THE IR STELLAR POPULATION AROUND THE GALACTIC CENTRE

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ABSTRACT. We present K-counts for a number of stars with K ≤ +9.0 in 3 clear regions near the galactic centre. They are located approximately at l~0.0 and b ~ -3.5, -4.0 and -4.5. Their Cumulative Counts Functions (CCF's) are formed, and with the aid of an exponential disc model for the Galaxy are separated into disc and bulge CCF. As for the case in Baade's Window (BW) (Ruelas-Mayorga and Teague, 1992a) the disc is dominant at bright magnitudes whereas the bulge dominates at fainter ones. The slope of the bulge CCF is steeper than that for the disc in all cases corroborating the result obtained for BW. The two colour JHK and the K vs J-K diagrams show that the stellar population in these areas is similar to that studied in BW by us and by Frogel and Whitford (1987). An average E(J-K) ~0.42 mag for the reddening is obtained. At K ≤ +9.0, the disc may be accounted for by those sources with J-K ≤ +1.6 whereas the bulge population presents values for J-K in excess of +1.6.

1. INTRODUCTION

In Ruelas-Mayorga and Teague (1992a,b) we present our infrared study for Baade's Window (BW). In this paper we study three clear windows in the general direction of the galactic centre. These regions are located at galactic coordinates (0.0, -3.5), (0.0, -4.0) and (0.0, -4.5); they are chosen from a plate of this area in which it is obvious they also enjoy low extinction and therefore a study of their stellar populations similar to that made for BW may be performed.

2. OBSERVATIONS

The observations were obtained scanning a single detector over the chosen area of the sky. Only the K-filter was used for reductions.

3. ANALYSIS

From the paper chart records of the observations the respective Cumulative Counts Functions (CCF's) (Number of sources per square degree down to a given K-magnitude) for each region are formed. Using the Ruelas-Mayorga (1991a) model of the galaxy a disc prediction for each region is obtained; simple subtraction yields a bulge estimate for

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each position. The model also predicts colour distributions for the disc, which, when subtracted from the observed colour distribution, yield a colour distribution for the bulge sources. The main results of this analysis are summarised in the next section.

4. SUMMARY

i) Scanning observations in the IR (2.2 μm) have been performed for three clear windows (R1: (0.0, -3.5), R2: (0.0,-4.0) and R3: (0.0,-4.5)) in the general direction of the galactic centre.
ii) After correction for confusion, the CCF for each region is formed.
iii) An exponential disc simulation indicates that there is a fair agreement with the observed CCF at bright magnitudes. This fact suggests that the disc stellar population dominates the bright sections of the CCF and also lends further support to the equivalent finding for BW.
iv) The disc and bulge appear to be equally important at magnitudes in the range $+8.0 \leq K \leq +9.5$. The bulge component becomes definitely the dominant contributor at fainter magnitudes.
v) A mean CCF determination for the bulge is obtained from the observed and the predicted disc CCF's and the bulge CCF for the BW area. The slopes of the mean bulge CCF's are always steeper than those of the disc CCF's.
vi) All the stars lie along the reddening line at a mean E(J-K) ~0.42.
vii) The colour-magnitude (K vs. (J-K)) diagram shows that sources lie above and to redder colours than the GB of 47 Tuc when properly reddened. The photometric results suggest that the stars of our photometric sample are more metal rich than those in the 47 Tuc GB.
viii) The mean reddening value for R1, R2 and R3 (E(J-K) ~0.42) is larger than that for BW (E(J-K)~0.27) and is obtained by assuming that the stellar mix in R1, R2 and R3 is the same as that in the BW region.
ix) A theoretical prediction of the distribution of disc stars for $K \leq +9.0$ with respect to J-K, shows that most of the objects in our photometric sample with $(J-K) \leq +1.6$ may be accounted for as disc members.
x) The histrogram of number of sources versus (J-K) shows that the majority of the stars with $(J-K) \geq +1.8$ and $K \leq +9.0$ may be thought as real bulge members.

5. REFERENCES

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