THE MAGELLANIC CLOUDS NEWSLETTER
An electronic exchange on Magellanic Clouds research

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Editorial

Dear Magellanic Clouds Enthusiasts,

Welcome to the 40th issue of the Magellanic Clouds Newsletter (MCNews). MCNews does not usually feature an editorial, but we make an exception for the current “millennium issue”.

Evolution and Current State of MCNews

Since MCNews was founded at the end of 1995, it has grown significantly in several ways. The number of subscribers increased slowly but steadily. Every month 3-4 new subscribers are added. (On the other hand, on average one subscriber is removed every month due to untraceable changes in his/her e-mail address. Please do check that this issue is mailed to your current e-mail address and inform us about changes!) The total number of subscribers comprises currently 429 people in 28 countries. Since MCNews is sent to a number of libraries the total number of readers may be larger.

MCNews offers a variety of web pages that are accessible from the URLs listed in the header of this newsletter. Web pages including a page on meetings of interest to Magellanic Cloud researchers,
a page with job ads, a page with links related to the Magellanic Clouds, and a European mirror site\textsuperscript{1} were established in August 1996 (sixth issue). In addition to the downloadable \LaTeX and postscript versions, the MCNews abstracts are being made available as HTML documents since in August 1997 (12th issue), when MCNews was turned into a monthly newsletter.

A typical issue of MCNews contains on average 10 abstracts of refereed papers, 1–2 conference contributions, and \textasciitilde{} 1 thesis abstract, job and/or meeting announcement. Abstract submissions continue to be handled through a simple \LaTeX template, which is occasionally updated. 380 abstracts of refereed papers from researchers in 26 countries have been published in MCNews so far.

Submissions are acknowledged within 24 hours of receipt except when we have no internet access due to, e.g., travel. We aim at posting the HTML version of MCNews at the same time when sending out the \LaTeX version, but occasionally time constraints may significantly delay this as well as other web page updates. We appreciate your patience in these cases.

We welcome your suggestions for improvements of MCNews. Our own desiderata include searchable issues, keyword searches, links to published papers, etc. However, since this will require a major investment of time that neither one of us can spare we regret that this won’t happen any time soon.

Editors’ Request

As many of you know, Elias Brinks and I established another newsletter in August 1998 named Dwarf Tales (http://www.astro.udto.mx/~dwarfs/), which is dedicated to all aspects of dwarf galaxy research. While the Magellanic Clouds are dwarf galaxies they play a very special role due to their proximity. Indeed the number of publications dealing directly with the Magellanic Clouds is only slightly smaller than the number of publications on other dwarf galaxies. Since the Magellanic Clouds community and the dwarf galaxies community overlap only partially we decided to keep the two newsletters separate. MCNews and Dwarf Tales are intended to be complementary and to avoid duplications. We thus ask that you send abstracts of papers primarily on dwarf galaxies other than the Magellanic Clouds to Dwarf Tales (dwarfs@astro.udto.mx), while MCNews welcomes abstracts dealing primarily with the Magellanic Clouds.

There are exceptions when a paper is of direct relevance to both areas. A more detailed policy statement will be posted in the MCNews and Dwarf Tales web pages.

A Word of Thanks

Many thanks to you, the subscribers and contributors to MCNews, for your continuing interest and support. MCNews depends on your contributions, so please keep sending your abstracts as well as other communications such as the availability of data sets, meeting and job advertisements. We aim at being as comprehensive as possible, but this is only possible with your help.

A very happy and productive year 2000 to all of you!

_Eva Grebel \& You-Hua Chu_

\textsuperscript{1}Unfortunately, the European mirror site was unreachable for about a month beginning mid-December, but is now back on-line. We apologize for any inconvenience.
Abstracts of Refereed Papers

The Magellanic System’s Interactive Formations

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The results of the interaction between the Milky Way and the Magellanic Clouds are revealed through several high velocity complexes which are connected to the Clouds. The complexes are known as the Magellanic Bridge, an HI connection between the Large and Small Magellanic Clouds, the Magellanic Stream, a 10° × 100° H I filament which trails the Clouds, and the Leading Arm, a diffuse H I filament which leads the Clouds. The mechanism responsible for these features’ formation remains under some debate, with the lack of detailed H I observations being one of the limiting factors in resolving the issue. Here, I present several large mosaics of H I Parkes All-Sky Survey (HIPASS) data which show the full extent of the three Magellanic complexes at almost twice the resolution of previous observations. These interactive features are connected, but unique in their spatial and velocity distribution. The differences may shed light on their origin and present environment. Dense clumps of H I along the sightline to the Sculptor Group, which may or may not be associated with the Magellanic complexes, are also discussed.

Accepted by: PASA

For preprints, contact putman@mso.anu.edu.au

Also available from the URL http://msowww.anu.edu.au/~putman/pubs.html

Calibration of Nebular Emission-Line Diagnostics:
I. Stellar Effective Temperatures

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We present a detailed comparison of optical H II region spectra to photoionization models based on modern stellar atmosphere models. We examine both spatially resolved and integrated emission-line spectra of the H II regions DEM L323, DEM L243, DEM L199, and DEM L301 in the Large Magellanic Cloud. The published spectral classifications of the dominant stars range from O7 to WN3, and morphologies range from Strömgren sphere to shell structure. Two of the objects include SNR contamination. The overall agreement with the predictions is generally within 0.2 dex for major diagnostic line ratios. An apparent pattern in the remaining discrepancies is that the predicted electron temperature is ~ 1000 K hotter than observed. [Ne III] intensities are also slightly overpredicted, which may or may not be related. We model the shock emission for the SNR-contaminated objects, and find excellent agreement with the observations for composite shock and photoionized spectra. DEM L301’s
emission apparently results from both shocks and density-bounded photoionization. The existence of contaminating shocks can be difficult to ascertain in the spatially integrated spectra.

Our analysis of the complex DEM L199 allows a nebular emission-line test of unprecedented detail for WR atmospheres. Surprisingly, we find no nebular He\textsc{ii} 4686Å emission, despite the fact that both of the dominant WN3 stars should be hot enough to fully ionize He\textsc{i} in their atmospheres. The nebular diagnostics are again in excellent agreement with the data, for stellar models not producing He\textsuperscript{+}-ionizing photons. The optical diagnostics are furthermore quite insensitive to the ionizing energy distribution for these early WR stars.

We confirm that the \( \eta' \) emission-line parameter is not as useful as hoped for determining the ionizing stellar effective temperature, \( T_\ast \). Both empirically and theoretically, we find that it is insensitive for \( T_\ast \gtrsim 40 \text{ kK} \), and that it also varies spatially. The shock-contaminated objects show that \( \eta' \) will also yield a spuriously high \( T_\ast \) in the presence of shocks. It is furthermore sensitive to shell morphology. We suggest [Ne\textsc{iii}]/H\textbeta as an additional probe of \( T_\ast \). Although it is abundance-dependent, [Ne\textsc{iii}]/H\textbeta has higher sensitivity to \( T_\ast \), is independent of morphology, and is insensitive to shocks in our objects. These observations should be useful data points for a first empirical calibration of nebular diagnostics of \( T_\ast \), which we attempt for LMC metallicity.

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For preprints, contact oey@stsci.edu
Also available from the URL http://www.stsci.edu/~oey

RX J050736–6847.8: a Large Supernova Remnant
Around an X-ray Binary in the Large Magellanic Cloud?!

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RX J050736–6847.8 in the Large Magellanic Cloud (LMC) is an intriguing X-ray source consisting of a large ring (diameter \( \sim 150 \text{ pc} \)) of diffuse emission and a central compact source. It is projected in the vicinity of the superbubble N103 around the star cluster NGC 1850. RX J050736–6847.8’s ring of diffuse X-ray emission, offset from the superbubble N103, is not bounded by any optical shell structure, while RX J050736–6847.8’s central compact X-ray source is projected within the cluster HS122. We have analyzed archival ROSAT observations of RX J050736–6847.8 to determine the physical properties of its X-ray-emitting gas. The X-ray luminosity of the diffuse X-ray emission is \( 5–6 \times 10^{35} \text{ ergs s}^{-1} \) in the 0.1–2.4 keV band, within the range for supernova remnants (SNRs). Assuming a shell geometry with a fractional shell thickness (\( \Delta R/R \)) of 0.05–0.2, we find the density of the hot gas to be 0.05–0.09 cm\textsuperscript{-3} and a hot gas mass of \( \sim 820 \text{ M}_\odot \). The physical properties of this shell of hot gas are consistent with Sedov’s solution for a \( \sim 5 \times 10^4 \)-yr old SNR in a low-density (\( \sim 0.015 \text{ cm}^{-3} \)) medium formed by a supernova of an explosion energy of \( 3 \times 10^{51} \) ergs. The density is so low that no detectable optical emission is expected. Therefore, we suggest that this ring of X-ray emission originates in a SNR, the largest known in the LMC. The large size, low density, and the regular X-ray morphology suggest that this SNR is located in the halo of the LMC; the small absorption column density further suggests that this SNR is on the near side of the LMC halo. The central compact source of RX J050736–6847.8 is probably an X-ray binary in the cluster HS122. The relationship between the compact source and the
diffuse ring is unknown.

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For preprints, contact chu@astro.uiuc.edu
Also available from the URL http://www.astro.uiuc.edu/~chu/publications/preprints/preprints.html

Wind properties of Wolf-Rayet stars at low metallicity:
Sk 41 (SMC)

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The stellar properties of Sk 41 (AB4, WN5h), the only known single Wolf-Rayet star in the SMC, are derived from ultraviolet (IUE), optical (AAT) and near-IR (NTT) spectroscopy. Contrary to expectations, the stellar properties of Sk 41 are typical of equivalent WN stars in the Galaxy and LMC, with $T_e \sim 42$ K, $\log(L/L_\odot)=5.7$, $v_\infty=1300$ km s$^{-1}$, $\dot{M}/\sqrt{\mathcal{J}}=3 \times 10^{-5} M_\odot$ yr$^{-1}$, and H/He $\sim 2$ by number, where $f$ is the volume filling factor. The stellar luminosity of Sk 41 is 50% below the minimum value predicted by single star evolutionary models at the metallicity of the SMC.

Emission line luminosities of He II $\lambda 4686$ and C IV $\lambda 5801$-12 in SMC WR stars are not systematically lower than their Galactic and LMC counterparts. From 43 late-type and 59 early-type WN stars, $\log L_{\text{HeII}}^{\text{HeII}}=36.0$ erg s$^{-1}$ and 35.8 erg s$^{-1}$, respectively, while $\log L_X^{\text{CIV}}=36.5$ erg s$^{-1}$. From 25 early-type WC stars. This new calibration has an application in deriving WR populations in young starburst galaxies.

Synthetic WN models are calculated with identical parameters except that metal abundances are varied. Following the Smith et al. WN classification scheme, CNO equilibrium models reveal that earlier spectral types are predicted at lower metallicity, i.e. WN3-4 at 0.04$Z_\odot$ versus WN6 at 1.0$Z_\odot$. This provides an explanation for the trend towards earlier WN spectral types at low metallicity.

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For preprints, contact pac@star.ucl.ac.uk
Also available from the URL http://www.star.ucl.ac.uk/~pac/publications.html

Search for the optical counterpart of the 16ms X-ray pulsar in the LMC

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The 16ms X-ray pulsar PSR J0537−6910 in SNR N157B is the fastest known isolated (non-recycled) pulsar and, with a rotational energy loss $\dot{E} \sim 4.8 \times 10^{38}$ erg s$^{-1}$, is the most energetic (together with
the Crab). Here we report the results of optical observations of the field, recently performed with the SUSI2 camera of the NTT. Few objects are observed inside the ≃ 3 arcsec X-ray error circle but none of them can be convincingly associated to the pulsar, which appears undetected down to \( V \sim 23.4 \). With a corresponding optical luminosity \( L_{\text{opt}} \leq 1.3 \times 10^{33} \, \text{erg s}^{-1} \), PSR J0537−6910 is, at best, comparable to the other very young pulsars Crab and PSR B0540−69.

**Accepted by: Astronomy & Astrophysics**

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*Also available from the URL http://babbage.sissa.it/ps/astro-ph/9912271*

**The nature of RX J0052.1−7319**

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The nature of the X-ray source RX J0052.1−7319 is discussed from observational data obtained from ROSAT observations performed in 1995 and 1996. An accurate position is derived from ROSAT HRI observations of the source performed in 1995. The 6″ error circle contains two OGLE microlensing optical variables of which one has previously been identified with a 14.5 mag Be-type star in the Small Magellanic Cloud. During the October 1996 observation RX J0052.1−7319 was found to be extremely bright (with a count rate of \( \sim 1.1 \pm 0.1 \, \text{s}^{-1} \)) and 15.3±0.1 second X-ray pulsations have been discovered during this observation. This would indicate for a high-mass X-ray binary nature of the source. During the 1995 observation the X-ray source detected at the position of RX J0052.1−7319 was a factor \( \sim 200 \) fainter. The corresponding luminosity has changed from \( \sim 5.2 \times 10^{37} \, \text{erg s}^{-1} \) to \( \sim 2.6 \times 10^{35} \, \text{erg s}^{-1} \) assuming SMC membership of the source. It is unclear whether the so-far unidentified second optical variable contributes to the X-ray flux of the source.

**Accepted by: Astronomy & Astrophysics Main Journal**

*For preprints, contact pkahabka@astro.uni-bonn.de*

*Also available from the URL http://xxx.lanl.gov/abs/astro-ph/0001063*

**The SMC X-ray transient XTE J0111.2−7317:**

**A Be/X-ray binary in a SNR?**

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We report observations which confirm the identity of the optical/IR counterpart to the Rossi X-ray Timing Explorer transient source XTE J0111.2−7317. The counterpart is suggested to be a B0-B2 star (luminosity class III–V) showing an IR excess and strong Balmer emission lines. The distance derived from reddening and systemic velocity measurements puts the source in the SMC. Unusually, the source exhibits an extended asymmetric Hα structure.
New infrared object in the field of the SMC cluster NGC 330

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We report ISO (Infrared Space Observatory) observations of a new infrared source discovered in the vicinity of the young populous cluster NGC 330 in the Small Magellanic Cloud. The object was observed with ISOCAM at 4.5, 6.75 and 11.5 \(\mu m\) and shows a prominent mid-infrared excess, indicating the presence of a dust shell. The available observations of the optical counterpart together with the mid-infrared ISOCAM data suggest that this object is most likely a post-AGB star, or a Be supergiant. Cluster membership and candidate evolutionary scenarios are discussed briefly.

OB Stellar Associations in the Large Magellanic Cloud. Identification Method

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We describe an objective method for the identification of stellar OB associations in the LMC under the assumption that they are loose, unbound stellar systems with young OB stellar component.

The method is based on star counts and spectral classification. First, we detect the areas where an enhancement of star number density occurs above 3\(\sigma\) of the average field density in large regions. The boundaries at 3\(\sigma\) provide the size and morphology of the detected stellar concentrations. Further examination at different magnitude ranges allows us to select the systems with bright stellar component within the detected areas.

In the second step, star counts around the peak density of each detected stellar concentration provide a typical value of the projected half-mass radius, in order to calculate the central density.
using the appropriate MF slope. The central density, being a crucial parameter for the bound and unbound systems, has been used as a tentative criterion for the distinction between open clusters and associations. Finally, spectral classification in objective prism plates provides further evidence for the existence of OB type stars in these concentrations.

The faintest magnitude, where the various systems were detected, is found to be independent of the presence or not of gas and varies up to four magnitudes. An explanation for this effect is the possible existence of Pre-Main Sequence stars, which are not visible in the optical region.

Accepted by: The Astronomical Journal

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**Microlensing and the mass function of halo dark matter**

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The simplest interpretation of the microlensing events observed towards the Large Magellanic Clouds is that approximately half of the mass of the Milky Way halo is in the form of MAssive Compact Halo Objects with \( M \sim 0.5M_\odot \). It is not possible, due to limits from star counts and chemical abundance arguments, for faint stars or white dwarves to comprise such a large fraction of the halo mass. This leads to the consideration of more exotic lens candidates, such as primordial black holes, or alternative lens locations. If the lenses are located in the halo of the Milky Way, then constraining their mass function will shed light on their nature. Using the current microlensing data we find, for four halo models, the best fit parameters for delta-function, primordial black hole and various power law mass functions. The best fit primordial black hole mass functions, despite having significant finite width, have likelihoods which are similar to, and for one particular halo model greater than, those of the best fit delta functions. We then use Monte Carlo simulations to investigate the number of microlensing events necessary to determine whether the MACHO mass function has significant finite width. If the correct halo model is known, then \( \sim 500 \) microlensing events will be sufficient, and will also allow determination of the mass function parameters to \( \sim 5\% \).

Submitted to: Astrophysical Journal

For preprints, contact amg@maths.qmw.ac.uk
Abstracts of Non-Refereed Papers

Hot Gas in the Large Magellanic Cloud

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The Large Magellanic Cloud (LMC) offers an excellent laboratory to study the physical structure of the interstellar medium (ISM) because of its proximity, nearly face-on orientation, and small foreground and internal extinction. Optical and radio surveys of the LMC ISM have revealed interstellar structures of sizes ranging from a few parsecs to over 1000 parsecs. ROSAT X-ray mosaics of the LMC have detected abundant 10^6 K hot gas, some of which is bounded by large shell structures while the rest does not appear to be associated with any visible interstellar structure. The X-ray observations have been analyzed to determine the physical conditions of the hot gas. The distribution of the hot gas can be compared to those of the cooler gas and massive stars, in order to determine the production mechanism of the hot gas. UV observations of interstellar absorption lines of high ions, such as C iv, N v, and O vi, can be used to study the interfaces between the 10^6 K gas and cooler ionized gas, and to provide constraints on the location of 10^6 K gas with respect to the cooler gas along the line of sight.


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Also available from the URL http:
www.astro.uiuc.edu/~chu/publications/preprints/preprints.html

DENIS colours of giant stars in the Magellanic Clouds and the determination of the distance using the tip of the red giant branch

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We present the first analysis of the DENIS PSC towards the Magellanic Clouds (MCs). We discuss the DENIS colours of the detected sources: mainly Red Giant Branch (RGB) and Asymptotic Giant Branch (AGB) stars. We give a preliminary determination of the distance modulus to the MCs using the tip of the red giant branch (TRGB) and the theoretical relation derived by Salaris and Cassisi (1998). We obtain 18.59 ± 0.1 and 18.86 ± 0.1 towards the Large Magellanic Cloud (LMC) and the Small Magellanic Cloud (SMC), respectively.


For preprints, contact mrcioni@strw.leidenuniv.nl
Star Clusters in Local Group Galaxies – Impact of Environment on their Evolution and Survival

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2 Hubble Fellow

In about 40% of the Local Group galaxies star clusters have been detected so far, but the census is still incomplete. The properties of these clusters are briefly reviewed, and the impact of galaxy environment on the evolution and survival of star clusters is discussed. Several (but not all) Local Group galaxies seem to share a common epoch of the earliest globular cluster formation. The most massive galaxies show a tendency for rapid enrichment in their oldest cluster population near their centers as compared to clusters at larger galactocentric radii. The galactocentric dependence of cluster sizes and horizontal branch morphology may be intrinsic to the globular cluster formation process rather than to the accretion of dwarf galaxies. The observed properties of globular clusters in the least massive dwarfs suggest that their parent galaxies may originally have been substantially more massive. Cluster destruction mechanisms and time scales are a function of galaxy environment and galaxy mass. The most recent enhancement of star cluster formation in the Magellanic Clouds may have been triggered by their close encounter with each other and the Milky Way.

For preprints, contact grebel@astro.washington.edu

The 24-Hour Night Shift: Astronomy from Microlensing Monitoring Networks

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Scores of on-going microlensing events are now announced yearly by the microlensing discovery teams OGLE, MACHO and EROS. These early warning systems have allowed other international microlensing networks to focus considerable resources on intense photometric — and occasionally spectroscopic — monitoring of microlensing events. Early results include: metallicity measurements of main sequence Galactic bulge stars; limb darkening determinations for stars in the Bulge and Small Magellanic Cloud; proper motion measurements that constrain microlens identity; and constraints on Jovian-mass planets orbiting (presumably stellar) lenses. These results and auxiliary science such as variable star studies and optical identification of gamma ray bursts are reviewed.

For preprints, contact psackett@astro.rug.nl
Also available from the URL http://xxx.lanl.gov/abs/astro-ph/0001048
Meeting Announcements

MICROLENSING 2000:
A New Era in Microlensing Astrophysics

Venue and date: Cape Town, 21 – 25 Feb 2000
URL: http://www.sao.ac.za/~lens
Contact: Penny D. Sackett, Chair, Scientific Organizing Committee psackett@astro.rug.nl
John Menzies, Chair, Local Organizing Committee, jwm@sao.ac.za
Deadlines: Abstracts of oral presentations: 17 Jan 2000
Poster abstracts: 30 Jan 2000

Scope of the meeting:
The meeting will focus on the growing symbiotic relationship between microlensing astrophysics and the following topics: Galactic Structure and Dynamics, Composition and Dynamics of the Local Group, The Stellar Mass Function, Baryonic Dark Matter, Stellar Atmospheres, Stellar Binarity, Extrasolar Planets, Cosmology, and Future Astronomical Instrumentation.

In particular, the following questions will be addressed:
• What observational and theoretical considerations constrain the amount and type of Baryonic Dark Matter in galaxies?
• Has microlensing revealed a significant amount of BDM?
• Is the distribution of lensing Binaries and Planets consistent with previous expectations?
• Can the positive and null results from various Extrasolar Planet search techniques be combined to create a unified picture?
• Do microlensing results significantly constrain models of Stellar Atmospheres?
• Can models be improved for more direct comparison with existing and expected microlensing results on stellar profiles?
• Should particular constraints on the Stellar Mass Function serve as input to the interpretation of microlensing results?
• Is microlensing already telling us something about the IMF?
• What information about the Milky Way and Local Group is needed to interpret microlensing results?
• What can microlensing tell us about the Galaxy and its environs?
• What can Cosmological Microlensing tell us about quasars and the contents of distant galaxies?
• Which Technological Advances planned for the next 10-20 years could most benefit the field?

Emphasis will be on very recent results and expectations for the future, rather than on reports of older work. Ample time will be available for discussion in small groups, and attendees may opt for one of three possible excursions to the surrounding countryside during the week. Details, including an evolving list of registered participants, a preliminary program, registration forms, and tour information can be found on the web site given above.

But space is limited. If you would like to attend this novel meeting in a beautiful southern hemisphere setting, please register quickly.


SOC: Penny Sackett (Chair), James Binney, Roseanne DiStefano, Kenneth Freeman, Andrew Gould, Shude Mao, John Menzies, Bohdan Paczynski, Nathalie Palanque-Delabrouille, Andrzej Udalski.
A potential IAU Symposium on Extragalactic Star Clusters

This is a preliminary announcement of a potential IAU Symposium on “Extragalactic Star Clusters”, for which we hope to obtain IAU approval during the IAU General Assembly in Manchester in August 2000. If approved this will be the first IAU Symposium ever to be held in Chile. It will help our planning to get an initial idea of how many people may be interested in attending such a meeting. Please return the appended “indication of interest” if you would like to be added to the mailing list. Also, please feel free to pass this preliminary announcement on to other interested parties.

**Time and venue:** March 12–16, 2001, Pucón, Chile

**Host:** Universidad de Concepción, Chile

**Scientific rationale:** The planned IAU Symposium aims at exploring the diversity and common properties of star clusters ranging from ancient globulars to young starburst clusters in different environments. We want to bring together researchers working on the many different aspects of extragalactic star clusters in a variety of different wavelength ranges in order to gain a comprehensive picture of star cluster formation and evolution and their role in the evolutionary framework of their parent galaxies. Topics to be addressed include:

- Star cluster formation in its entirety ranging from short-lived, low-density OB associations to open clusters, rich populous clusters, and to very massive, dense super star clusters, the possible progenitors of today’s globular clusters.
- Star cluster formation in all possible environments including low-mass dwarf galaxies, irregular and spiral galaxies, starburst galaxies, interacting and merging galaxies or galaxies that suffered such events on a large scale in the past, isolated ellipticals and ellipticals in galaxy cluster environments.
- The preconditions for cluster formation as a function of environment and external influences, questions of variations of the initial mass function, the question of the existence and length of a period of preferred globular cluster formation, cluster life times and destruction mechanisms.
- The use of star clusters, especially globular clusters, to study galaxy formation and evolution, galaxy dynamics, and the distance scale.

**SOC:** Beatriz Barbuy, Jean Brodie, Gary Da Costa, Bruce Elmegreen, Uta Fritze-von Alvensleben, Juan Forte, Doug Geisler (Co-Chair), Eva Grebel (Co-Chair), Luis Ho, Rob Kennicutt, Myung-Gyoon Lee, Georges Meylan.

**Contact:** Eva K. Grebel, University of Washington, grebel@astro.washington.edu
Doug Geisler, Universidad de Concepción, doug@kukita.cfm.udc.cl

**Preliminary indication of interest:**

- Name, affiliation, and e-mail address:
- Hotel category preference (prices are preliminary):
- Hotel del Lago (5-star hotel), conference venue:
  - Single room: US$ 120/night
  - Double (shared) room: US$ 60/night/person
- Simpler accommodations within 10–15 min walking distance:
  - Single/double: US$ 50/night/person
  - Shared rooms: US$ 10–20/night/person
- Do you anticipate to need partial or full travel support?
- Would you be interested in giving a presentation?

Please return this form to grebel@astro.washington.edu if you are interested in attending our proposed IAU Symposium. A plain ASCII version is appended at the end of this \LaTeX{} file.