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Mapping the X-Shaped Milky Way Bulge

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We analyzed the distribution of the RC stars throughout Galactic bulge using 2MASS data. We mapped the position of the red clump in 1 sq.deg. size fields within the area $||\leq 8.5\text{deg}$ and $3.5\text{deg}\leq |b|\leq 8.5\text{deg}$, for a total of 170 sq.deg. The red clump seen single in the central area splits into two components at high Galactic longitudes in both hemispheres, produced by two structures at different distances along the same line of sight. The X-shape is clearly visible in the Z-X plane for longitudes close to $l=0$ deg axis. Crude measurements of the space densities of RC stars in the bright and faint RC populations are consistent with the adopted RC distances, providing further supporting evidence that the X-structure is real, and that there is approximate front-back symmetry in our bulge fields. We conclude that the Milky Way bulge has an X-shaped structure within $||\leq 2\text{deg}$, seen almost edge on with respect to the line of sight. Additional deep NIR photometry extending into the innermost bulge regions combined with spectroscopic data is needed in order to discriminate among the different possibilities that can cause the observed X-shaped structure.

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