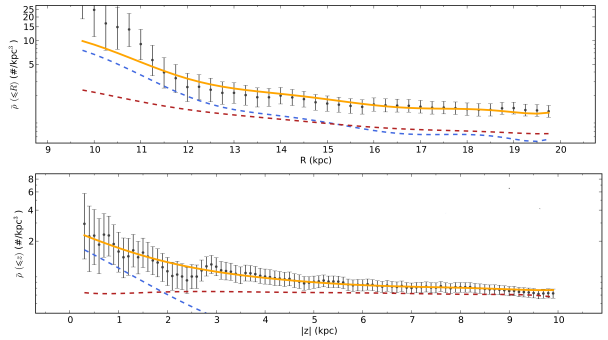

Fig. 1. Mean radial (top) and vertical (bottom) density profiles. The dots with error bars correspond to the observed mean accumulated densities of RRLs. The red, blue and yellow lines correspond respectively to the best-fitting halo, thick disk and total density profiles.

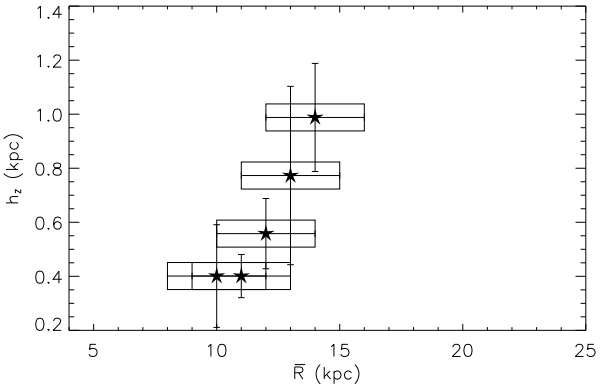

Fig. 2. Thick disk scale height h_Z as a function of R, computed from *in situ* RRLs in five different distance intervals. The horizontal extent of the boxes denotes the width of each radial interval.

where $\rho(R,z)$ denotes the full density profile corresponding to $\rho(R,z) = \rho_{\rm H}(R,z)+\rho_{\rm TkD}(R,z)$, the sum of the halo and thick disk density profiles. The left-hand side in equations 1 and 2 was computed from the observed distribution of RRLs, while the right-hand side was computed via a Monte Carlo integration of the theoretical halo and thick Disk density profiles. The halo and thick disk profile parameters were obtained from a χ^2 fit of the observed density profiles.

Halo Density Profile We fitted the halo density profile $\rho_{\rm H} = C_{\rm H}(R^2 + z^2/q^2)^{n/2}$ to the observed profile for RRLs outside the Galactic Plane ($|z| \geq 6$ kpc), where the thick disk contribution in equations 1 and 2 is expected to be negligible. We obtained a slope $n = -2.9 \pm 0.2$, flattening $q = 0.85 \pm 0.14$ and local normalization of $C_{\rm H} = 3.7 \pm 0.8$ RRab/kpc^3.

Thick Disk Density Profile Using the parameters obtained for the halo RRL profile in equations 1 and 2, we obtained the best-fitting parameters for the thick disk density profile $\rho_{\rm TkD} = C_{\rm TkD} e^{-(R-R_\odot)/h_R} e^{-|z|/h_Z}$ from the observed radial and vertical density profile for RRLs near the Galactic Plane ($|z| \leq 3$ kpc). The observed and best-fitting halo, thick disk and total density profiles are shown in Figure 1. We obtained a mean scale height $h_Z = (0.94 \pm 0.15)$ kpc, mean scale length $h_R = (3.2 \pm 0.4)$ kpc and local normalization of thick disk RRL of $C_{\rm TkD} = (15.9 \pm 2.6)$ RRab/kpc^3.

The Thick Disk Flare In order to explore the dependence of the scale height h_Z with projected distance R, we fitted the vertical density profile of RRLs in five different distance intervals. The best-fitting scale heights as a function of R are shown in Figure 2, which clearly shows h_Z increases monotonically with distance indicating the Galactic thick disk is flared.

Antitruncation of the Thick Disk The radial density profile in Figure 1 (top panel) shows the best-fitting profile underestimates the number of RRLs at distances shorter than ∼11 kpc, when compared to the observations. Further analysis of this radial profile shows there is no apparent RRL overdensity for $R < 11$ kpc. This could be interpreted as evidence of the thick disk radial profile being antitruncated or type III (Pohlen et al. 2004). Under this assumption we computed the best-fitting parameters for the antitruncated profile obtaining an inner scale length $h_R = (1.6 \pm 0.3)$ kpc and brake radius $R_{\rm break} \sim 11.5$ kpc.

4. CONCLUSIONS

In this contribution we presented results for the QUEST RRL survey of the Galactic thick disk, the first deep RRL survey conducted at low galactic latitudes to date. The use of RRL at low galactic latitudes covering a large range of radial and vertical distances allowed for the derivation of the thick disk's structural parameters, particularly the scale length, from in situ stars having accurate individual reddenings and distances (errors < 7%) and using a tracer that ensures negligible contamination from the Galactic thin disk.

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