

51. CALIBRATION OF 4-COLOR AND $H\beta$ PHOTOMETRY FOR B- AND A-TYPE STARS

D. L. CRAWFORD

Kitt Peak National Observatory, Tucson, Ariz., U.S.A.*

Observing has been underway for several years, at Kitt Peak and Cerro Tololo, of the bright B and A stars, and of the brighter and nearer open clusters, to supply data necessary for calibration of 4-color and $H\beta$ indices in terms of intrinsic color and absolute magnitude, as well as for use in studies of galactic structure. To date, data are on hand – some published, most being prepared for publication – for all O- to G0-type stars brighter than $V=5^m0$, for most O- to B5-type to 6^m5 , and for most northern hemisphere O- to G0-type to 6^m5 . In addition, the following open clusters have been studied: Hyades, Coma, Ursa Major, Praesepe, α Persei, Pleiades, IC 2602, IC 2391, η and χ Persei, NGC 6231, NGC 752, and IC 4665.

The following parameters are derived for the $u\ v\ b\ y\ \beta$ photometry:

- (1) V , the visual magnitude;
- (2) $(b-y)$, a color index, which has 70% of the scale of $(b-v)$;
- (3) m_1 , a measure of 'blanketing' in the $\lambda 4100\ \text{\AA}$ region. $E(m_1) = -0.3 E(b-y)$.

For the A and F stars, a standard m_1 vs. β relation is used to derive $\delta m_1 = m_1$ (std) $- m_1$ (obs.).

(4) c_1 , a measure of the Balmer discontinuity. $E(c_1) = 0.2 E(b-y)$. For the A- and F-type stars $\delta c_1 = c_1$ (obs.) $- c_1$ (std).

(5) $(u-b)$, a color index. $E(u-b) = 1.7 E(b-y)$.

(6) β , a measure of the $H\beta$ line strength.

The definitive calibrations are being prepared for publication soon, but I would like to present a simple preliminary set of calibrations at this time:

(a) For the A-type stars ($2.890 < \beta < 2.720$, $\delta c_1 < 0.280$):

(1) $(b-y)_0 = 2.943 - 1.0 \beta - 0.1 \delta c_1 - 0.1 \delta m_1$. Cosmic scatter $\pm 0^m011$ (mean error, one star).

(2) $M_v = M_v(\text{Z.A.M.S.}) - 8 \delta c_1$.

(b) For the B stars ($-0.1 < c_1 < 1.000$):

(1) $(b-y)_0 = -0.116 + 0.097 c_1$. Cosmic scatter $\pm 0^m01$.

(2) $M_v = M_v(\text{Z.A.M.S.}) - 8 \delta \beta$. Cosmic scatter $\pm 0^m2$ at B9, $\pm 0^m7$ at B0.

* Operated by the Association of Universities for Research in Astronomy, Inc., under contract with the National Science Foundation.