ANALYSIS OF uvby PHOTOMETRY AND LOW-RESOLUTION SPECTROPHOTOMETRY OF B STARS

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A method of analysis of Strömgren photometry and low-resolution spectrophotometry of B stars is being developed in collaboration with J.P. Kaufmann (Technische Universität, Berlin). A full account will be published elsewhere.

The method is similar in spirit to that employed by Tobin & Kaufmann (1984) but aims at a more careful consideration of systematic effects. Stellar effective temperature and gravity are determined by the intersection in a 'Kiel diagram' of the loci of gravities and temperatures permitted by the observed colors and Hγ and Hδ equivalent widths. Kurucz (1979) models are used in this part of the analysis, and a major difficulty is that systematic effects in Balmer equivalent widths measured from low-resolution spectra can affect log g by $\gtrsim 0.5$! We are investigating using empirical multiplicative factors for our Balmer equivalent widths in order to tie our mean results onto values determined from Sinnerstad's (1980) analysis of the photoelectric β index.

The helium content can next be determined (at least for Teff $\gtrsim$ 20 000 K) using the method of Kaufmann & Hunger (1972) on Hγ, Hδ, HeI 402.6 and HeI 447.1 nm. Pure hydrogen-helium 'Berlin models' are used in this part of the analysis, and differences in the blanketing and thus effective temperature scale must be allowed for. Projected rotational velocity can be determined from measured widths of HeI 402.6, 438.8 and 447.1 nm absorptions and calculations of solid-body rotation of the Berlin atmospheres. Allowing for both temperature *and* gravity dependence of the HeI lines, values of rotational velocity can be obtained to ±30 km/s, or about half the error of an earlier calibration which only allowed for the temperature dependence of the HeI lines (Balona 1975).

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DISCUSSION

PHILIP: I have a question concerning the program that you mention in your paper, the runaway B stars. You may know that I have been working on A stars at high galactic latitudes and I have found a similar problem. There are too many so-called normal A-type stars far off the galactic plane. Rodgers worked on a list that Sanduleak and I published of A-Type stars at the South Galactic Pole and he claimed that there were 19 out of 62 A-stars in the list that seemed to be normal, Population I stars. John Drilling and I have just completed a paper concerning four-color measures of all 62 stars in the list and we have reclassified some of the Rodgers classifications. But we still end up with something like 12 out of 62 stars seem to be normal Population I A-type stars. Do you know the statistics for the B-type stars?

TOBIN: No. The whole problem is that what has been done with these stars has been very unsystematic. I have no idea about completeness of the sample, etc.

PHILIP: At the South Galactic Pole we measured all the early-type stars in the area down to a limiting magnitude of V = 15.

TOBIN: Yes, but the problem is that we depend on published material.

PHILIP: How many B-type stars of this type are there?

TOBIN: Many scores, certainly, if you were to have a sample complete to something like 9th magnitude. I would guess that if you were complete down to the 10th magnitude you might have perhaps 1000 stars. For instance, I have just submitted a paper on the total galactic reddening using B-type stars more than 10 from the galactic plane as tracers. I was able to compile a catalogue of 1100 such B-type stars with uvby photometry without any problem. And then, under the assumption that they had normal luminosity, and - because of the reddening interest - after eliminating many stars with possible peculiar intrinsic colors (because of emission, etc.) I was still left with 72 stars more than 250 parsecs from the plane.

JASCHEK: Could you use the H-gamma line for your absolute magnitude calibration?

TOBIN: I am not attempting an M_v calibration. For the plate material I am using the H-gamma line that has already been calibrated in terms of M_v by Balona and Crampton (1974 Mon. Not. R. Astr. Soc. 166, 203).

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