CEPHEID TEMPERATURES DERIVED FROM ENERGY DISTRIBUTIONS

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A number of previous studies of the relation between observed colors and temperatures of Cepheids have been done (Kraft 1961; Johnson 1966; Parsons 1971; Bohm-Vitense 1972; Schmidt 1972; Pel 1978). It was the discrepancies between these various temperature scales, especially at the cooler end, that led us to undertake the present recalibration. We felt some improvement on the previous work would result from our access to better scan data, reddening information, and model atmospheres. The results presented here are preliminary, as they represent only a sample of the data we have obtained.

The energy distributions were obtained from spectrum scans, using the Intensified Reticon Scanner (IRS) of Kitt Peak National Observatory. The high sensitivity of the IRS, as well as the fact that all wavelengths are measured simultaneously, generates very high quality data. Scans were made between approximately 3600 and 8000Å. The scans were reduced with standard Kitt Peak IRS reduction software.

The stars chosen for this study are Cepheids located in galactic clusters which have been well observed, and so their other properties are relatively well known. In this discussion we will present some results, at a few phases, for CF Cas, which is a member of NGC 7790. Schmidt (1981) has obtained four-color photometry of the early type stars in NGC 7790 and determined the color excess for CF Cas. To correct the scans this color excess was used in conjunction with the reddening curve for Cassiopeia given by Nandy (1968).

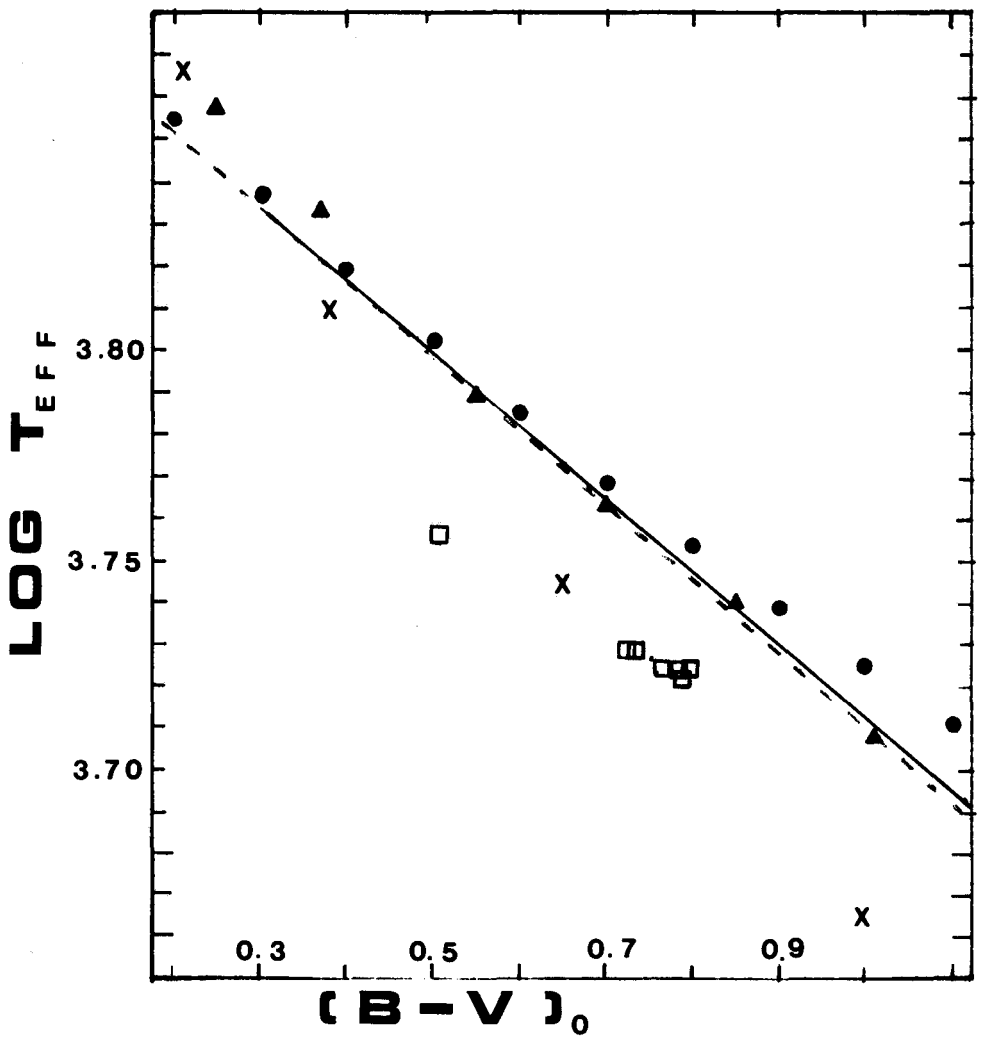
In this report we have compared the scans to the model atmospheres of Kurucz (1970). The color index of the star, at the corresponding phase, was determined from a B-V color curve of the star and compared to the temperature derived from the scan. The results of a few of these comparisons are shown in Figure 1, along with the results of earlier authors.

These data were obtained while the authors were guest observers at Kitt Peak National Observatory, National Optical Astronomy Observatories, which is operated by the Association of Universities for Research in Astronomy, Inc., under contract with the National Science Foundation.

References

Bohm-Vitense, E. (1972). Astr. Ap., 17, 335
Johnson, H. L. (1966). Ann. Rev. Astr. Ap., 4, 193.
Kraft, R. P. (1961). Ap. J., 134, 616.
Kurucz, R. L. (1979). Ap. J. Suppl., 40, 1.
Nandy, K. (1968). Publ. Roy. Obs. Edinburgh, 7, 177.
Parsons, S. B. (1971). M. N. R. A. S., 152, 121.
Pel, J. W. (1978). Astr. Ap., 62, 75.
Schmidt, E. G. (1972). Ap. J., 174, 605.
Schmidt, E. G. (1981). A. J., 86, 242.

Fig. 1 - Log of effective temperature vs. B-V. The temperature scales of various authors are indicated by: a solid line, Kraft (1961) and Parsons (1971); a broken line, Pel (1978); triangles, Johnson (1966); crosses, Bohm-Vitense (1972); dots, Schmidt (1972). The boxes represent the new data for CF Cas.



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