269	8010	-	-	-	8010
483	6130	6020	5925	5730	6025
1543	6430	6520	6450	-	6467
2943	6550	6600	6585	6600	6584
4540	6110	6035	6095	-	6080
5986	6520	-	-	-	6520
6561	7580	-	-	-	7580
8162	7820	7770	7725	7730	7774

$\log m/m_\odot$ were taken according to Straizys and Kuriliene (1981).

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TABLE II. Physical parameters of stars.

BS	F_{tot}	B.C.	θ''	$R/R_\odot$	lg $L/L_\odot$	lg $m/m_\odot$	lg g
21	$3.114\ 10^{-9}$	-0.01	2.00	2.92	1.270	0.18	3.68
269	$6.963\ 10^{-10}$	+0.01	0.71	1.93	1.152	0.26	4.12
483	$3.014\ 10^{-10}$	-0.16	0.83	1.08	0.156	0.00	4.36
1543	$1.392\ 10^{-9}$	-0.06	1.55	1.19	0.364	0.08	4.36
2943	$1.868\ 10^{-8}$	-0.07	5.46	1.97	0.832	0.10	3.94
4540	$9.571\ 10^{-10}$	-0.07	1.45	1.47	0.436	0.04	4.14
5986	$6.684\ 10^{-10}$	-0.08	1.05	2.18	0.900	0.11	3.86
6561	$9.536\ 10^{-10}$	0.00	0.93	3.27	1.516	0.20	3.60
8162	$2.702\ 10^{-9}$	-0.03	1.49	2.32	1.260	0.22	3.92

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