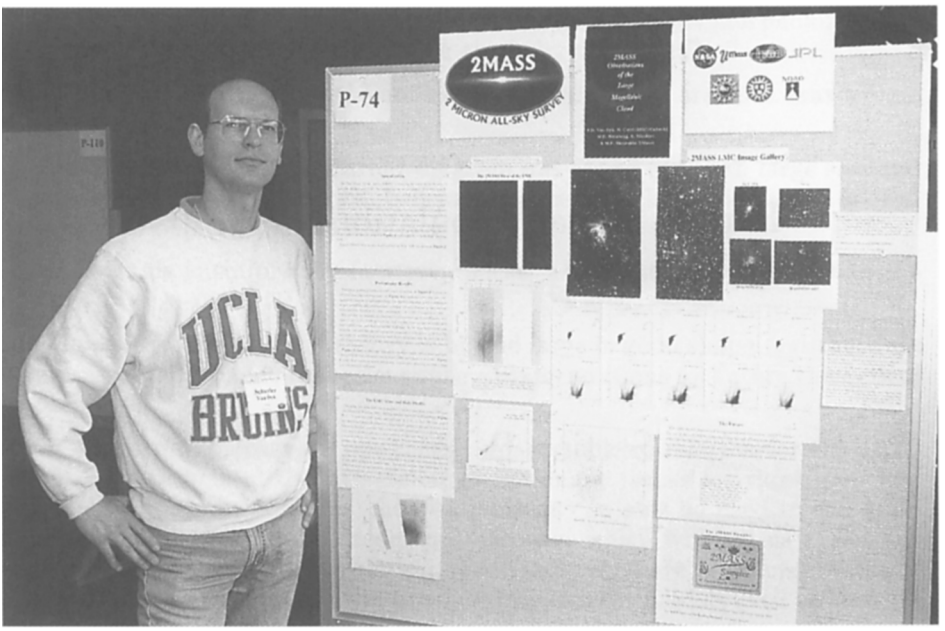
Part 5. Stellar Populations and Surveys

Section B. Poster Papers

https://doi.org/10.1017/S0074180900118157 Published online by Cambridge University Press



(Top) Schuyler Van Dyk with his 2MASS poster, and (bottom) Steve Majewski answering questions on his poster.

https://doi.org/10.1017/S0074180900118157 Published online by Cambridge University Press

New Views of the Magellanic Clouds
IAU Symposium, Vol. 190, 1999
Y.-H. Chu, N.B. Suntzeff, J.E. Hesser, and D.A. Bohlender, eds.

A Photometric Survey of the LMC Field near NGC 2257

A. R. Walker, R. A. Schommer, N.B. Suntzeff

Cerro Tololo Inter-American Observatory, NOAO, Casilla 603, La Serena, Chile

P.W. Hodge

University of Washington, Dept. Astr., Box 351580, Seattle, WA 98195, USA

M. Mateo

University of Michigan, Dept. Astr., 821 Dennison Bldg., Ann Arbor, MI 48109-1090, USA

E. W. Olszewski

University of Arizona, Steward Obs., Tucson, AZ 85721, USA

Abstract.
Star formation in the outermost regions of the LMC, several kpc from the center, has been dormant for some Gyr. With deep HST and wide-field ground-based imaging surveys, sufficient stars can be measured to accurately delineate the critical turn-off and subgiant branch regions of the CMD, and thus provide a picture of the first 10 Gyr of star formation in the LMC.

The LMC field in the vicinity of NGC 2257 has been subject to several studies over the last 15 years. There exists photometry, spectroscopy of RGB stars and proper motions; results which can be compared with detailed studies of more inner fields (e.g., Elson, Gilmore, & Santiago 1997; Holtzman et al. 1997).

Our group has HST WFPC2 Cycle 6 images of four fields near NGC 2257, and CTIO 4-m prime focus imaging datasets covering 0.25 deg^2 with extension to 5 deg^2 scheduled. For each HST pointing total exposure times were 2000s in F555W (V) and 2400s in F814W (I). The fields are sparse and there are typically 50-80 stars on each WF CCD frame, contamination by non-stellar objects is thought to be negligible brighter than $V \sim 25, I \sim 24$. The resultant CMD is plotted in Figure 1. Approximately 850 stars are easily identifiable as being LMC members, and show a main sequence turn-off at $V \sim 22$ with a well-populated subgiant branch, plus a younger MS extending to approximately $V = 21.2$. The red giant clump is presumably associated with the brighter turn-off. After adopting $E(B-V) = 0.06$ and a distance modulus for the LMC of 18.55 mag (Walker 1999), a fit was made with Bertelli et al. (1994) isochrones. The old turn-off and SGB is well-fit with a 12 Gyr isochrone and metallicity [Fe/H]$= -1.6$.

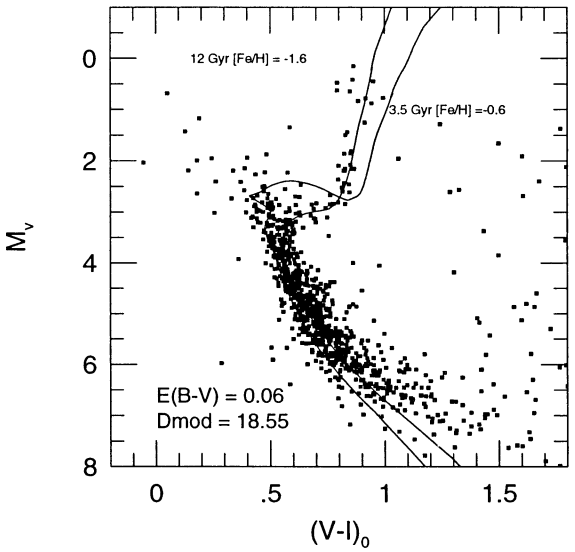


Figure 1. NGC 2257 Field - 4 WF (HST) pointings

An even more metal-poor isochrone would be needed to force the isochrone to lie more central on the MS, indirect evidence that this is not likely is that the LMC field RR Lyraes do not appear to be more metal-poor in the mean than [Fe/H]~ -1.6. A 12 Gyr population is old enough to generate RR Lyraes and there may not be any need for a minority even more ancient ($\sim$ 15 Gyr) population.

The stars making up the bulk of the MS are clearly younger and more metal rich, an isochrone with age 3.5 Gyr and [Fe/H]$= -0.6$ is a possible fit. However the match at the turn- off is clearly not very good, and possibly a distribution of ages and metallicities would be more apt (although we and others have found difficulties fitting these isochones in general, in the sense that the theoretical RGB's are too red cf the MS). Presumably this population corresponds to the [Fe/H]$= -0.5$ (in the mean) red giants studied spectroscopically by Olszewski (1993).

References

Bertelli, G., Bressan, A., Chiosi, C., Fagotto, F., & Nasi, E. 1994, A&AS, 106, 276

Elson, R.A.W., Gilmore, G.F., & Santiago, B.X. 1997, MNRAS, 289, 157

Holtzman, J., et al. 1997, AJ, 113, 656

Olszewski, E. 1993, in *The Globular Cluster-Galaxy Connection*, eds. Smith, G.H., & Brodie, J.P., ASP Conf. Ser. No. 48, publ. ASP., p. 351

Walker, A.R. 1999, in *Post Hipparcos Cosmic Candles*, ed. Caputo, F., & Heck, A., publ. Kluwer, p.125