

Red Clump as a Distance Indicator

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The Red clump (RC) is a group of stars seen close to the position of the red end of the red horizontal branch in the color-magnitude diagrams of the intermediate-age stellar systems such as old open clusters and nearby galaxies. They are believed to be at the evolutionary stage of core-helium burning.

Is the RC a reliable distance indicator? This question has been controversial recently, and no clear answer is yet available. Two critical issues related to this question are 1) what is the zero point of the RC calibration?, and 2) how much do the magnitudes of the RC depend on metallicity or age?. While some studies claimed that the mean I-band magnitude of RC slightly depends only on its metallicity, other studies showed that it depends significantly not only on metallicity but also on age.

We have embarked a study of this problem using the HST/WFPC2 archive data for several nearby galaxies showing a presence of the RC. Here we present a progress report of our project. We have measured the magnitudes of the RC stars in these galaxies with a wide range of age and metallicity. We have measured also the difference in magnitude between the RC and that of the tip of the red giant branch (TRGB). Implications of these results will be discussed.