

The Distance to M33 based on the Tip of the Red Giant Branch and Red Clump

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We have estimated the distance to M33 using the Tip of the Red Giant Branch (TRGB) and red clump (RC) methods from HST/WFPC2 VI images. We have obtained VI photometry of field stars in ten regions surrounding compact star clusters in M33. Mean metallicities of the red giant branch are derived from the color of the RGB. It is found that the mean metallicity decreases as galactocentric distance increases. We have derived the distance to M33: $(m-M)_0(\text{TRGB})=24.87 \pm 0.1$ using the I-band magnitude of the TRGB, and $(m-M)_0(\text{RC})=24.80 \pm 0.03$, both showing an excellent agreement. We have also investigated the relation between the metallicity and the mean difference between the I-band magnitudes of the TRGB and red giant clump, finding that there is a linear correlation.

The Surface Brightness Fluctuation (SBF) As Probes of Stellar Population In Distant Galaxies

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SBFs are, in fact, an intrinsic property of a stellar population as a whole. Therefore, in addition to their utility as a distance indicator, SBFs offer much promise in adding to our knowledge of the stellar content of old stellar systems. We present new model results (after the inclusion of systematic horizontal-branch morphology variation with age and metallicity) for optical/infrared SBFs of old simple stellar populations. The comparison of our results with current available SBF observations in the literature is shown and implications from this study are briefly discussed.