Dear Colleagues,

The Magellanic Clouds Working Group is proud to announce the availability of the complete MC News archive in \TeX, Postscript, PDF, and HTML formats. The entire archive of issues is available for download from our Website at \url{http://www.astro.uiuc.edu/projects/mcnews/MCNews.html}. Look for more enhancements to our Website in the future!

Best Wishes,
Bryan Dunne
Abstracts of Refereed Papers

Blue Variable Stars from the MACHO database I: Photometry and Spectroscopy of the LMC sample

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We present the photometric properties of 1279 blue variable stars within the LMC. Photometry is derived from the MACHO database. The lightcurves of the sample exhibit a variety of quasi-periodic and aperiodic outburst behavior. A characteristic feature of the photometric variation is that the objects are reddest when at maximum outburst. A subset of 102 objects were examined spectroscopically. Within this subset, 91% exhibited Balmer emission in at least one epoch, in some cases with spectacular spectral variability. The variability observed in the sample is consistent with the establishment and maintenance of the Be phenomenon.

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For preprints, contact skeller@igpp.uc1lnl.org
Also available from the URL astro-ph/0206444

The Low End of the Initial Mass Function in Young Clusters: II. Evidence for Primordial Mass Segregation in NGC 330 in the SMC

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As part of a larger program aimed at investigating the universality of the initial mass function (IMF) at low masses in a number of young clusters in the LMC/SMC, we present a new study of the low end of the stellar IMF of NGC 330, the richest young star cluster in the SMC, from deep broadband V and I images obtained with HST/WFPC2. We detect stars down to a limiting magnitude of $m_{555} = 24.9$ which corresponds to stellar masses of $\sim 0.8\, M_\odot$ at the distance of the SMC. A comparison of the cluster color-magnitude diagram with theoretical evolutionary tracks indicates an age of $\sim 30\, \text{Myr}$ for NGC 330, in agreement with previous published results. We derive the cluster luminosity function, which we correct for background contamination using an adjacent SMC field, and construct the mass function (MF) in the $1-7\, M_\odot$ mass range. Given the young cluster age, the MF can well approximate the IMF. We find that the IMF in the central cluster regions (within $30''$) is well reproduced by a power-law with a slope consistent with Salpeter's. In addition, the richness of the cluster allows us to investigate the IMF as a function of radial distance from the center. We find that the IMF becomes steeper at increasing distances from the cluster center (between $30''$ and $90''$), with the number of massive stars ($> 5\, M_\odot$) decreasing from the core to the
outskirts of the cluster five times more rapidly than the less massive objects (≈ 1 M_☉). We believe
the observed mass segregation to be of primordial nature, rather than dynamical, since the age of
NGC 330 is ten times shorter than the expected relaxation time of the cluster.

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Abstracts of Non-Refereed Papers

Three aspects of red giant studies in the Magellanic Clouds

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There are three important aspects concerning the study of the red giant and in particular of the
asymptotic giant branch (AGB) stars in the Magellanic Clouds. These are: the surface distribution,
the luminosity function and the variability. The spatial distribution of AGB stars is an efficient tool
to study the structure of the galaxies and their metallicity by analysing the ratio between carbon–
and oxygen–rich AGB stars. The shape of the luminosity function carries informations about the star
formation rate in the Clouds and it can be mathematically related to their history. Most AGB stars
vary their magnitude in a few to several hundred years time; the one epoch DENIS magnitudes for
both Large and Small Magellanic Cloud AGB stars outline the same relations as a function of period.

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Observational Constraints on Massive Star Evolution

Phil Massey¹

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In this paper, I discuss the observational quantities that are useful for judging the successes and
failures of current massive star evolutionary theory. The galaxies of the Local Group can serve as
important laboratories for providing these diagnostics, as their metallicities vary by a factor of 10.
We find that the evolutionary tracks do a good job of matching the distribution of stars in the H-R
diagram during the main-sequence phase. However, none of the models produce RSGs that are as
cool and as bright as what is observed. The relative number of WC and WN stars is a strong function
of metallicity, and the Padova and Geneva “normal mass-loss” models do a reasonably good job of
matching the observations at low metallicities, but predict too few WCs at higher metallicity. The
“enhanced” mass-loss models of the Geneva group do not match the observations at all. New data is
providing excellent statistics on the number of RSGs in these nearby galaxies, and the number ratio of RSGs to WRs is also an extremely sensitive function of metallicity. None of the models reproduce the trend of the RSG/WR ratio with metallicity.

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Available from the URL ftp://ftp.iovell.edu/pub/massey/iau212massey.ps.gz

Primordial or Dynamical Mass Segregation in Young LMC Clusters?

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We present the detailed analysis of Hubble Space Telescope observations of the spatial distributions of different stellar species in two young compact star clusters in the Large Magellanic Cloud, NGC 1805 and NGC 1818. Based on a comparison of the characteristic relaxation times in their cores and at their half-mass radii with the observed degree of mass segregation, it is most likely that significant primordial mass segregation was present in both clusters, particularly in NGC 1805. Both clusters were likely formed with very similar initial mass functions.

For preprints, contact grijs@ast.cam.ac.uk
Meeting Announcements

The Outer Edges of Dwarf Irregular Galaxies:
Stars and Gas

Venue: Flagstaff, Arizona, USA
Dates: October 10 to 11, 2002
Contact: Deidre Hunter and Sally Oey
Address: Lowell Observatory, 1400 W. Mars Hill Road, Flagstaff AZ 86001, USA
Phone: +1-928-774-3358
E-mail: lowell02@lowell.edu
URL: http://www.lowell.edu/Workshops/Lowell02/

From the meeting abstract:
We have in recent years come to view dwarf galaxy evolution in the broader context of the cosmic evolution of large-scale structure. Dwarf galaxies, as the putative building blocks of hierarchical galaxy formation, and also as the most numerous galaxies in the Universe, play a central role in cosmic evolution. In particular, the interplay of galactic and intergalactic material around dwarf irregulars must be more extensive than in more massive disk galaxies because of their lower gravitational potential and lower interstellar pressures. The outer regions of dwarf irregular galaxies therefore yield vital clues to the dominant processes in this interaction zone.