Elizabeth and Frederick White Conference on the Magellanic System

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Tanaka	Mikito	National Astronomical Observatory of Japan
Tauber	Leigh	James Cook University
Torii	Kazufumi	Nagoya University

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Scientific Program

Monday July 16

Session: The Stellar Population of the Magellanic System

Chair: Dr Russell Cannon

10:30-10:40	Erik Muller	Conference Welcome
10:40-11:10	**Maria-Rosa Cioni***	The Magellanic Clouds as a Template for the Study of Stellar Populations and Galaxy Interaction
11:10-11:30	Lynn Redding Carlson	Dating Young Stellar Objects in the Magellanic Clouds
11:30-11:50	Slawomir Piatek	Internal Kinematics of the LMC Based on Mean Proper Motions in 21 Fields
11:50-12:10	**Morning Tea**	
12:10-12:30	David Nidever	The Extended Population of the Large Magellanic Cloud
12:30-12:50	Warren Reid	Spectral Diagnostics of Newly Discovered Planetary Nebulae in the Large Magellanic Cloud
12:50-1:20	**Jason Harris***	The Stellar Content of the Magellanic System: Unlocking the Secrets of Star Formation
1:20-2:20	**Lunch & Poster Viewing**	

Chair: Dr Kenji Bekki

02:20-02:40	Greg Madsen	H-alpha Observations of the Magellanic Stream
02:40-3:00	Joss Bland-Hawthorn	The Source of Ionisation in the Magellanic System

Session: Numerical Simulations/Evolution of the Magellanic System

03:00-03:20	Carlton Pryor	Has the LMC had Close Encounters with other Satellite Galaxies
03:20-03:40	Tomoaki Ishiyama	Statistical Study of Substructure Pair Histories
03:40-04:00	**Afternoon Tea**	
04:00-04:30	**Chiara Mastropietro***	Ram-pressure Induced Star Formation in the LMC
04:30-04:50	Gurtina Besla	Are the Magellanic Clouds on Their First Passage about the Milky Way?
04:50-05:10	Kenji Bekki	Formation of Old and Young Star Clusters in the Magellanic Clouds
05:10-05:30	Adam Ruzicka	Magellanic Clouds in Interaction – Evolutionary Search for Good Models
05:30	**End**	

Elizabeth and Frederick White Conference on the Magellanic System

Scientific Program

Tuesday July 17

Session: Spitzer and Dust Surveys of the Magellanic System

Chair: Prof. Lister Staveley-Smith

09:30-10:00	**Margaret Meixner***	Spitzer Survey of the Large Magellanic Clouds: Surveying the Agents of a Galaxy's Evolution (SAGE): Infrared Stellar Populations
10:00-10:20	Jean Philippe Bernard	ISM in the LMC, from SAGE Data
10:20-10:40	Alberto Bolatto	The Spitzer View of the Small Magellanic Cloud: Results from the S3MC and S4MC Surveys
10:40-11:00	Caroline Bot	Millimetre Dust Emission as a tracer of Molecular Gas in Galaxies: Comparison of SMC and Local Giant Molecular Clouds
11:00-11:20	**Morning Tea**	

Session: The Magellanic ISM

11:20-11:40	Miroslav Filipovic	The Magellanic Clouds in radio-continuum: overview of their history
11:40-12:00	Deanna Matthews	Characterising the Turbulent HI in the Magellanic Stream
12:00-12:20	Annie Hughes	The HI gas associated with Molecular Clouds in the LMC
12:20-12:40	Erik Muller	Zooming into the Star Forming ISM in the SMC
12:40-1:40	**Lunch & Poster Viewing**	

Chair: Prof. Yasuo Fukui

01:40-02:00	Ann Mao	A Radio and Optical Polarisation Study of the Magnetic Field in the Small Magellanic Cloud
02:00-2:20	Bryan Gaensler	The Radio Supernova Remnant of SN 1987A at 20 Years of Age

Session: The Molecular Component of the Magellanic System

02:20-02:50	**Akiko Kawamura***	Study of the Molecular Clouds and Star Formation in the Magellanic Clouds
02:50-03:10	Tetsuhiro Minamidani	An Observational Study of the GMCs in the Magellanic Clouds in Millimetre and Sub-millimetre wavelengths
03:10-03:30	**Afternoon Tea**	
03:30-04:00	**Jürgen Ott***	High Resolution Mopra Observations of the Molecular Ridge Close to 30 Doradus

Session: Infrared Studies of the Magellanic System

04:00-04:20	Takashi Onaka	AKARI Area Survey of the Large Magellanic Cloud
04:20-04:40	Yasuo Doi	AKARI Far-Infrared Survey of the Large Magellanic Cloud
..04:40-05:00	Daisuke Kato	The IRSF Magellanic Cloud Point Source Catalogue
05:00	**Wrap up and End**	

*** Key Speaker**

ABSTRACTS

KEY SPEAKERS

Maria-Rosa Cioni
ROE

The VISTA near-infrared YJKs survey of the Magellanic System (VMC)

The Magellanic System, because of its properties, represents one of the best places to study the formation and evolution of galaxies. Photometric surveys of various depths, areas and wavelengths have had a significant impact on our understanding of the system; however, a global picture is still lacking. VMC (a VISTA Public Survey) will provide new data to derive the spatially resolved star formation history and to construct a three-dimensional map of the system. These data combined with those from other ongoing and planned surveys will provide us with an absolutely unique view of the system opening up the doors to truly new science!

Jason Harris
University of Arizona

The Stellar Content of the Magellanic System: Unlocking the Secrets of Star Formation

The Magellanic Clouds represent a unique gift from nature: a window opened onto a grand, sweeping view of galaxy evolution in action. I present the results of several lines of research aimed at using the stellar populations in the Magellanic system as probes of its rich history. I review my reconstruction of the global star formation history (SFH) of the Small Magellanic Cloud, and present for the first time, my reconstruction of the global SFH of the Large Magellanic Cloud as well. I also present a study of the stellar populations in the Magellanic Bridge, and discuss ongoing work on the internal kinematics of stars in the Clouds. Finally, I outline future directions for this research, including the emerging field of protostellar populations, using mid-infrared data from the SAGE Spitzer Legacy program.

Akiko Kawamura
Nagoya University

Study of molecular clouds and star formation in the Magellanic Clouds

Recent mm to sub-mm observations in the Magellanic System started to reveal the properties of the individual molecular clouds in detail and their relation to star formation activities. We will present the properties of about 300 molecular clouds in the Magellanic Clouds observed by NANTEN. Comparisons of the clouds with young clusters and HII regions show that about one third of them are without massive star formation in the LMC, while most in the SMC are associated with HII regions. These

molecular clouds are also compared with the recent results from the observations by the infrared satellites.

Chiara Mastropietro
University Observatory Munich

Ram-pressure induced star formation in the LMC.

We use high-resolution SPH simulations to study the effects of the interaction between the interstellar medium of the Large Magellanic Cloud and the diffuse hot halo of the Milky Way. We investigate wether the ram-pressure acting on the LMC during its orbital motion around the MW is responsible for the asymmetric large scale features observed in the HI distribution and for triggering star formation in the external disk, in particular along the leading edge where most of the youngest stellar complexes are located. The LMC is modeled using multi-component systems with a stellar and gaseous disk embedded in a spherical NFW halo. The effects of an increasing ram-pressure between the last apogalacticon and the present nearly perigalactic position of the satellite are simulated using ''wind tunnels'' where the ram-pressure varies with time. Different disk orientations, hot halo densities, orbital parameters and star formation recipes are investigated.

Margaret Meixner
STSCI

Spitzer Survey of the Large Magellanic Cloud: Surveying the Agents of a Galaxy's Evolution (SAGE): Infrared Stellar Populations

We are performing a uniform and unbiased imaging survey of the Large Magellanic Cloud (LMC, ~7x7), using the IRAC (3.6, 4.5, 5.8 and 8 m) and MIPS (24, 70, and 160 m) instruments on board the Spitzer Space Telescope (Spitzer) in order to survey the agents of a galaxy's evolution (SAGE), through the interaction between the interstellar medium (ISM) and stars in the
LMC. I will provide an overview of the SAGE legacy project with a focus on the infrared stellar populations: evolved stars and young stellar objects. SAGEs point source sensitivity enables a complete census of newly formed stars with masses >3 M and of evolved stars with mass loss rates >1x10-8 M yr^{-1}.

Jürgen Ott
NRAO (National Radio Astronomy Observatory)

High-resolution Mopra observations of the molecular ridge close to 30 Doradus

The molecular ridge close to 30 Doradus is one of the most prominent features in the distribution of molecular gas in the LMC. It extends from the vigorous star forming region 30 Doradus ~2 kpc southward into much quieter star forming

regions. Therefore it offers a unique possibility to derive molecular gas parameters as a function of the radiation field in a low-metallicity environment. We present high spatial, wide-field observations of this feature in the 12CO(1-0) line observed with the Mopra telescope. An analysis of the spatial and velocity structure of this feature will be provided and we discuss different modes of molecular cloud formation. In addition, we show that despite of the extreme conditions within the LMC, the properties of individual molecular clouds do not deviate substantially from clouds observed in the Galaxy.

ORAL PRESENTATIONS

Kenji Bekki
UNSW

Formation of old and young star clusters in the Magellanic Clouds

We discuss physical properties of old and intermediate-age globular clusters (GCs) and young star clusters in the LMC and the SMC based both on galaxy-scale chemodynamical simulations of interacting LMC/SMC and on pc-scale ones of forming star clusters in GMCs. We particularly discuss (1) the origin of possible rotational kinematics of old GCs in the LMC, (2) the origin of the ``age gap'' in the LMC's GC system, (3) the formation of binary clusters in the MCs, (4) the roles of the last Magellanic collision about 0.2 Gyr ago in the formation of 30 Doradus of the LMC, and (5) physical relationships between field star formation and cluster one in the MCs.

Jean-Philippe Bernard
CESR

ISM in the LMC, from SAGE data

I will describe the latest findings regarding the diffuse IR emission in the LMC, using the SAGE Spitzer data from 3 to 160 microns. Correlation of this data with the HI and CO emission allows for the first time to study the distribution of the radiation field intensity, abundance of the various dust components, from large molecules (PAHs), very small grains and big grains, and even the abundance of the CO molecule across the whole galaxy.

Gurtina Besla
Harvard

Are the Magellanic Clouds on their First Passage about the Milky Way?

Recent proper motion measurements of the L/SMC by Kallivayalil et al. (2006a,b) suggest that the 3D velocities of the Clouds are substantially higher (~100 km/s) than previously estimated and now approach the escape velocity of the Milky Way (MW). We have re-examined the orbital history of the Clouds using the new velocities and a LCDM-motivated MW model (e.g. Klypin et al. (2002)). We conclude that the L/SMC are either currently on their first passage about the MW or, if the MW can be accurately modeled by an isothermal sphere to distances > 200 kpc, that their orbital period and apogalacticon distance must be a factor of two larger than previously estimated. We discuss the implications of this analysis to our understanding of the origin of the Magellanic Stream.

Joss Bland-Hawthorn
University of Sydney

The source of ionization along the Magellanic Stream

Since its discovery over a decade ago, the source of ionization along the Magellanic Stream has defied explanation. We now provide a simple but elegant explanation -- consistent with all known constraints -- that in turn has important consequences for the lifetime and eventual fate of the Stream.

Alberto Bolatto
Berkely University

The Spitzer view of the Small Magellanic Cloud: results from the S3MC and S4MC surveys

I will present some of the recent results from the Spitzer Survey of the Small Magellanic Cloud (S3MC) and its spectroscopic follow up (S4MC). S3MC imaged the main star forming body of the SMC and obtained photometric data in all Spitzer wavebands, from 3.6 to 160 um. S4MC is ongoing, obtaining large (8'x8') low resolution spectral maps of several regions of interest selected using the imaging data. I will discuss our results on the nature and distribution of the stellar populations (including Young Stellar Objects and a newly discovered population of dusty early-B stars), variations in the dust composition, cold molecular gas and star formation, and the FIR-radio continuum relation within the SMC.

Caroline Bot
Caltech

Millimeter dust emission as a tracer of molecular gas in galaxies comparison of SMC and Local giant molecular clouds

Molecular gas is of particular importance in galaxies as the primary fuel of star formation. Most of this component is located in giant molecular clouds (GMCs), but the exact amount of gas in those clouds remains unknown since H2 is almost impossible to observe directly in cold interstellar regions. CO observations have been so far the best way to trace molecular gas in external galaxies, but in low metallicity environments the gas mass deduced could be largely underestimated due to enhanced photo dissociation of the CO molecule. In this context, using millimeter dust emission as a dense gas tracer could unveil large H2 envelopes.

Different molecular gas mass tracers are applied and compared in two GMC samples: the local molecular clouds in our Galaxy, and equivalents in the Small Magellanic Cloud (SMC), one of the nearest low metallicity dwarf galaxy. In our Galaxy, virial masses are systematically larger than mass estimates from millimeter (FIRAS) dust emission, confirming previous studies. This is not the case for SMC giant molecular clouds: molecular cloud masses deduced from SIMBA millimeter observations are systematically higher than the virial masses from SEST CO observations. The

observed excess cannot be accounted for by any plausible change on dust properties. Revisiting the standard virial theorem, we show that an additional magnetic field support of the SMC clouds could explain the difference observed. In this scenario, CO is confined in clumps embedded in large envelopes of H2 and their motion are not representative of the gravitational potential.

Lynn Redding Carlson
Johns Hopkins University

Dating Young Stellar Objects in the Magellanic Clouds

We are examining Young Stellar Objects (YSOs) in the SMC and the LMC by looking at their Spectral Energy Distributions (SEDs) and making use of a state of the art YSO SED fitter to determine their evolutionary state. LMC data comes from HST and from the Spitzer Legacy program SAGE (Surveying the Agents of a Galaxy's Evolution). The SMC imaging comes from the Spitzer Space Telescope (Spitzer) and the Advanced Camera for Surveys aboard the Hubble Space Telescope (HST/ACS) and focuses on two young clusters: NGC 602 and NGC 346, both of which were spotlighted in recent HST press releases.

Yasuo Doi
University of Tokyo

AKARI Far-Infrared Survey of the Large Magellanic Cloud

We present first observational results of the LMC in far-infrared wavelength range by the infrared astronomy satellite AKARI. The observation covers 50--180 um wavelength range with 4 continuous photometric bands centering at 65 um, 90 um, 140 um, and 160 um with high spatial resolution of 43"--72". Distribution of low temperature dust (T < 20 K) observed in >100 um and characteristics of dust spectral energy distribution revealed by four-band photometry of AKARI will be discussed.

Miroslav Filipovic
UWS

The Magellanic Clouds in radio-continuum: overview of their history, surveys, structure and objects

During the last few decades, the MCs have been investigated over almost all of the electromagnetic spectrum. I will review the past, present and future radio-continuum surveys of the Magellanic Clouds including the LMC/SMC-RC structure and objects such as SNRs, HII regions, microquasars and PNe.

Bryan Gaensler
USyd/ATNF

The Radio Supernova Remnant of SN 1987A at 20 Years of Age

Supernova 1987A in the Large Magellanic Cloud was the brightest supernova in almost 400 years. The supernova ejecta, seen initially to be moving outwards at more than 10% of the speed of light, are now producing bright emission at all wavelengths as they collide with and shock surrounding material. For the last 15 years the Australia Telescope Compact Array (ATCA) has tracked the steadily increasing radio flux from this violent interaction, revealing an expanding asymmetric shell. We will present the latest results from our high-resolution ATCA imaging of SN 1987A, and will explain how the spectacular combination of ATCA, Chandra and HST data reveal both symmetries in the progenitor star's stellar wind and asymmetries in the supernova ejecta. The interaction of SN 1987A with its environment is just beginning: we can expect this source to be a prominent feature of the Magellanic skies for many centuries to come.

Annie Hughes
Swinburne University of Technology

The HI gas associated with molecular clouds in the LMC

Observational evidence that molecular clouds have lifetimes of only a few Myr has raised the possibility that molecular clouds may be transient features within large-scale flows in the atomic interstellar gas, rather than well-defined, quasi-equilibrium objects. In this talk, I will present a survey of the 12CO(J=1-0) emission from molecular clouds in the Large Magellanic Cloud that we have been conducting with the ATNF Mopra telescope in order to study the relationship between the atomic and molecular gas phases. At 115GHz, the angular resolution of Mopra is well-matched to the angular resolution of the ATCA+PKS HI survey of the LMC (Kim et al. 2003), allowing us to examine the relationship between the two gas phases on physical scales down to ~15pc. I will present the physical and dynamical properties of the molecular clouds in our survey, and discuss how the clouds appear to be related to their surrounding atomic envelopes.

Tomoaki Ishiyama
University of Tokyo

LMC-SMC system is the most famous example of substructure close pairs. We statistically study the abundance and history of such substructure close pair using cosmological N-body simulation in LCDM universe.

We follow the evolution of 21 group and galaxy sized halos with 512^3 dark matter particles in 20 Mpc cubic box, and find substructure close pairs in these parent halos. In each parent halo, on average, one substructure close pair can be found if we define the pair-distance as about 0.15 mean substructure separation. Almost all of these close pairs were formed very recently ($z < 0.33$).

Daisuke Kato
Nagoya University

The IRSF Magellanic Clouds Point Source Catalog

We present a near-infrared (JHKs) photometric catalog including about 18 million point sources distributed over 40 square degrees of the LMC, 11 square degrees of the SMC, and 4 square degrees of the Magellanic Bridge. The 10-sigma limiting magnitudes are 18.8, 17.8, and 16.6 at J, H, and Ks, respectively, about 2 mag deeper than those for 2MASS. The photometric and astrometric accuracies for bright sources are 0.03-0.04 mag and 0.1 arcsecond. We present luminosity functions, color-color diagrams, and color-magnitude diagrams for the sources, which show features of the red clump and Herbig Ae/Be stars in the Magellanic Clouds.

Greg Madsen
University of Sydney

Ionised Gas in the Magellanic Stream

The Magellanic Stream is a large gaseous filament of neutral gas that extends more than 100 degrees away from the Magellanic Clouds. Some observations and simulations suggest it is a tidal feature created as the Clouds orbit the Galaxy, but this is not a consensus view. Studying the Stream offers a important clues to the evolution of the Magellanic Clouds and is a unique probe of the Galactic halo. Many studies of the Stream focus on the wealth of HI data from recent surveys. In this talk, I will review the current state of observations of ionised gas in the Stream, including new observations from the Wisconsin H-Alpha Mapper. I will discuss the implications the observations have on the physical conditions of the Stream, its baryonic mass, and its interaction with the Galactic halo.

Ann Mao
Harvard

A Radio and Optical Polarization study of the Magnetic Field in the Small Magellanic Cloud

We present a study of Faraday rotation measures towards extragalactic radio sources behind the Small Magellanic Cloud (SMC) to determine the magnetic field properties of the galaxy. Consistent negative rotation measures (RMs) across the galaxy suggests that the magnetic field along the line of sight is coherently directed away from us, with a strength of 0.3\uffff 0.1 G. We apply the Chandrasekhar-Fermi (C-F) Method to the starlight polarization data from stars in the SMC and obtain an ordered magnetic field strength of 3.2 - 0.7 G in the plane of the sky. We study the random magnetic field strength and the 3D magnetic field structure of the SMC and discuss the possible magnetic field generation mechanisms.

Deanna Matthews
La Trobe University / ATNF

The Magellanic Stream South of 0º - turbulent clumps and filaments

The formation and evolution of the Magellanic Stream certainly causes controversy among the Magellanic community. Existing HI observations of the entire Stream have only been made at the relatively low angular resolution of the Parkes telescope (~14 arcmin). We present our high-resolution Australia Telescope Compact Array (ATCA) southern sky Magellanic Stream data combined with recent Parkes GASS observations, the first allowing a detailed study of the Stream's HI. Results from a statistical analysis of the turbulent nature of the Stream's gas are also presented. We trace the change of HI spatial power index from declination -72º to -38º in an attempt to trace the Stream's filaments from the Interface Region along the twisting filaments.

Tetsuhiro Minamidani
Hokkaido University

An observational study of the GMCs in the Magellanic Clouds in millimeter and sub-millimeter wavelengths

It is of a particular interest to observe the dense molecular gas in the Magellanic Clouds, where populous clusters are still being formed. To reveal the physical properties of GMCs, high-resolution sub-millimeter observations with ASTE were performed. We have mapped 6 GMCs in the LMC in 12CO(3-2) and 32 clumps were identified. Among them in 13 clumps, the density and temperature are derived from the LVG analysis using 12CO(3-2), 12CO(1-0), and 13CO(1-0) data. The derived density and temperature are distributed in wide ranges. We suggest that differences of clump properties represent an evolutionary sequence of GMCs in terms of density increase leading to star formation.

Erik Muller
ATNF

Zooming into the star forming ISM in the SMC

We have completed the highest-yet observations of the Neutral hydrogen in the Southwest star forming region in the SMC. These observations are the highest resolutions that are possible by current-generation instrumentation. For the first time, we can directly probe the effects that the sites of star formation have on reshaping and the reorganisation of structure on the ambient ISM. The scales accessible by this study pushes the current limits far beyond existing studies which show an otherwise normal spatial power hierarchy down to ~30 pc.

David Nidever
University of Virginia

The Extended Population of the Large Magellanic Cloud

We have surveyed the periphery of the Large Magellanic Cloud and discovered an extended population of LMC stars that reaches to 22 degrees from the LMC centre. The velocity profile and dispersion of this new population are consistent with it being part of an LMC halo.

Takashi Onaka
University of Tokyo

AKARI Large Area Survey of the Large Magellanic Cloud

We present large area survey observations of the LMC with the AKARI infrared satellite. In addition to the all-sky survey at 9, 18, 65, 90, 140, and 160 micron, more than 15 square degree region of the LMC will be observed in pointed observations with the Infrared Camera (IRC) on board AKARI at 3, 7, 11, 15, and 24 micron together with 2-5 micron low-resolution slit-less spectroscopy. The AKARI observations will provide a significant database for the various fields of the LMC study. We report the status of the AKARI LMC survey together with some early results.

Slawomir Piatek
Rutgers Univeristy

Internal Kinematics of the LMC Based on Mean Proper Motions in 21 Fields

We have re-derived proper motions for 21 fields in the LMC using the same data as those in Kallivayalil et al. (2006). Our analysis confirms that the proper motions for several fields are “discrepant'' despite the absence of any problems in the data or the analysis. We investigate whether these discrepant fields contain real information about the internal kinematics of the LMC such as streaming motions due to a tidal interaction with the Milky Way and/or the SMC; due to the presence of a bar; or due to kinematically distinct groups of stars.

Carlton Pryor
Rutgers University

Has the LMC Had Close Encounters with Other Satellite Galaxies?

We use proper motions and radial velocities for the LMC and other satellite galaxies of the Milky Way to investigate whether any close encounters have occurred. For example, we will show that a proposed encounter between the LMC and Fornax dwarf galaxy about 200 Myr ago did not occur.

Warren Reid
Macquarie University

Spectral diagnostics of newly discovered Planetary Nebulae in the Large Magellanic Cloud

We report our discovery of 460 planetary nebulae (PNe) in the central 25 deg^2 region of the Large Magellanic Cloud (LMC). Candidate emission sources were discovered using deep, high resolution UKST stacked Short Red (SR) and Hα images which go deeper than any previously available. The two digitized stacks were then merged to reveal emission sources. Confirmatory spectroscopy was performed using 2dF on the AAT, the 1.9-m telescope at SAAO, the 2.3-m Advanced Technology Telescope at the MSSSO, FLAMES on the ESO VLT2 and 6dF on the UKST. Optical spectroscopy not only allowed us to identify PNe from our large sample but results are allowing physical conditions to be determined. The new PNe have implications for the LMC PN luminosity function, kinematics, abundance gradients, chemical evolution and the initial to final mass relation for low to intermediate mass stars via the AGB halos revealed on the Hα map.

All the previously known PNe in the survey area have also been spectroscopically observed, resulting in a sample of 629 PNe. These have now been used to produce nebula diagnostics including temperatures electron densities and masses. Together with newly derived excitation classes, these diagnostics and fluxes have led to the discovery of new evolutionary tracks for LMC PNe. Different excitation levels are shown graphically where luminosity gradients are compared to masses and densities. Newly derived dynamical ages are also presented. PN abundances have been determined, comprising the largest sample ever obtained in any galaxy beyond the Milky Way, allowing clear trends to be graphically displayed for the first time. A new luminosity function has been constructed, finally revealing the shape of the faint end. This is compared to a new luminosity function constructed from a very complete sample of local PNe. Radial velocities from the complete LMC sample have been used to compare PN kinematics to that of the HI disk. The resulting transverse velocity and angle of inclination for PNe in the central 25 deg^2 region of the LMC are presented.

Adam Ruzicka
Astronomical Institute of AS CR, v.v.i., Prague, Czech Republic

Magellanic Clouds in Interaction - Evolutionary Search for Good Models

We performed an extended analysis of the parameter space for the interaction of the Magellanic System with the Milky Way (MW). The varied parameters cover the phase space parameters, the masses, the structure, and the orientation of both Magellanic Clouds, as well as the flattening and the orientation of the dark matter halo of the MW. The analysis was done by an optimization code - genetic algorithm - searching for the best match between numerical models and the HI map of the Magellanic System by Brüns et al. (2005). By this, we were able to analyze more than 10^6 models, which makes this study one of the most extended ones for the Magellanic System.

POSTER PRESENTATIONS

Francisco Hernandez
UNAM

I-band surface brightness fluctuations (SBFs) of Magellanic star clusters

In a series of papers, Gonzalez-Lopezlira et al. have advanced in the calibration of model SBF luminosities for the study of unresolved stellar populations, through a comparison with the data of Magellanic star clusters. Here, we present the relation between absolute I-band fluctuation magnitude and (V-I) color, using data from the Deep Near-Infrared Southern Sky Survey (DENIS), and from the literature. We also compare the star cluster sample with data of early-type galaxies and spiral bulges obtained by Tonry et al.

Ingrid Meschin
Instituto de Astrofísica de Canarias

The outer stellar populations in LMC

We present a ground-based photometry study in bands B and I for two fields of the Large Magellanic Cloud (LMC) located towards the north in the outermost part of the galaxy (2 and 4 degrees of the centre) The photometry was carried out with the DAOPHOT/ ALLSTAR/ALLFRAME suite of programs (Stetson 1987, 1994) and we present the first Color-Magnitude diagrams (CMD) and a qualitative analysis of the stellar population through theoretical isochrones.

Yoji Mizuno
Nagoya University

The results of sub-mm observation in Large Magellanic Clouds with NANTEN2 telescope

The study of the Large Magellanic Cloud is important to understand the formation process of massive stellar clusters. We have been performing multi-line observations toward giant molecular clouds (GMCs) in the Large Magellanic Cloud by NANTEN and ASTE. Further observations are being carried by NANTEN2 telescope in Atacama, Chile. We mapped 12CO(J=4-3) emission from the clump in the GMCs and detected 12CO(J=7-6) emission from centre of the N159W clump. These results indicate that temperature and density of these clumps are high. We also detected 13CO(4-3) and CI(2-1) emissions and these are the first detections in the LMC. We will present these NANTEN2 results and discuss physical properties of the GMCs.

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Pre-main sequence stars in the Magellanic Bridge

We have found Herbig Ae/Be star candidates in the western region of the Magellanic Bridge. Using the near infrared camera SIRIUS and the 1.4 m telescope IRSF, we surveyed about 4 square degree in the J, H, and Ks bands. On the basis of colors and magnitudes, about 200 Herbig Ae/Be star candidates are selected. Considering the contaminations by miscellaneous sources such as foreground stars and early-type dwarfs in the Magellanic Bridge, we conclude that about 100 of the candidates are genuine Herbig Ae/Be stars.

Jeffrey L Payne
JCU

Long-slit Optical Spectroscopy of Magellanic Cloud Radio SNRs and Candidate SNR

We present analysis of optical long-slit spectra from Magellanic Cloud radio supernova remnants (SNRs) and candidate SNRs (12/16 SMC; 36/76 LMC) obtained using the 2.3-meter Advanced Technology Telescope double beam spectrograph at Siding Springs Observatory in Australia and the 1.9-meter Cassegrain spectrograph at the South African Astronomical Observatory in Sutherland. Resulting shock analysis does not show evolutionary trends. Line ratios -- dominated by the interstellar medium (ISM) at their current evolutionary stage -- allow metal abundance estimates, based on oxygen to hydrogen ratio, of 10-4.07 (SMC) and 10-3.83 (LMC). These values are in general agreement with those found in the literature.

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We present empirical relations for excess emission from asymptotic giant branch (AGB) stars in the Large Magellanic Cloud (LMC) using data from the Spitzer Space Telescope SAGE (Surveying the Agents of a Galaxy's Evolution) survey, combined with the 2MASS survey and the optical Magellanic Cloud Photometric Survey (MCPS) catalogues.

Outflows from AGBs and supergiants are the main producers of dust in a galaxy, and we investigate the mass loss return by AGBs to the interstellar medium of the LMC. The 8 and 24 micron excesses are shown to increase with bolometric luminosity. The 24 micron flux for 'extreme' AGBs is entirely due to excess emission from dust.

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Small Magellanic Cloud: A smaller halo?

The Small Magellanic Cloud is the smallest of the interacting Galaxy-LMC-SMC system. Using the RR Lyrae stars detected by the OGLE survey, the distribution and depth of the old halo of the SMC are studied. RR Lyrae stars are denser near the SMC centre and the bar. The density decreases towards the outer regions. The depth is also found to be more near the central regions (up to 5kpc) and much less outward. Thus the SMC halo is flatter and less extended than the LMC halo, which in turn is less extended than the Galaxy. This might indicate a gradation in the extent of the halo with the mass of the parent galaxy.