

Calibration of the tip of the red giant branch as a distance indicator for J,H,Ks bands

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The I-band magnitude of the tip of red giant branch (TRGB) stars is known to be a very efficient and precise distance indicator for resolved stellar systems with old populations. One distinguishable advantage of the TRGB over other primary distance indicators such as Cepheids and RR Lyraes is that it requires basically single-epoch observations, while the latter require multiple-epoch observations to detect the variables and to determine the periods and mean magnitudes of the variable stars. Therefore it became a major tool as a distance indicator for nearby galaxies with the advent of the Hubble Space Telescope.

However, the I-band magnitude of the TRGB becomes to change more for the high metallicity with $[Fe/H] > -0.7$, due to the increasing blanketing effect. Therefore it is needed to extend the band of the TRGB to longer wavelength where the metallicity dependence of the TRGB magnitude decreases.

We present a calibration of J, H, and Ks magnitudes of the TRGB based on the 2MASS data. The 2MASS project which covered the all-sky area provided an excellent data for investigating the near-IR magnitudes of the TRGB. We used the point sources in 20 Galactic globular clusters presently available in the 2MASS point source catalog, to measure the J, H, and Ks magnitudes of the TRGB. We have investigated the metallicity dependence and dispersion of the J, H, and Ks magnitudes of the TRGB.