CCD BVRI PHOTOMETRY OF STARS IN THE GALACTIC BULGE

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ABSTRACT. We present preliminary results from BVRI CCD photometry of stars in the galactic bulge. The importance of disc contamination is shown. Several statistical criteria to separate disc from bulge stars are used.

1. INTRODUCTION

The nuclear bulge of the Galaxy contains a stellar population that does not conform to the old ideas we had about its origin and physical characteristics.
In Ruelas-Mayorga and Teague (1992a) the stars of the bulge of our galaxy are characterized as follows:
i) They appear mainly at faint magnitudes, show
ii) Low values for their CO index, which might indicate an associated low value for their metallicity, and
iii) They appear to have a Luminosity Function similar to that of globular clusters. Further studies of the stellar population in the galactic bulge are needed to solve discrepancies between published results.

2. RESULTS

The observations were obtained using a CCD and filters B, V, R and I. Standard observation and reduction techniques were used. Here we present a preliminary set of results (for a 2' x 3' field) based on magnitude versus colour and colour-colour diagrams. A brief discussion in terms of a stellar distribution model of the galaxy (Ruelas-Mayorga, 1991a) is also given.
The V vs B-V and the V vs V-I diagrams (Figures 1 and 2) show the same character as those of Terndrup's (1988); both the red and blue sequences identified by him are seen here. There are very red stars in this field with V-I in excess of 4.0. The V-R vs R-I two-colour diagram shows a linear elongation almost parallel to the reddening vector (Johnson, 1968). This may not be produced by depth effects in the galactic bulge since the E(R-I) ~ 2.3 would imply a diameter of the order 20 kpc. We must conclude that very red stars are present in this field. Differential reddening is ruled out due to the small size of the field under study.

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According to the Ruelas-Mayorga (1991a) model of the galaxy, 79 % of the stars (110) observed down to V=18 mag must belong to the disc, and the rest (21 % = 29) to the bulge of our galaxy. Model predictions in this direction produce the correct proportions if V-I = 2.0 is used as separator; the bulge is redder and the disc is bluer than this value. We propose the 29 redmost (V-I ≥ 2.0) stars to be the bulge stars.

3. CONCLUSIONS

From these preliminary results we conclude the following:
i) There is a substantial number of disc stars in the low absorption windows through which the galactic bulge is usually studied. Allowance for their presence must always be made.
ii) In agreement with the results found in the bright IR (see Ruelas-Mayorga and Teague, 1992c); in the bright visual magnitude range (V≤+18) bulge sources must have on the average red colours (V-I ≥ +2.0) which, after dereddening [$(V-I)_0 \geq +1.21$] imply spectral types later than G8 III.

4. REFERENCES

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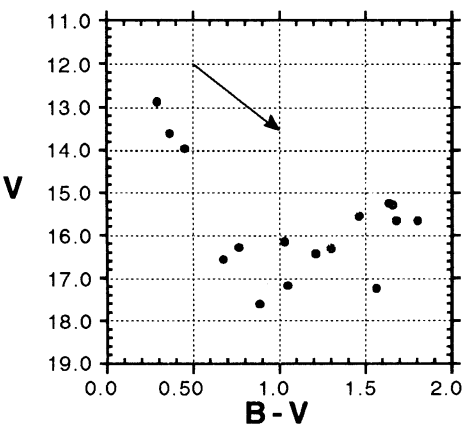

Figure 1

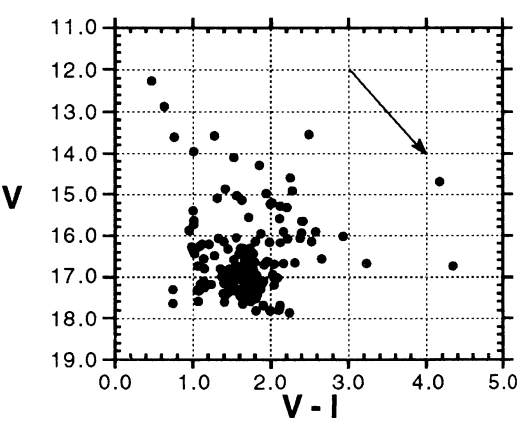

Figure 2

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