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# Integrated brightness and colour of Omega Centauri

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**Abstract** : Integrated magnitudes in $U$, $B$, $V$, $R$ and $I$ bands are calculated for the globular cluster Omega Centauri. The observed radial change in the integrated colour of the cluster shows that the cluster core ($r < 2'$) is redder in $R - I$ colour and bluer in $U - B$ colour. It is argued that there is an increase in the ratio of AGB stars to the red giants towards the centre of the cluster.

*Key words* : integrated brightness—globular cluster—Omega Centauri

## 1. Introduction

Early estimates of integrated magnitude of the globular cluster Omege Centauri were by visual comparison of the cluster with the standard stars, made either at the focal plane of the telescope or in the photographs taken of the cluster. The visual estimates range from 3.7 to 4.7 in photographic magnitude (Ekenberg 1940). Shapley (1927) makes a visual estimate of 3.0 for the integrated photographic magnitude of the cluster. Christy (1940) determined photographically integrated magnitudes of 68 globular clusters using the Schraffierkassette or the moving plate camera. The brightness determined this way keeps the errors caused by local irregularities in the sensitivity and distribution of the silver grains in the photographic plate and imperfections in the optical parts of the telescope to a minimum. For accurate determination of the integrated magnitude, the motion of the plate-holder should be double the diameter of the cluster, so that the stars on the edges of the cluster also pass through the centre of the Schraffierkassette image. Christy has used a diameter much smaller than the real diameter of Omega Centauri and hence his estimate of the integrated brightness is bound to be slightly smaller. Christy (1940) gives a value of 5.1 for the photographic magnitude of Omega Centauri. Shapley applied an approximate value for the galactic extinction appropriate for the low galactic latitude of Omega Centauri and gives a value of $m_{pg} = 4.7$ (Shapley 1942).

Gascoigne & Burr (1956) made drift scans of the cluster in the E—W direction using a circular aperture 26 arcsec in diameter. Also concentric aperture measures were made with a 9″ reflector. The cluster is elliptical in shape. Gascoigne & Burr used Schilt's (1928) photographic measures and Shapley's (1930) star counts to estimate the ellipticity of the cluster at different distances from the centre. Close to the centre and also in the outer regions, they assumed that the cluster isophotes are circular and in the intermediate regions they assumed elliptical isophotes with the major axes oriented East-West. Gascoigne & Burr estimated a value of 4.22 for the integrated photographic magnitude of Omega Centauri. With a colour of $P - V = 0.68$, the visual integrated magnitude of the cluster becomes 3.54. This value is much brighter than the estimate of Shapley (1949).

Scaria & Bappu (1981) have made photoelectric spot measurements over the cluster Omega Centauri in *U*, *B*, *V*, *R* and *I* bands. Scaria (1980) gives estimates of ellipticity of the cluster in *B*, *V* and infrared bands. These data can be used to calculate the integrated brightness in *U*, *B*, *V*, *R* and *I* bands.

## 2. Surface brightness and ellipticity of Omega Centauri

Scaria (1980) has obtained equidensity contours of Omega Centauri employing Sabattier technique to the photographs taken in standard B, V system and also in an infrared band isolated by the filter-emulsion combination of RG8 and hyper sensitised I N Plate. The evenly distributed equidensity contours have major axes ranging from 0.81 arcmin to 7.75 arcmin. It has been shown that the cluster has the smallest ellipticity within 1.7 arcmin from the centre. Beyond this the ellipticity increases and reaches a maximum around 3 arcmin from the centre. At larger distances the ellipticity decreases again to reach a second minimum before increasing again. These variations pronounced in the blue band when compared to the infrared band. Close to the centre, ellipticity is low in all wavelegth bands. The orientations of the major axes of the isophotes are not exactly east-west as assumed by Gascoigne & Burr in determining integrated magnitude of Omega Centauri. Their orientations show considerable variation with distance from the cluster centre.

Scaria & Bappu (1981) made photoelectric spot measurements over the cluster in the east-west and north-south directions in *U*, *B*, *V*, *R* and *I* bands. We have used these measurements to calibrate intensity levels of the isophotes obtained by Scaria (1980) and thereby determine the integrated magnitude of the cluster in *U*, *B*, *V*, *R* and *I* bands. The *B* band ellipticities were used for the determination of integrated magnitudes in *U* and *B* bands, the *V* band ellipticities for the integrated magnitude in *V* band and the ellipticities from the infrared plate for the integrated magnitude in *R* and *I* bands.

The brightness profile of the cluster shows sudden variations even at the dense inner regions of the cluster. A smooth curve of the brightness profile was drawn through the observed points avoiding the regions where clumping of stars occurs. East-west and north-south scans cut each isophote at four points. The intensity value for each isophote was obtained as a mean of these four values.

The relevant data are given in tables 1–3. Table 1 is for *V* band, table 2 for the *U*, *B* bands and table 3 for the *R*, *I* bands. In table 1, columns 1 through 5 give the serial number of the isophote as given by Scaria (1980), the semimajor axis *a* of the isophote in arcmin, the axial ratio $b/a$, the area included in the isophote in arcmin$^2$ and the position angle of the major axis of the isophote in degree respectively. Surface brightness of the isophote in magnitude is given in column 6 and the light included within the isophote in *V* band expressed in magnitude in column 7.

In table 2, we give data for *U* and *B* bands. Columns 1 through 5 give particulars

**Table 1.** Photometric data for Omega Centauri in *V* band

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| Centre | 0.5000 | 1.000 | 0.785 | — | 16.800 | 8.17 |
| 1 *V* | 0.8154 | 0.915 | 1.911 | 102.3 | 16.845 | 7.22 |
| 2 *V* | 1.1368 | 0.915 | 3.713 | 109.6 | 16.885 | 6.52 |
| 3 *V* | 1.3128 | 0.912 | 4.935 | 125.9 | 16.928 | 9.23 |
| 4 *V* | 1.3879 | 0.900 | 5.443 | 128.3 | 16.945 | 6.13 |
| 5 *V* | 1.7553 | 0.887 | 8.589 | 112.4 | 17.065 | 5.69 |
| 6 *V* | 1.8241 | 0.886 | 9.264 | 111.1 | 17.093 | 5.62 |
| 7 *V* | 2.4141 | 0.879 | 16.085 | 101.5 | 17.323 | 5.13 |
| 8 *V* | 2.4474 | 0.879 | 16.535 | 98.1 | 17.340 | 5.11 |
| 9 *V* | 2.5976 | 0 886 | 18.784 | 104.1 | 17.403 | 5.00 |
| 10 *V* | 2.6902 | 0.884 | 20.097 | 98.1 | 17.440 | 4.95 |
| 12 *V* | 2.7870 | 0.866 | 21.131 | 98.4 | 17.463 | 4.91 |
| 13 *V* | 2.9597 | 0.871 | 23.962 | 101.7 | 17.535 | 4.81 |
| 14 *V* | 2.2070 | 0.845 | 27.305 | 98.9 | 17.615 | 4.71 |
| 15 *V* | 3.5436 | 0.852 | 33.628 | 99.4 | 17.753 | 4.56 |
| 16 *V* | 3.7651 | 0.865 | 38.500 | 98.0 | 17.855 | 4.47 |
| 17 *V* | 3.8821 | 0.870 | 41.178 | 100.1 | 17.905 | 4.43 |
| 18 *V* | 4.2068 | 0.858 | 47.694 | 98.8 | 18.015 | 4.33 |
| 19 *V* | 4.4655 | 0.862 | 53.995 | 97.5 | 18.130 | 4.26 |
| 20 *V* | 4.9410 | 0.874 | 67.017 | 98.9 | 18.333 | 4.13 |
| 21 *V* | 5.2681 | 0.844 | 73.551 | 96.0 | 18.423 | 4.08 |
| 22 *V* | 5.8892 | 0.839 | 91.421 | 99.1 | 18.668 | 4.03 |
| 23 *V* | 6.0606 | 0.842 | 97.128 | 93.3 | 18.735 | 4.00 |
| 24 *V* | 7.4221 | 0.829 | 143.410 | 98.5 | 19.228 | 3 83 |

**Table 2.** Photometric data for Omega Centauri in *U* and *B* bands

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|
| Centre | 0.5000 | 1.000 | 0.785 | — | 17.820 | 9.19 | 17.680 | 9.05 | 0.14 |
| 1 *V* | 0.8154 | 0.915 | 1.911 | 102.3 | 17.893 | 8.25 | 17.733 | 8.10 | 0.15 |
| 2 *V* | 1.1368 | 0.915 | 3.713 | 109.6 | 17.953 | 7.57 | 17.775 | 7.41 | 0.16 |
| 1 *B* | 1.5410 | 0.890 | 6.641 | 114.5 | 18.095 | 6.99 | 17.855 | 6.82 | 0.17 |
| 2 *B* | 1.9766 | 0.890 | 10.676 | 105.1 | 18.195 | 6.54 | 17.963 | 6.35 | 0.19 |
| 3 *B* | 2.0531 | 0.903 | 11.951 | 100.8 | 18.235 | 6.44 | 17.998 | 6.25 | 0,19 |
| 4 *B* | 2.3852 | 0.891 | 15.920 | 98.0 | 18.345 | 6.19 | 18.108 | 5.99 | 0.20 |
| 5 *B* | 2.5108 | 0.877 | 17.375 | 96.2 | 18.383 | 6.12 | 18.148 | 5.91 | 0.21 |
| 6 *B* | 2.6012 | 0.855 | 18.167 | 100.7 | 18.398 | 6.08 | 18.158 | 5.87 | 0.21 |
| 7 *B* | 3.0422 | 0.855 | 24.853 | 100.5 | 18.565 | 5.83 | 18.318 | 5.61 | 0.22 |
| 8 *B* | 3.0945 | 0.841 | 25.286 | 100.4 | 18.570 | 5.81 | 18.328 | 5.60 | 0.21 |
| 9 *B* | 3.4560 | 0.834 | 31.280 | 101.3 | 18.725 | 5.65 | 18.465 | 5.43 | 0.22 |
| 10 *B* | 3.5602 | 0.850 | 33.832 | 100.3 | 18.805 | 5.60 | 18.543 | 5.38 | 0.22 |
| 11 *B* | 3.6501 | 0.855 | 35.772 | 101.3 | 18.863 | 5.56 | 18.590 | 5.34 | 0.22 |
| 12 *B* | 3.8147 | 0.858 | 39.238 | 100.5 | 18.963 | 5.50 | 18.673 | 5.27 | 0.23 |
| 13 *B* | 3.9834 | 0.858 | 42.752 | 101.8 | 19.068 | 5.45 | 18.768 | 5.22 | 0.23 |
| 14 *B* | 4.0294 | 0.856 | 43.651 | 99.5 | 19.093 | 5.43 | 18.785 | 5.20 | 0.23 |
| 15 *B* | 4.0815 | 0.872 | 45.611 | 100.4 | 19.128 | 5.41 | 18.813 | 5.18 | 0.23 |
| 16 *B* | 4.2729 | 0.861 | 49.400 | 99.6 | 19.218 | 5.36 | 18.880 | 5.13 | 0.23 |
| 17 *B* | 4.3610 | 0.869 | 51.922 | 97.1 | 19.280 | 5.34 | 18.928 | 5.10 | 0.24 |
| 18 *B* | 4.4727 | 0.868 | 54.572 | 100.2 | 19.340 | 5.31 | 18.978 | 5.07 | 0.24 |
| 19 *B* | 4.7511 | 0.867 | 61.450 | 97.4 | 19.518 | 5.25 | 19.108 | 5 00 | 0.25 |
| 20 *B* | 4.9551 | 0.867 | 66.889 | 101.8 | 19.628 | 5.21 | 19.208 | 4.96 | 0.25 |
| 21 *B* | 5.4877 | 0.844 | 79.863 | 101.4 | 19.843 | 5.14 | 19.410 | 4.87 | 0.27 |
| 22 *B* | 6.0401 | 0.847 | 97.088 | 100.6 | 20.078 | 5.06 | 19.660 | 4.78 | 0.28 |
| 23 *B* | 6.4897 | 0.837 | 110.763 | 103.8 | 20.333 | 5.01 | 19.845 | 4.73 | 0.28 |
| 24 *B* | 7.3260 | 0.822 | 138.579 | 106.1 | 20.617 | 4.95 | 20.210 | 4.65 | 0.30 |

about the isophotes obtained from the *B* band photograph in a way similar to table 1. Column 6 and 8 give the brightness level of the isophotes in the *U* and *B* bands respectively. In columns 7 and 9 we give the light coming from the cluster inside each isophote in *U* and *B* bands expressed in magnitude. Column 10 gives the integrated *U* — *B* colour of the cluster with in each isophote.

**Table 3.** Photometric data for Omega Centauri in *R* and *I* bands

| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|
| Centre | 0.5000 | 1.000 | 0.784 | — | 15.820 | 7.19 | 15.290 | 6.66 | 0.53 |
| 1 *V* | 0.8154 | 0.915 | 0.911 | 102.3 | 15.878 | 6.24 | 15.380 | 5.72 | 0.52 |
| 1 *I* | 1.1889 | 0.888 | 3.945 | 105.9 | 15.928 | 5.49 | 15.470 | 4.99 | 0.50 |
| 2 *I* | 1.5313 | 0.886 | 6.523 | 108.2 | 16.025 | 4.98 | 15.595 | 4.51 | 0.47 |
| 3 *I* | 1.5477 | 0.889 | 6.690 | 108.7 | 16.033 | 4.96 | 15.608 | 4 48 | 0.48 |
| 4 *I* | 1.7492 | 0.910 | 8.748 | 111.4 | 16.103 | 4.70 | 15.730 | 4.24 | 0.46 |
| 5 *I* | 1.9486 | 0.905 | 10.795 | 110.0 | 16.143 | 4.50 | 15.795 | 4.06 | 0.44 |
| 6 *I* | 2.0340 | 0.898 | 11.673 | 107.9 | 16.188 | 4.43 | 15.850 | 3.99 | 0.44 |
| 7 *I* | 2.2834 | 0.904 | 14.795 | 102.0 | 16.265 | 4.22 | 15.960 | 3.80 | 0.42 |
| 8 *I* | 2.2956 | 0.902 | 14.930 | 102.6 | 16.268 | 4.21 | 15.960 | 3.80 | 0.41 |
| 9 *I* | 2.6852 | 0.884 | 20.016 | 99.0 | 16.415 | 3.96 | 16.143 | 3.57 | 0.39 |
| 10 *I* | 2.8982 | 0.875 | 23.088 | 98.7 | 16.488 | 3.85 | 16.213 | 3.47 | 0.38 |
| 11 *I* | 3.0066 | 0.865 | 24.564 | 98.2 | 16.533 | 3.80 | 16.290 | 3.42 | 0.38 |
| 12 *I* | 3.1868 | 0.871 | 27.791 | 100.9 | 16.618 | 3.71 | 16.380 | 3.34 | 0.37 |
| 13 *I* | 3 6605 | 0.883 | 37.142 | 99.0 | 16.855 | 3.50 | 16.643 | 3.16 | 0.34 |
| 14 *I* | 3.9386 | 0.886 | 43.163 | 98.7 | 16.978 | 3.41 | 16.785 | 3.07 | 0.34 |
| 15 *I* | 4.0298 | 0.883 | 45.041 | 98.4 | 17.010 | 3.38 | 16.825 | 3.05 | 0.33 |
| 16 *I* | 4.3418 | 0.883 | 52.295 | 100.5 | 17.133 | 3.29 | 16.958 | 2.97 | 0.32 |
| 17 *I* | 4.4918 | 0.881 | 55.862 | 100.2 | 17.185 | 3.25 | 17.023 | 2.94 | 0.31 |
| 18 *I* | 5.1069 | 0.864 | 70.807 | 102.0 | 17.418 | 3.12 | 17.263 | 2.82 | 0.30 |
| 19 *I* | 5.2911 | 0.864 | 75.974 | 101.1 | 17.482 | 3.08 | 17.335 | 2.79 | 0.29 |
| 20 *I* | 6.3795 | 0.863 | 110.318 | 102.0 | 17.873 | 2.90 | 17.713 | 2.63 | 0.27 |
| 21 *I* | 7.7530 | 0.862 | 162.829 | 102.2 | 18.325 | 2.74 | 18.130 | 2.48 | 0.26 |

Table 3 is similar to table 2 and is for the *R* and *I* bands. The letters *B*, *V* or *I* with the serial numbers indicate the wavelength band from which the isophotes have been taken. The inner most two isophotes in table 2 and one isophote in table 3 are taken from the *V* band, as our isophotes in B and infrared bands do not go so close to the centre as they do in the *V* band. This will not create any inaccuracy in the calculation of integrated magnitudes, as the ellipticily of the cluster does not show much change with colour, close to the centre (Scaria 1980). The last column in table 3 gives the integrated *R* — *I* colour.

## Results

Our results on ellipticity of the cluster cover only 7.75 arcmin along the E—W direction and hence the determination of the integrated magnitude is also limited to this area of the cluster. Table 4 gives the light from the cluster in *UBVR* and *I* bands within an area of 140 sq arcmin. When our V magnitude is compared with the *V* magnitude obtained for a similar area of the cluster by Gascoigne & Burr (1956), it is seen that our value is about 0.15 mag brighter in the *V* band. As Gascoigne & Burr have pointed out the centre of the cluster has large surface brightness irregularities. This is also seen in the photoelectric scans of Scaria & Bappu (1981). The smoothening process adopted by us could be in error by considerable amount at the centre and could affect the integrated magnitude especially in the longer wavelength bands where the irregularities are most evident. To make a more precise determination of integrated magnitude, we should make concentric aperture observations in the 5 wavelength bands. Even though the integrated brightness could be in error by few tenths of a magnitude it still can give fairly accurate integrated colour of the cluster. *U* — *B*, *B* — *V*, *V* — *R* and *R* — *I* colours obtained for the cluster are given in table 4.

In figure 1, we have plotted the total light from the cluster within an isophote against its area in sq arcmin. In figure 2, we show the radial change *U—B* and

$R - I$ colours of the cluster. The integrated colour of the region between two consecutive isophotes is calculated and plotted against the mean of their semi major axes in arcmin. These colours and distances from the centre are given in table 5. The $R - I$ colour variation clearly shows the large concentration of red stars close to the centre.

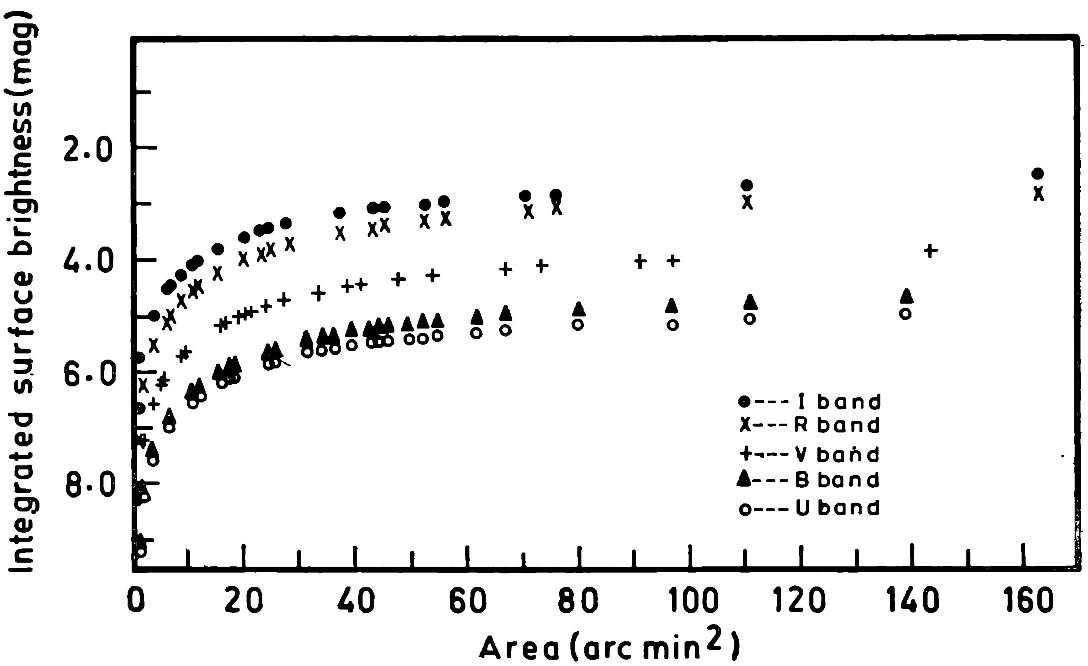


**Figure 1.** Total light from the cluster with in each isophote in *U, B, V, R* and *I* bands plotted against the area of the cluster included within the isophote.

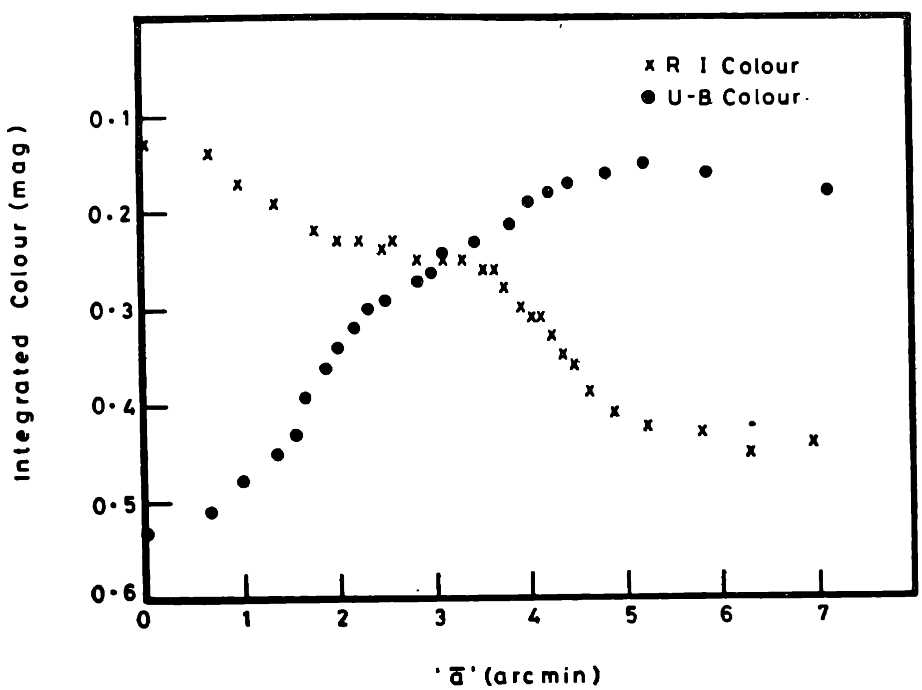


**Figure 2.** Radial change in integrated $U - B$ and $R - I$ colours of Omega Centauri. The integrated colour of the region between two consecutive isophotes is calculated and plotted against the mean of their semi major axes in arcmin.

**Table 4.** Integrated *U, B, V, R* and *I* brightnesses and $U - B$, $B - V$, $V - R$ and $R - I$ colours of Omega Centauri. The values given are for the inner 140 sq. arc min. of the cluster

| | | |
|---|---|---|
| *U* | 4.94 | $U - B = 0.28$ |
| *B* | 4.66 | $B - V = 0.81$ |
| *V* | 3.85 | $V - R = 1.03$ |
| *R* | 2.82 | $R - I = 0.26$ |
| *I* | 2.56 | |

Scaria & Bappu (1981) have shown that the cluster is bluer in $B - I$ colour between 2 and 4 arcmin from the centre when compared to the $B - I$ colour at the centre of the cluster. They have also shown that this is due to an excess of blue horizontal branch stars in this region. The flat region in the $U - B$ colour curve in figure 2 shows the effect of this increased blueness in this part of the cluster. Integrated B — *V* colour given in table 4 for an area of 140 arcmin is 0.81 mag. $B - V$ colour obtained by Gascoigne & Burr for the whole cluster is 0.78 mag. Our value is for the inner region of the cluster where there is a concentration of large number of bright red stars. As more and more of the cluster is included in the determination of integrated magnitude, the effect of these red stars gets diluted and the $B - V$ colour will come closer to the value of 0.78 mag.

de Vaucouleurs (1960) has observed that the elliptical and lenticular galaxies fall along the "unreddened" main sequence in $U-B$, $B-V$ diagram. While the giant E

**Table 5.** (a) Radial change in integrated $U - B$ and (b) $R - I$ colours of the cluster Omega Centauri with distance from centre.

| Distance from Centre arcmin | Colour mag | Distance from Centre arcmin | Colour mag |
|---|---|---|---|
| 9.0 | 0.53 | 0.0 | 0.13 |
| 0.66 | 0.51 | 0.66 | 0.14 |
| 1.00 | 0.48 | 0.98 | 0.17 |
| 1.36 | 0.45 | 1.34 | 0.19 |
| 1.54 | 0.43 | 1.76 | 0.22 |
| 1.65 | 0.39 | 2.01 | 0.23 |
| 1.85 | 0.36 | 2.22 | 0.23 |
| 1.99 | 0.34 | 2.45 | 0.24 |
| 2.16 | 0.32 | 2.56 | 0.23 |
| 2.29 | 0.30 | 2.82 | 0.25 |
| 2.49 | 0.29 | 3.07 | 0.25 |
| 2.79 | 0.27 | 3.28 | 0.25 |
| 2.95 | 0.26 | 3.51 | 0.26 |
| 3.10 | 0.24 | 3.61 | 0.26 |
| 3.42 | 0.23 | 3.73 | 0.28 |
| 3.80 | 0.21 | 3.90 | 0.30 |
| 3.98 | 0.19 | 4.01 | 0.31 |
| 4.19 | 0.18 | 4.06 | 0.31 |
| 4.42 | 0.17 | 4.18 | 0.33 |
| 4.80 | 0.16 | 4.32 | 0.35 |
| 5.20 | 0.15 | 4.42 | 0.36 |
| 5.84 | 0.16 | 4.61 | 0.39 |
| 7.07 | 0.18 | 4.86 | 0.41 |
| | | 5.23 | 0.42 |
| | | 5.76 | 0.43 |
| | | 6.27 | 0.45 |
| | | 6.91 | 0.44 |

and SO galaxies fall in a narrow range between $0.85 \leqslant (B-V) \leqslant 1.0$ the dwarf systems are very much bluer and cluster around $U-B = 0.1$ and $B-V = 0.62$. Space reddening in $U-B$ and $B-V$ for Omega Centauri is given by $E_{U-B} = 0.08$ and $E_{B-V} = 0.11$ (Dickens & Woolley, 1966). $U-B/B-V$ values of Omega Centauri, if plotted after correcting for space reddening, will occupy a position of the unreddened main sequence close to the dwarf galaxies, but a little redder in both $U-B$ and $B-V$ colours. When we consider the radial change in the colour of the cluster, the change in $R-I$ colour is consistent with the fact that there is concentration of red giants towards the centre. The nature of $U-B$ colour change demands the stars close to the centre to have smaller values of $U-B$ colour. The centre is found to be bluer by $\approx 0.1$ magnitude when compared to the outer regions. The procedure adopted by us for the smoothening of the surface brightness profiles in $U$ and $B$ bands could not have created such a large difference in colour. As pointed by Scaria & Bappu (1981), the contribution from diffuse background and HB stars may be partly responsible for the centre becoming bluer in $U-B$ colour. A second source could be a larger concent ration of AGB stars within 2′ from the centre. Though AGB stars are redder than the HB stars, these two groups have comparable $U-B$ colours. Hence a larger concentration of AGB stars close to the centre can keep the value of $U-B$ colour quite low as seen in the present case. Scaria & Bappu (1981) have shown that the density of HB stars is larger between 2′ and 4′ from the cluster centre. The larger concentration of AGB stars at the centre could be because they are more massive than the HB stars. Probably there is a radial change in the mass of these stars which are in a very advanced stage of stellar evolution.

Omega Centauri is one of those clusters with all the horizontal branch stars occupying the blue side of the RR Lyrae gap. van Albada *et al.* (1981) have shown that clusters with blue horizontal branches form two separate groups depending on the heavy element abundance of the clusters. Clusters wlth redder blue horizontal branches are found to be metal poor when compared to clusters with bluer horizontal branches. BHB stars of the latter group are found too blue for their metallicity. Scaria & Bappu (1981) give distribution of blue horizontal branch (BHB) stars in Omega Centauri. They find an annular zone of larger number of BHB stars around the inner core of the cluster ($2' \leqslant r \leqslant 4'$). The problem is explained as a result of mass segregation in globular clusters. The less massive and metal poor BHB stars have got relaxed to larger distances from the cluster centre leaving behind BHB stars of larger mass and higher metal abundance. Since van Albada *et al.* (1981) find that BHB stars in metal rich clusters are bluer than the BHB stars of metal poor clusters, it is likely that BHB stars close to the centre in Omega Centauri is bluer than the BHB stars seen outside the core of the cluster, and can contribute to the excess of U brightness observed at the centre. It is important to make concentric aperture photoelectric observations of the cluster in $U$, $B$, $V$, $R$ and $I$ bands to confirm the above results.

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