Dear Colleagues,

It is my pleasure to present you the 99th issue of the Magellanic Clouds Newsletter, a little later than usual due to the editor having been involved in some hydrodynamical experiments (snorkelling in the Seychelles). A couple of the more different and exciting works presented in this issue include the γ-rays observations of the LMC with Fermi (a conference talk), the new extinction map of the SMC, the compilation of a large number of AGN candidates behind the Magellanic Clouds, and final (?) results on microlensing. There is also an interesting White Paper arguing for a new generation of photometric and spectroscopic surveys of the Magellanic Clouds.

The next issue will be distributed on the 1st of August 2009; the deadline for contributions is the 31st of July. That will be the 100th issue of the Magellanic Clouds Newsletter. To celebrate this occasion, you are warmly invited to e-mail mcnews@astro.keele.ac.uk your nice images or diagrams with a caption (preferably no more than a few MB in size, and preferably in PS or EPS format), anecdotes, visions on future research, or anything else slightly out of the ordinary.

Editorially Yours,
Jacco van Loon
The Evolution of Massive YSOs in the LMC: Part I. Identification and Spectral Classification

Jonathan P. Seale\(^1\), Leslie W. Looney\(^1\), You-Hua Chu\(^1\), Robert A. Gruendl\(^1\), Bernhard Brandl\(^2\), C.-H. Rosie Chen\(^3\), Wolfgang Brandner\(^4\) and Geoffrey A. Blake\(^5\)

\(^1\)Astronomy Department, University of Illinois, Astronomy Department, MC-221, 1002 West Green Street, Urbana, IL 61801, USA
\(^2\)Leiden Observatory, Leiden University, Niels Bohrweg 2, 2300 RA Leiden, The Netherlands
\(^3\)Astronomy Department, University of Virginia, Department of Astronomy, P.O. Box 400325, Charlottesville, VA 22904-4325, USA
\(^4\)Max-Planck-Institut für Astronomie, Planet Star Formation Königstuhl 17, 69117 Heidelberg, Germany
\(^5\)Astronomy Department, California Institute of Technology, Caltech, MC 105-24, 1200 East California Blvd, Pasadena, CA 91125, USA

We present and categorize Spitzer IRS spectra of 294 objects in the Large Magellanic Cloud (LMC) to create the largest and most complete catalog of massive young stellar object (YSO) spectra in the LMC. Target sources were identified from infrared photometry and multi-wavelength images indicative of young, massive stars highly enshrouded in their natal gas and dust clouds. Several objects have been spectroscopically identified as non-YSOs and have features similar to more evolved stars such as red supergiants, asymptotic giant branch (AGB), and post-AGB stars. Our sample primarily consists of 277 objects we identify as having spectral features indicative of embedded YSOs. The remaining sources are comprised of 7 C-rich evolved sources, 8 sources dominated by broad silicate emission, and 1 source with multiple broad emission features. Those with YSO-like spectra show a range of spectral features including polycyclic aromatic hydrocarbon emission, deep silicate absorption, fine-structure lines, and ice absorption features. Based upon the relative strengths of these features, we have classified the YSO candidates into several distinct categories using the widely-used statistical procedure known as principal component analysis. We propose that these categories represent a spectrum of evolutionary stages during massive YSO formation. Using our catalog we put statistical constraints on the relative evolutionary timescale of processes involved in massive star formation. We conclude that massive pre-main sequence stars spend a majority (possibly as high as 90\%) of their massive, embedded lives emitting in the UV. Half of the sources in our study have features typical of compact H\(\text{II}\) regions, suggesting that massive YSOs can create a detectable compact H\(\text{II}\) region half-way through the formation time present in our sample. This study also provides a check on commonly used source-selection procedures including the use of photometry to identify YSOs. We determine a high success rate (> 95\%) of identifying objects with YSO-like spectra can be achieved through careful use of infrared color–magnitude diagrams, spectral energy distributions, and image inspections.

Accepted for publication in The Astrophysical Journal
Available from arXiv:0904.1825

Ultra-low Amplitude Variables in the LMC — Classical Cepheids, Pop. II Cepheids, RV Tau Stars and Binary Variables

J. Robert Buchler\(^1\), Peter Wood\(^2\) and Igor Soszyński\(^3\)

\(^1\)Physics Dept., University of Florida, Gainesville FL, USA
\(^2\)Research School of Astronomy & Astrophysics, Australian National University, Canberra, Australia
\(^3\)Warsaw University Observatory, Al. Ujazdowskie 4, 00-478 Warszawa, Poland

A search for variable stars with ultra-low amplitudes (ULA), in the millimag range, has been made in the combined MACHO and OGLE data bases in the broad vicinity of the Cepheid instability strip in the HR diagram. A total of 25 singly periodic and 4 multiply periodic ULA objects has been uncovered. Our analysis does not allow us to distinguish between pulsational and ellipsoidal (binary) variability, nor between LMC and foreground objects. However, the objects are strongly clustered and appear to be associated with the pulsational instability strips of LMC Pop. I and II variables. When combined with the ULA variables of Buchler et al. (2005) a total of 20 objects fall close to the
classical Cepheid instability strip. However, they appear to fall on parallel period–magnitude relations that are shifted to slightly higher magnitude which would confer them a different evolutionary status. Low amplitude RV Tauri and Pop. II Cepheids have been uncovered that do not appear in the MACHO or OGLE catalogs. Interestingly, a set of binaries seem to lie on a PM relation that is essentially parallel to that of the RV Tauri/Pop. II Cepheids.

Accepted for publication in Astrophysical Journal
Available from arXiv:0904.1542

Discovery of 5000 AGN behind the Magellanic Clouds

Szymon Kozlowski1 and Christopher S. Kochanek1,2

1Department of Astronomy, The Ohio State University, USA
2Center for Cosmology and Astroparticle Physics, The Ohio State University, USA

We show that using mid-IR color selection to find AGN is as effective in dense stellar fields such as the Magellanic Clouds as it is in extragalactic fields with low stellar densities using comparisons between the Spitzer Deep, Wide-Field Survey data for the NOAO Deep Wide Field Survey Bootes region and the SAGE Survey of the Large Magellanic Cloud. We use this to build high purity catalogs of ~ 5000 AGN candidates behind the Magellanic Clouds. Once confirmed, these quasars will expand the available astrometric reference sources for the Clouds and the numbers of quasars with densely sampled, long-term (>decade) monitoring light curves by well over an order of magnitude and potentially identify sufficiently bright quasars for absorption line studies of the interstellar medium of the Clouds.

Submitted to ApJ
Available from arXiv:0904.1740

The metallicity gradient as a tracer of history and structure: the Magellanic Clouds and M 33 galaxies

Maria-Rosa L. Cioni1

1University of Hertfordshire, STRI, Hatfield AL10 9AB, United Kingdom

The stellar metallicity and its gradients pose constraints to the formation and evolution of galaxies. This is a study of the metallicity gradient of the LMC, SMC and M 33 galaxies derived from their asymptotic giant branch (AGB) stars. The [Fe/H] abundance was derived from the ratio between C- and M-type AGB stars and its variation analysed as a function of galactocentric distance. Galaxy structure parameters were adopted from the literature. The metallicity of the LMC decreases linearly as $-0.055 \pm 0.004$ dex kpc$^{-1}$ out to ~ 8 kpc from the centre. In the SMC [Fe/H] $\sim -1.12 \pm 0.03$ dex up to ~ 12 kpc. The gradient of the M 33 disc, until ~ 9 kpc, is $-0.098 \pm 0.004$ dex kpc$^{-1}$ while an outer disc/halo, out to ~ 25 kpc, has [Fe/H] $\sim -1.61 \pm 0.03$ dex. The metallicity of the LMC, as traced by different populations, bears the signature of two major star forming episodes: forming a thick disc/halo population and one a thin disc and bar due to a close encounter with the MW and SMC. The [Fe/H] of the recent episode supports an LMC origin for the Stream. The metallicity of the SMC supports star formation, ~ 3 Gyr ago, as triggered by LMC interaction and sustained by the bar in the outer region of the galaxy. The SMC [Fe/H] agrees with the present-day abundance in the Bridge and shows no significant gradient. The metallicity of M 33 supports an “inside-out” disc formation via accretion of metal poor gas from the interstellar medium. M 33 has not experienced significant chemical enrichment from the formation of the AGB progenitors to the present time.

Submitted to Astronomy and Astrophysics
Available from arXiv:0904.3136
Period–Luminosity Relations for Type II Cepheids and their Application

Noriyuki Matsunaga\textsuperscript{1}, Michael W. Feast\textsuperscript{2,3} and John W. Menzies\textsuperscript{3}

\textsuperscript{1}Department of Astronomy, Kyoto University, Japan; Research Fellow of the Japan Society for the Promotion of Science
\textsuperscript{2}Department of Astronomy, University of Cape Town, South Africa
\textsuperscript{3}South African Astronomical Observatory, South Africa

\(JHK_s\) magnitudes corrected to mean intensity are estimated for LMC type II Cepheids in the OGLE-III survey. Period–luminosity (PL) relations are derived in \(JHK_s\) as well as in a reddening-free VI parameter. Within the uncertainties the BL Her stars (\(P < 4\) d) and the W Vir stars (\(P = 4\) to 20 d) are co-linear in these PL relations. The slopes of the infrared relations agree with those found previously for type II Cepheids in globular clusters within the uncertainties. Using the pulsation parallaxes of V553 Cen and SWTau the data lead to an LMC modulus uncorrected for any metallicity effects of 18.46 \(\pm\) 0.10 mag. The type II Cepheids in the second-parameter globular cluster, NGC6441, show a PL(VI) relation of the same slope as that in the LMC and this leads to a cluster distance modulus of 15.46\(\pm\)0.11 mag, confirming the hypothesis that the RR Lyrae variables in this cluster are overluminous for their metallicity. It is suggested that the Galactic variable \(\kappa\) Pav is a member of the peculiar W Vir class found by the OGLE-III group in the LMC. Low-resolution spectra of OGLE-III type II Cepheids with \(P > 20\) d (RV Tau stars) show that a high proportion have TiO bands; only one has been found showing C\(_2\). The LMC RV Tau stars, as a group, are not co-linear with the shorter-period type II Cepheids in the infrared PL relations in marked contrast to such stars in globular clusters. Other differences between LMC, globular cluster and Galactic field type II Cepheids are noted in period distribution and infrared colours.

Accepted for publication in Monthly Notices of the Royal Astronomical Society
Available from arXiv:0904.4701

Planetary nebulae and the chemical evolution of the Magellanic Clouds

W.J. Maciel\textsuperscript{1}, R.D.D. Costa\textsuperscript{1} and T.E.P. Idiart\textsuperscript{1}

\textsuperscript{1}University of S\~ao Paulo, Brazil

The determination of accurate chemical abundances of planetary nebulae (PN) in different galaxies allows us to obtain important constraints of chemical evolution models for these systems. We have a long term program to derive abundances in the galaxies of the Local Group, particularly the Large and small Magellanic Clouds. In this work, we present our new results on these objects and discuss their implications in view of recent abundance determinations the literature. In particular, we obtain distance-independent correlations involving He, N, O, Ne, S, and Ar, and compare the results with data from our own Galaxy and other galaxies in the Local Group. As a result of our observational program, we have a large database of PN in the Galaxy and the Magellanic Clouds, so that we can obtain reliable constraints to the nucleosynthesis processes in the progenitor stars in galaxies of different metallicities.

Accepted for publication in Rev. M\éxico de Astronomia y Astrof\álsica
Available from arXiv:0904.2549
and from http://www.astro.iag.usp.br/~maciel
Unusual dust emission from planetary nebulae in the Magellanic Clouds


1Cornell University, USA
2The University of Western Ontario, Canada
3SETI Institute, USA
4National Astronomical Observatory of Japan, Japan
5University College London, UK
6NASA Ames Research Center, USA
7Jodrell Bank Centre for Astrophysics, UK

We present a Spitzer Space Telescope spectroscopic study of a sample of 25 planetary nebulae in the Magellanic Clouds. The low-resolution modules are used to analyze the dust features present in the infrared spectra. This study complements a previous work by the same authors where the same sample was analyzed in terms of neon and sulfur abundances. Over half of the objects (14) show emission of polycyclic aromatic hydrocarbons, typical of carbon-rich dust environments. We compare the hydrocarbon emission in our objects to those of Galactic HII regions and planetary nebulae, and LMC/SMC HII regions. Amorphous silicates are seen in just two objects, enforcing the now well-known fact that oxygen-rich dust is less common at low metallicities. Besides these common features, some planetary nebulae show very unusual dust. Nine objects show a strong silicon carbide feature at 11 μm and twelve of them show magnesium sulfide emission starting at 25 μm. The high percentage of spectra with silicon carbide in the Magellanic Clouds is not common. Two objects show a broad band which may be attributed to hydrogenated amorphous carbon and weak low-excitation atomic lines. It is likely that these nebulae are very young. The spectra of the remaining eight nebulae are dominated by the emission of fine-structure lines with a weak continuum due to thermal emission of dust, although in a few cases the S/N in the spectra is low, and weak dust features may not have been detected.

Accepted for publication in ApJ
Available from arXiv:0905.1124

The Chandra survey of the Small Magellanic Cloud "Bar". II. Optical counterparts of X-ray sources

Vallia Antoniou, Andreas Zezas, Despina Hatzidimitriou, and Jonathan C. McDowell

1Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA; vantiou@head.cfa.harvard.edu
2Physics Department, University of Crete, P.O. Box 2208, GR-710 03, Heraklion, Crete, Greece

We present the most likely optical counterparts of 113 X-ray sources detected in our Chandra survey of the central region of the Small Magellanic Cloud (SMC) based on the OGLE-II and Magellanic Clouds Photometric Survey catalogs. We estimate that the foreground contamination and chance coincidence probability are minimal for the bright optical counterparts (corresponding to OB type stars; 35 in total). We propose here for the first time 13 high-mass X-ray binaries, of which four are Be/X-ray binaries (Be-XRBs), and we confirm the previous classification of 18 Be-XRBs. We estimate that the new candidate Be-XRBs have an age of ~15–85 Myr, consistent with the age of Be stars. We also examine the "overabundance" of Be-XRBs in the SMC fields covered by Chandra, in comparison with the Galaxy. In luminosities down to ~10^{34} erg s^{-1}, we find that SMC Be-XRBs are ~1.5 times more common when compared to the Milky Way even after taking into account the difference in the formation rates of OB stars. This residual excess can be attributed to the lower metallicity of the SMC. Finally, we find that the mixing of Be-XRBs with other than their natal stellar population is not an issue in our comparisons of Be-XRBs and stellar populations in the SMC. Instead, we find indication for variation of the SMC XRB populations on kiloparsec scales, related to local variations of the formation rate of OB stars and slight variation of their age, which results in different relative numbers of Be stars and therefore XRBs.

Published in Astrophysical Journal 697, 1695 (2009)
Available from arXiv:0812.1226
VLT/SINFONI time-resolved spectroscopy of the central, luminous, H-rich WN stars of R 136

O. Schnurr1,2, A.-N. Chené2,3, J. Casoli2,4, A.F.J. Moffat2 and N. St-Louis2

1University of Sheffield, Sheffield, UK
2Université de Montréal, Montréal, Canada
3Herzberg Institute of Astrophysics, Victoria, Canada
4École Normale Supérieure, Paris, France

Using the Very Large Telescope’s Spectrograph for INtegral Field Observation in the Near-Infrared (VLT/SINFONI), we have obtained repeated AO-assisted, NIR spectroscopy of the six central luminous, Wolf-Rayet (WR) stars in the core of the very young (~ 1 Myr), massive and dense cluster R136, in the Large Magellanic Cloud (LMC). We also de-archived available images that were obtained with the Hubble Space Telescope’s Space Telescope Imaging Spectrograph (HST/STIS), and extracted high-quality, differential photometry of our target stars to check for any variability related to binary motion.

Previous studies, relying on spatially unresolved, integrated, optical spectroscopy, had reported that one of these stars was likely to be a 4.377-day binary. Our study set out to identify the culprit and any other short-period system among our targets. However, none displays significant photometric variability, and only one star, BAT 99-112 (R 136c), located on the outer fringe of R 136, displays a marginal variability in its radial velocities; we tentatively report an 8.2-day period. The binary status of BAT 99-112 is supported by the fact that it is one of the brightest X-ray sources among all known WR stars in the LMC, consistent with it being a colliding-wind system. Follow-up observations have been proposed to confirm the orbital period of this potentially very massive system.

Accepted for publication in MNRAS
Available from arXiv:0905.2934

The OGLE View of Microlensing towards the Magellanic Clouds. I. A Trickle of Events in the OGLE-II LMC data.

Łukasz Wyrzykowski1,2, Szymon Kozłowski3, Jan Skowron2, Vasily Belokurov1, Martin C. Smith1, Andrzej Udalski2, Michał Szymański2, Marcin Kubiał2, Grzegorz Pietrzyński2,4, Igor Soszyński2, Olaf Szewczyk2,4 and Karol Żebrun2

1Institute of Astronomy, University of Cambridge, UK
2Warsaw University Astronomical Observatory, Poland
3Ohio State University, USA
4Universidad de Concepción, Chile

We present the results from the OGLE-II survey (1996–2000) towards the Large Magellanic Cloud (LMC), which has the aim of detecting the microlensing phenomena caused by dark matter compact objects in the Galactic Halo (Machos).

We use high resolution HST images of the OGLE fields and derive the correction for the number of monitored stars in each field. This also yield blending distributions which we use in ‘catalogue level’ Monte Carlo simulations of the microlensing events in order to calculate the detection efficiency of the events.

We detect two candidates for microlensing events in the All Stars Sample, which translates into an optical depth of 0.43±0.33×10−7. If both events were due to Macho the fraction of mass of compact dark matter objects in the Galactic halo would be 8 ± 6 per cent. This optical depth, however, along with the characteristics of the events, seems to be consistent with the self-lensing scenario, i.e., self-lensing alone is sufficient to explain the observed microlensing signal.

Our results indicate a non-detection of Machos lensing towards the LMC with an upper limit on their abundance in the Galactic halo of 19 per cent for $M = 0.4 \, M_\odot$ and 10 per cent for masses between 0.01 and 0.2 $M_\odot$.

Accepted for publication in MNRAS
Available from arXiv:0905.2044
and from http://www.ast.cam.ac.uk/~wyrzykow/
Extinction map of the Small Magellanic Cloud based on the SIRIUS and 6X 2MASS point source catalogs

K. Dobashi¹, J.-P. Bernard², A. Kawamura³, F. Egusa¹, A. Hughes³, D. Paradis², C. Bot⁷ and W.T. Reach¹

¹Department of Astronomy and Earth Sciences, Tokyo Gakugei University, Koganei, Tokyo 184-8501, Japan
²Centre d’Etude Spatiale des Rayonnements, CNRS, 9, Avenue du Colonel Roche, 31028 Toulouse, France
³Department of Astrophysics, Nagoya University, Chikusa-Ku, Nagoya 464-01, Japan
⁴IPAC/Caltech, MS 220-6, Pasadena, CA 91125, USA
⁵CSIRO Australia Telescope National Facility, P.O. Box 76, Epping NSW 1710, Australia
⁶Centre for Supercomputing and Astrophysics, Swinburne University of Technology, Hawthorn, VIC. 3122, Australia
⁷Observatoire Astronomique de Strasbourg, 11, rue de l’université, 67000 Strasbourg, France

In this paper, we present the first extinction map of the Small Magellanic Cloud (SMC) constructed using the color excess at near-infrared wavelengths. Using a new technique named “X percentile method”, which we developed recently to measure the color excess of dark clouds embedded within a star distribution, we have derived an E(J–H) map based on the SIRIUS and 6X Two Micron All Sky Survey (2MASS) star catalogs. Several dark clouds are detected in the map derived from the SIRIUS star catalog, which is deeper than the 6X 2MASS catalog. We have compared the E(J–H) map with a model calculation in order to infer the locations of the clouds along the line of sight, and found that many of them are likely to be located in or elongated toward the far side of the SMC. Most of the dark clouds found in the E(J–H) map have counterparts in the CO clouds detected by Mizuno et al. with the NANTEN telescope. A comparison of the E(J–H) map with the virial mass derived from the CO data indicates that the dust-to-gas ratio in the SMC varies in the range $A_V/N_H = 1–2 \times 10^{-22}$ mag H⁻¹ cm² with a mean value of $\sim 1.5 \times 10^{-22}$ mag H⁻¹ cm². If the virial mass underestimates the true cloud mass by a factor of $\sim 2$, as recently suggested by Bot et al., the mean value would decrease to $\sim 8 \times 10^{-23}$ mag H⁻¹ cm², in good agreement with the value reported by Gordon et al., $7.59 \times 10^{-23}$ mag H⁻¹ cm².

Published in Astronomical Journal, 137, 5099 (2009)

X-ray spectral evolution of the extragalactic Z-source, LMC X-2

V.K. Agrawal¹ and R. Misra²

¹ISRO Head Quarter, Bangalore, India
²IUCAA, Pune, India

We present the results obtained by a detailed study of the extragalactic Z source, LMC X-2, using broad band Suzaku data and a large (~ 750 ksec) data set obtained with the proportional counter array (PCA) onboard RXTE. The PCA data allows for studying the complete spectral evolution along the horizontal, normal and flaring branches of the Z-track. Comparison with previous study show that the details of spectral evolution (like variation of Comptonizing electron temperature), is similar to that of GX17+2 but unlike that of Cyg X-2 and GX349+2. This suggests that Z sources are heterogeneous group with perhaps LMC X-2 and GX17+2 being member of a subclass. However non monotonic evolution of the Compton y-parameter seems to be generic to all sources. The broad band Suzaku data reveals that the additional soft component of the source modelled as a disk blackbody emission is strongly preferred over one where it is taken to be a blackbody spectrum. This component as well as the temperature of seed photons do not vary when source goes into a flaring mode and the entire variation can be ascribed to the Comptonizing cloud. The bolometric unabsorbed luminosity of the source is well constrained to be $\sim 2.23 \times 10^{38}$ ergs s⁻¹ which if the source is Eddington limited implies a neutron star mass of 1.6 M⊙. We discuss the implications of these results.

Accepted for publication in MNRAS
Available from arXiv:0905.0584

7
The $\Sigma - D$ Analysis of Recently Detected Radio Planetary Nebulae in the Magellanic Clouds

B. Vukotić1, D. Urošević2,4, M.D. Filipović3 and J.L. Payne3

1Astronomical Observatory Belgrade, Volgina 7, 11160 Belgrade-74, Serbia
2University of Belgrade, Faculty of Mathematics, Studentski trg 16, 11000 Belgrade, Serbia
3University of Western Sydney, Locked Bag 1797, Penrith South, DC, NSW 1797, Australia
4Isaac Newton Institute of Chile, Yugoslavia Branch, Yugoslavia

Our aim is to investigate and analyze the radio surface brightness to diameter ($\Sigma - D$) relation for recently detected, bright radio-continuum planetary nebulae (PNe) in the Magellanic Clouds (MC). We apply a Monte Carlo analysis in order to account for sensitivity selection effects on measured $\Sigma - D$ relation slopes for bright radio PNe in the MCs. In the $\Sigma - D$ plane these radio MCs PNe are positioned among the brightest of the nearby Galactic PNe, and are close to the $D^{-2}$ sensitivity line of the MCs radio maps. The fitted Large Magellanic Cloud (LMC) data slope appears to be influenced with survey sensitivity. This suggests the MCs radio PN sample represents just the “tip of the iceberg” of the actual luminosity function. Specifically, our results imply that sensitivity selection tends to flatten the slope of the $\Sigma - D$ relation. Although MCs PNe appear to share the similar evolution properties as Galactic PNe, small number of data points prevented us to further constrain their evolution properties.

Submitted to Astronomy & Astrophysics
Available from arXiv:0905.1844

Estimators for the exponent and upper limit, and goodness-of-fit tests for (truncated) power-law distributions

Thomas Maschberger1,2 and Pavel Kroupa1

1IoA, Cambridge, UK
2Argelander-Institut für Astronomie, Bonn, Germany

Many objects studied in astronomy follow a power-law distribution function (DF), for example the masses of stars or star clusters. A still used method by which such data is analysed is to generate a histogram and fit a straight line to it. The parameters obtained in this way can be severely biased, and the properties of the underlying DF, such as its shape or a possible upper limit, are difficult to extract. In this work, we review techniques available in the literature and present newly developed (effectively) bias-free estimators for the exponent and the upper limit. Furthermore, we discuss various graphical representations of the data and powerful goodness-of-fit tests to assess the validity of a power law for describing the distribution of data. As an example, we apply the presented methods to the data set of massive stars in R.136 and the young star clusters in the Large Magellanic Cloud. For R.136 we confirm the result of Koen of a truncated power law with a bias-free estimate for the exponent of $2.20 \pm 0.78 / 2.87 \pm 0.98$ (where the Salpeter-Massey value is 2.35) and for the upper limit of $143 \pm 9 / 163 \pm 9 M_\odot$, depending on the stellar models used. The star clusters in the Large Magellanic Cloud (with ages up to $10^{7.5}$ yr) follow a truncated power-law distribution with exponent $1.62 \pm 0.06$ and upper limit $68 \pm 12 \times 10^3 M_\odot$. Using the graphical data representation, a significant change in the form of the mass function below $10^{2.5} M_\odot$ can be detected, which is likely caused by incompleteness in the data.

Published in MNRAS, 395, 931 (2009)
Available from arXiv:0905.0474
MASYS. The AKARI spectroscopic survey of Symbiotic Stars in the Magellanic Clouds

R. Angeloni\textsuperscript{1,2}, S. Ciroi\textsuperscript{1}, P. Marigo\textsuperscript{1}, M. Contini\textsuperscript{2,1}, F. Di Mille\textsuperscript{1} and P. Rafanelli\textsuperscript{1}

\textsuperscript{1}Department of Astronomy, University of Padova, Italy
\textsuperscript{2}School of Physics & Astronomy, Tel Aviv University, Israel

MASYS is the AKARI spectroscopic survey of Symbiotic Stars in the Magellanic Clouds, and one of the European Open Time Observing Programmes approved for the AKARI (Post-Helium) Phase-3. It is providing the first ever near-IR spectra of extragalactic symbiotic stars. The observations are scheduled to be completed in July 2009.

Poster contribution, published in "AKARI, a light to illuminate the misty Universe", Fukutake Hall, The University of Tokyo, Japan, 16–19 February 2009
Available from arXiv:0904.1094

Fermi Observations of the Large Magellanic Cloud

Jürgen Knödlseder (on behalf of the Fermi LAT collaboration)\textsuperscript{1}

\textsuperscript{1}Centre d’Étude Spatiale des Rayonnements, CNRS/Université de Toulouse, P.O. Box 44346, 31028 Toulouse Cedex 4, France

We report on observations of the Large Magellanic Cloud with the Fermi Gamma-Ray Space Telescope. The LMC is clearly detected with the Large Area Telescope (LAT) and for the first time the emission is spatially well resolved in gamma-rays. Our observations reveal that the bulk of the gamma-ray emission arises from the 30 Doradus region. We discuss this result in light of the massive star populations that are hosted in this area and address implications for cosmic-ray physics. We conclude by exploring the scientific potential of the ongoing Fermi observations on the study of high-energy phenomena in massive stars.

Oral contribution, published in High Energy Phenomena in Massive Stars
Available from arXiv:0905.2498
The Magellanic Clouds Survey: a Bridge to Nearby Galaxies

Paul Scowen\(^1\), Rolf Jansen\(^1\), Matthew Beasley\(^2\), Daniela Calzetti\(^3\), Alex Fullerton\(^4\), John Gallagher\(^5\), Mark McCaughrean\(^6\), Robert O’Connell\(^7\), Sally Oey\(^8\) and Nathan Smith\(^9\)

\(^1\)Arizona State University, USA
\(^2\)University of Colorado — Boulder, USA
\(^3\)University of Massachusetts, USA
\(^4\)Space Telescope Science Institute, USA
\(^5\)University of Wisconsin — Madison, USA
\(^6\)University of Exeter, UK
\(^7\)University of Virginia, USA
\(^8\)University of Michigan, USA
\(^9\)University of California — Berkeley, USA

We outline to the community the value of a Magellanic Clouds Survey that consists of three components: I) a complete-area, high resolution, multi-band UV-near-IR broadband survey; II) a narrowband survey in 7 key nebular filters to cover a statistically significant sample of representative H\(_{\text{II}}\) regions and a large-area, contiguous survey of the diffuse, warm ISM; and III) a comprehensive FUV spectroscopic survey of 1300 early-type stars. The science areas enabled by such a dataset are as follows: A) assessment of massive star feedback in both H\(_{\text{II}}\) regions and the diffuse, warm ISM; B) completion of a comprehensive study of the 30 Doradus giant extragalactic H\(_{\text{II}}\) region (GEHR); C) development and quantitative parameterization of stellar clustering properties; D) extensive FUV studies of early-type stellar atmospheres and their energy distributions; and E) similarly extensive FUV absorption-line studies of molecular cloud structure and ISM extinction properties. These data will also allow a number of additional studies relating to the underlying stellar populations.

Published in a Science White Paper for the Astro2010 Decadal Survey Panel(s): Planetary Systems and Star Formation; Stars and Stellar Evolution; the Galactic Neighborhood


and from http://sfc.asu.edu