N20b IRSF 近赤外カタログを用いたマゼラン雲の TRGB とレッドクランプ等級の算出

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We present measurements of the Tip of the Red Giant Branch (TRGB) and Red Clump (RC) magnitudes for the Large Magellanic Cloud (LMC) derived from the IRSF Magellanic Clouds Point Source Catalog data. The Catalog is extracted from a new, deep, three band near-infrared (J ($\lambda_c \simeq 1.25\mu m$), H ($1.63\mu m$) , and K_s ($2.14\mu m$)) survey with a pixel scale of 0".45 and reaching 10σ limiting magnitudes of 18.8, 17.8, and 16.6 magnitudes in the J, H, and K_s bands, respectively.

We apply direct maximum likelihood parameter fitting methods to luminosity function (LF) models to extract the m_{TRGB} and m_{RC} magnitudes and the LF behavior between these regimes. In the LMC, we find magnitudes of $m_{TRGB,J} = 13.33$, $m_{TRGB,H} = 12.48$, and $m_{TRGB,K_s} = 12.23$ for the TRGB and $m_{RC,J} = 17.54$, $m_{RC,H} = 17.07$, and $m_{RC,K_s} = 16.94$ for the RC, consistent with previous measurements. The parameter fitting method can also incorporate prior information through a Bayesian formalism, an avenue for future exploration.

By extending our models to incorporate spatial and color information we will study the component stellar populations in, and structure of, the Magellanic Clouds.