EFFECTIVE TEMPERATURES, RADII AND BOLOMETRIC MAGNITUDES OF Ap AND Am STARS

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Abstract. The effective temperatures, radii and bolometric magnitudes of Ap, Am and normal A stars have been estimated from their energy distribution curves between 478 nm and 680 nm. All the Am stars and one Ap star (i.e. β CrB) were found to be affected by line blanketing, a rough estimation of which in the respective (B−V) colours has been found out in each case.

The range in effective temperature is 0.45-0.60 in terms of θ∗ (= 5040/T∗), while it is 1.8-4.8 R⊙ in the case of radius, that in bolometric magnitude being from −0.67 to +1.61. An approximate estimate of the masses shows that they are between 1.5 and 3.0 M⊙. All these estimates are in agreement with those of the normal A stars. The Ap and Am stars are found to be slightly evolved and, therefore, are probably in the hydrogen shell-burning phase.

1. Introduction

In this extension of our earlier work (Babu, 1976, 1977), we have determined the effective temperatures, radii and bolometric magnitudes of twenty-one A stars (including Ap, Am and normal A stars) from their energy distribution curves obtained by the same instrumentation and observational techniques employed earlier. The basic data of these stars are given in the first six columns of Table I.

It has already been shown (Babu, 1976, 1977; Wolff, 1967a, b) that, in the visible region, the physical parameters of Ap and Am stars are not significantly different from those of normal A stars. On the other hand, since the abnormal abundances of certain elements in Ap and Am stars constitute the main differences between them and the normal A stars, one expects the respective energy distribution curves to show various amounts of blanketing effects, particularly towards the shorter wavelengths. On this basis an attempt has also been made to estimate the blanketing effects, if any, in the colours of these stars.

Finally, the evolutionary aspects of these stars are discussed and their masses estimated.

2. Results

2.1. EFFECTIVE TEMPERATURES

The standard magnitudes of the program stars normalized to 555.5 nm are plotted in Figures 1(a) and 1(b), where the probable errors in the observed magnitudes are less than ±0.02. The reduction techniques are the same as those described earlier (Babu,
WAVELENGTH (in nm)