The International Ultraviolet Explorer (IUE) Archives have been delivered to the world scientific community on 21st March. ESA, in collaboration with the Spanish Laboratory of Space Astrophysics and Theoretical Physics (LAEFF) belonging to INFA (National Institute of Air and Space Technology), has developed and set up the INES system to access IUE Data.

INES (IUE Newly Extracted Spectra) is a complete astronomical archive and data-distribution system. Its release to the community represents the final activity by ESA in the context of the IUE project. From now LAEFF, on behalf of the international astronomical community, will be responsible of maintaining INES, making it available and providing world-wide support to scientists using IUE data.

The IUE Archive contains more than 110,000 spectra of more that 11,000 astronomical objects. All data are fully reduced and calibrated. The INES archive consists of:

- an access catalog containing the parameters required to query the archive and evaluate the observations,
- a publications catalog which links each spectrum to the publications in which it has been used via the ADS,
• and the data themselves (low dispersion spectra, high dispersion spectra rebinned to the low resolution wavelength step, full high dispersion concatenated spectra, and bi-dimensional low dispersion images).

The INES Archive can be accessed at http://ines.vilspa.esa.es. Users can consult the catalogue, preview the spectra and download the data with a standard browser from the Principal Centre at LAEFF, its Mirror Centre located at the Canadian Astronomical Data Centre or any of the National Centres spread in all continents. This distributed system guarantees the availability and efficient access to the data.

Questions about the INES archive can be directed to the INES Help Desk at ineshelp@iuearc.vilspa.esa.es or at http://iuearc.vilspa.esa.es/ines_jb/HelpDesk/

Antonio Talavera
INES Project Scientist

Release of the DENIS Point Source Catalogue

The DENIS consortium is pleased to announce that the DENIS point source catalogue towards the Magellanic Clouds (DCMC) is now available at:

http://vizier.u-strasbg.fr/viz-bin/VizieR

or via ftp at:

    ftp ftp.strw.leidenuniv.nl
    cd /pub/ldac/dcmc
    mget *.*

The catalogue contains about 1300000 sources towards the LMC and 300000 sources towards the SMC detected in at least two of the three DENIS bands (I, J, Ks).

Maria-Rosa Cioni
Abstracts of Refereed Papers

An Empirical Test and Calibration of H II Region Diagnostics

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We present spectrophotometry in the 3600–9700 Å region for a sample of 39 HII regions in the Galaxy and Magellanic Clouds, for which independent information is available on the spectral types and effective temperatures of the ionizing stars. The spectra have been used to evaluate nebular diagnostics of stellar temperature, metal abundance, and ionization parameter, and compare the observed behavior of the line indices with predictions of nebular photoionization models. We observe a strong degeneracy between forbidden-line sequences produced by changes in stellar Teff and metal abundance, which severely complicates the application of many forbidden-line diagnostics to extragalactic HII regions. Our data confirm however that the Edmunds & Pagel [O II]+[O III] abundance index and the Vilchez & Pagel r′ index provide more robust diagnostics of metal abundance and stellar effective temperature, respectively. A comparison of the fractional helium ionization of the HII regions with stellar temperature confirms the reliability of the spectral type vs Teff calibration for the relevant temperature range Teff ≤ 38000 K. We use empirical relations between the nebular hardness indices and Teff to reinvestigate the case for systematic variations in the stellar effective temperatures and the upper IMFs of massive stars in extragalactic HII regions. The data are consistent with a significant softening of the ionizing spectra (consistent with cooler stellar temperatures) with increasing metal abundance, especially for Z ≤ Z⊙. However unresolved degeneracies between Z and Teff still complicate the interpretation of this result.

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Resolving SNR 0540–6944 from LMC X-1 with Chandra

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We examine the supernova remnant (SNR) 0540–697 in the Large Magellanic Cloud (LMC) using data from the Chandra ACIS. The X-ray emission from this SNR had previously been hidden in the bright emission of nearby X-ray binary LMC X-1; however, new observations with Chandra can finally
reveal the SNR’s structure and spectrum. We find the SNR to be a thick-shelled structure about 19 pc in diameter, with a brightened northeast region. Spectral results suggest a temperature of 0.31 keV and an X-ray luminosity (0.3–3.0 keV) of $8.4 \times 10^{33}$ erg s$^{-1}$. We estimate an age of 12,000–20,000 yr for this SNR, but note that this estimate does not take into account the possibility of cavity expansion or other environmental effects.

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ASCA Observation of the New Transient X-ray Pulsar XTE J0111.2–7317 in the Small Magellanic Cloud

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The new transient X-ray pulsar XTE J0111.2–7317 was observed with Advanced Satellite for Cosmology and Astrophysics (ASCA) on 1998 November 18, a few days after its discovery with the Proportional Counter Array onboard the Rossi X-ray Timing Explorer. The source was detected at a flux level of $3.6 \times 10^{-10}$ erg cm$^{-2}$ s$^{-1}$ in the 0.7–10.0 keV band, which corresponds to the X-ray luminosity of $1.8 \times 10^{38}$ erg s$^{-1}$, if a distance of 65 kpc for this pulsar in the Small Magellanic Cloud is assumed. Nearly sinusoidal pulsations with a period of 30.9497 ± 0.0004 s were unambiguously detected during the ASCA observation. The pulsed fraction is low and slightly energy dependent with average value of $\sim 27\%$. The energy spectrum shows a large soft excess below $\sim 2$ keV when fitted to a simple power-law type model. The soft excess is eliminated if the spectrum is fitted to an “inversely broken power-law” model, in which photon indices below and above a break energy of 1.5 keV are 2.3 and 0.8, respectively. The soft excess can also be described by a blackbody or a thermal bremsstrahlung when the spectrum above $\sim 2$ keV is modeled by a power-law. In these models, however, the thermal soft component requires a very large emission zone, and hence it is difficult to explain the observed pulsations at energies below 2 keV. A bright state of the source enables us to identify a weak iron line feature at 6.4 keV with an equivalent width of 50±14 eV. Pulse phase resolved spectroscopy revealed a slight hardening of the spectrum and marginal indication of an increase in the iron line strength during the pulse maximum.

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The Ultraviolet and Optical Spectra of Metal-Deficient O Stars in the Small Magellanic Cloud

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An ultraviolet and optical spectral atlas of 15 O stars in the SMC is presented and described. The echelle data have resolving powers of order 10⁴; they were obtained with HST/STIS in the UV, and at the AAT or the ESO 3.6 m in the optical. The ultimate objective is to develop metal-deficient templates for the interpretation of distant starbursts, but here we discuss interesting new properties of the SMC stars themselves, revealed by the high quality of these data. The SMC metal deficiency produces anomalously weak stellar-wind profiles along the entire O main sequence, as well as at intermediate luminosities; the first intermediate Si IV λ1400 wind profile in the SMC is shown. The second known O star in the SMC displays wind peculiarities that are identical to those of its spectral classmate, again likely due to the low systemic metallicity. Several objects display marked CNO anomalies, including the first cases of C III λ4650 emission without N III λ4640 in O-type spectra. The N/C ratio appears to increase with mass, extent of evolution away from the ZAMS, and/or rotational velocity in the young cluster NGC 346. In addition, the first examples of Onfp (Oef) and Of?p spectra in the SMC have been found (the latter being only the fourth member of its peculiar shell category known anywhere). The UV wind characteristics of these objects correlate with their optical peculiarities. All of these spectroscopic phenomena provide diagnostics of the evolutionary status of metal-deficient massive stars.

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Age and metallicity for six LMC clusters and their surrounding field population

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We investigate, on the basis of CCD Strömgren photometry, the ages and metallicities of six LMC clusters together with their surrounding field population. The clusters and metallicities are: NGC 1651 (in the range [Fe/H] = −0.65 dex to −0.41 dex), NGC 1711 (−0.57 ± 0.17 dex), NGC 1806 (−0.71±0.23 dex), NGC 2031 (−0.52±0.21 dex) and NGC 2136/37 (−0.55±0.23 dex) and NGC 2257 (−1.63±0.21 dex). The metallicities for NGC 1651, NGC 1711, NGC 1806 and NGC 2031 have been
determined for the first time (NGC 2031 and NGC 2136/37 are interesting for the Cepheid distance scale).

In the cluster surroundings, we found about 650 field stars that were suitable to be used for a determination of an age-metallicity relation (AMR). Our method is to estimate ages for individual stars on the basis of Strömgren isochrones with individually measured metallicities. With this method we are able to sample the AMR of the field population up to 8 Gyr.

Our metallicity data are incompatible with models predicting many metal-poor stars (G-dwarf problem). The metallicity of the field population increased by a factor of six, starting around 2 Gyr ago. The proposed AMR is consistent with the AMR of the LMC cluster system (including ESO 121 SC03 and three clusters with an age of 4 Gyr).

The proposed AMR is incompatible with the recently proposed AMR by Pagel & Tautvaišvienė (1998).

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Studies of Binary Star Cluster Candidates in the Bar of the LMC.
I: SL 353 & SL 349

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We present a detailed study of the cluster pair SL 353 & SL 349. This candidate binary cluster is located at the northwestern rim of the LMC bar. Based on photometric data we find that both clusters are coeval with an age of 550±100 Myr. We use the Ca II triplet in the spectra of individual red giants to derive radial velocities. Both components of the binary cluster candidate show very similar mean velocities (≈ 274 ± 10 km s\textsuperscript{-1} for SL 349 and ≈ 279 ± 4 km s\textsuperscript{-1} for SL 353) while the field stars show lower velocities (≈ 240 ± 19 km s\textsuperscript{-1}). These findings suggest a common origin of the two clusters from the same GMC. In this sense the cluster pair may constitute a true binary cluster. We furthermore investigate the stellar densities in and around the star clusters and compare them with isopleths created from artificial, interacting as well as non-interacting star clusters. Gravitational interaction leads to a distortion which can also be found in the observed pair.

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Studies of binary star cluster candidates in the bar of the LMC. II.

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Binary clusters account for more than 10% of the cluster population in the Magellanic Clouds. Statistically fewer than 50% of the found pairs are expected to be chance superpositions. We estimated the cluster encounter rate and suggest that tidal capture is an unlikely formation scenario for the formation of binary clusters. Thus, most true binary clusters can be expected to have formed together.

Here we present a study of three binary cluster candidates which are located in the bar of the LMC. NGC 1971 & NGC 1972 are situated in the association LH 59 in the eastern part of the bar. A third star cluster, NGC 1969, is close enough to this pair that all three objects may constitute a triple system. We present the first age determination that is based on CMDs for these star clusters. Our findings suggest that all three clusters are young (40-70 Myr) and may have been formed in the same GMC. It cannot clearly decided whether the clusters are physically interacting or not.

NGC 1894 & SL 341 are located at the south-western rim of the LMC bar. This pair is studied in detail for the first time: The isopleths of both clusters reveal an elliptical shape. Whether this might be interpreted as a sign of interaction or is a peculiarity which is shared with a large amount of LMC star clusters which show higher ellipticities than their counterparts in the Milky Way remains unclear. From our age determination we find that both clusters are coeval with an age of 55 ± 5 Myr. This makes a formation from the same GMC a likely scenario.

SL 385 & SL 387 are a close pair in the western part of the LMC bar. We derived ages of 170 ± 30 Myr for SL 385 and ≥ 250 for SL 387. The large age difference makes it unlikely that these two clusters formed in the same GMC.

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The Tip of the Red Giant Branch
and Distance of the Magellanic Clouds

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We present a precise determination of the apparent magnitude of the tip of the red giant branch (TRGB) in the I (0.8μm), J (1.25μm), and Ks (2.15μm) bands from the luminosity function of a sample of data extracted from the DENIS catalogue towards the Magellanic Clouds (Cioni et al. 2000). From the J and Ks magnitudes we derive bolometric magnitudes mbol. We present a new algorithm for the determination of the TRGB magnitude, which we describe in detail and test extensively using Monte-Carlo simulations. We note that any method that searches for a peak in the first derivative (used by most authors) or the second derivative (used by us) of the observed luminosity function does not yield an unbiased estimate for the actual magnitude of the TRGB discontinuity. We stress the importance of correcting for this bias, which is not generally done. We combine the results of our
algorithm with theoretical predictions to derive the distance modulus of the Magellanic Clouds. We obtain $m - M = 18.55 \pm 0.04$ (formal) $\pm 0.08$ (systematic) for the Large Magellanic Cloud (LMC), and $m - M = 18.99 \pm 0.03$ (formal) $\pm 0.08$ (systematic) for the Small Magellanic Cloud (SMC). These are among the most accurate determinations of these quantities currently available, which is a direct consequence of the large size of our sample and the insensitivity of near infrared observations to dust extinction.

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Pulsational $M_V$ versus $[Fe/H]$ relation(s)
for globular cluster RR Lyrae variables

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We use the results from recent computations of updated non-linear convective pulsating models to constrain the distance modulus of Galactic globular clusters through the observed periods of first overtone ($RR_c$) pulsators. The resulting relation between the mean absolute magnitude of RR Lyrae stars $< M_V(RR) >$ and the heavy element content $[Fe/H]$ appears well in the range of several previous empirical calibrations, but with a non linear dependence on $[Fe/H]$ so that the slope of the relation increases when moving towards larger metallicities. On this ground, our results suggest that metal-poor ($[Fe/H] <-1.5$) and metal-rich ($[Fe/H] >-1.5$) variables follow two different linear $< M_V(RR) > - [Fe/H]$ relations. Application to RR Lyrae stars in the metal-poor globular clusters of the Large Magellanic Cloud provides a LMC distance modulus of the order of 18.6 mag, thus supporting the “long” distance scale. The comparison with recent predictions based on updated stellar evolution theory is shortly presented and discussed.

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Structure of the Large Magellanic Cloud from 2MASS

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We derive structural parameters and evidence for extended tidal debris from star count and preliminary standard candle analyses of the Large Magellanic Cloud based on Two Micron All Sky Survey (2MASS) data. The full-sky coverage and low extinction in $K_s$ presents an ideal sample for structural analysis of the LMC.
The star count surface densities and deprojected inclination for both young and older populations are consistent with previous work. We use the full areal coverage and large LMC diameter to Galactocentric distance ratio to infer the same value for the disk inclination based on perspective.

A standard candle analysis based on a sample of carbon long-period variables (LPV) in a narrow color range, $1.6 < J - K_s < 1.7$ allows us to probe the three-dimensional structure of the LMC along the line of sight. The intrinsic brightness distribution of carbon LPVs in selected fields implies that $\sigma_M \lesssim 0.2^m$ for this color cut. The sample provides a direct determination of the LMC disk inclination: $42.3^\circ \pm 7.2^\circ$.

Distinct features in the photometric distribution suggest several distinct populations. We interpret this as the presence of an extended stellar component of the LMC, which may be as thick as 14 kpc, and intervening tidal debris at roughly 15 kpc from the LMC.

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The Morphologies of the Small Magellanic Cloud

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We compare the distribution of stars of different spectral types, and hence mean age, within the central SMC and find that the asymmetric structures are almost exclusively composed of young main sequence stars. Because of the relative lack of older stars in these features, and the extremely regular distribution of red giant and clump stars in the SMC central body, we conclude that tides alone are not responsible for the irregular appearance of the central SMC. The dominant physical mechanism in determining the current-day appearance of the SMC must be star formation triggered by a hydrodynamic interaction between gaseous components. These results extend the results of population studies (cf. Gardiner and Hatzidimitriou) inward in radius and also confirm the suggestion of the spheroidal nature of the central SMC based on kinematic arguments (Dopita et al; Hardy, Suntzeff & Azzopardi). Finally, we find no evidence in the underlying older stellar population for a “bar” or “outer arm”, again supporting our classification of the central SMC as a spheroidal body with highly irregular recent star formation.

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The morphology of the Magellanic Clouds revealed by stars of different age: results from the DENIS survey

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The spatial distribution of sources populating different regions of the colour–magnitude diagram \((I - J, I)\) extracted from the DENIS catalogue towards the Magellanic Clouds (DCMC – Cioni et al. 2000) reveal significantly different morphologies. The Large Magellanic Cloud (LMC) shows an extended circular shape with a prominent, off center bar, a nucleus and irregular spiral arms. The Small Magellanic Cloud shows a perturbed structure with a prominent central concentration of stars. Old and young populations are offset from one another.

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The MACHO Project: Microlensing Results from 5.7 Years of LMC Observations

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We report on our search for microlensing towards the Large Magellanic Cloud (LMC). Analysis of 5.7 years of photometry on 11.9 million stars in the LMC reveals 13 – 17 microlensing events. A detailed treatment of our detection efficiency shows that this is significantly more than the \(\sim 2\) to 4 events expected from lensing by known stellar populations. The timescales \((\hat{t})\) of the events range from 34 to 230 days. We estimate the microlensing optical depth towards the LMC from events with \(2 < \hat{t} < 400\) days to be \(\tau^2_{260} = 1.2^{+0.4}_{-0.3} \times 10^{-7}\), with an additional 20% to 30% of systematic error. The
spatial distribution of events is mildly inconsistent with LMC/LMC disk self-lensing, but is consistent with an extended lens distribution such as a Milky Way or LMC halo. Interpreted in the context of a Galactic dark matter halo, consisting partially of compact objects, a maximum likelihood analysis gives a MACHO halo fraction of 20% for a typical halo model with a 95% confidence interval of 8% to 50%. A 100% MACHO halo is ruled out at the 95% C.L. for all except our most extreme halo model. Interpreted as a Galactic halo population, the most likely MACHO mass is between 0.15\(M_\odot\) and 0.9\(M_\odot\), depending on the halo model, and the total mass in MACHOs out to 50 kpc is found to be \(9^{+4}_{-3} \times 10^9 M_\odot\), independent of the halo model. These results are marginally consistent with our previous results, but are lower by about a factor of two. This is mostly due to Poisson noise because with 3.4 times more exposure and increased sensitivity to long timescale events, we did not find the expected factor of \(~ 4\) more events. Besides a larger data set, this work also includes an improved efficiency determination, improved likelihood analysis, and more thorough testing of systematic errors, especially with respect to the treatment of potential backgrounds to microlensing. We note that an important source of background are supernovae (SNe) in galaxies behind the LMC.

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The MACHO Project: Microlensing Detection Efficiency

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The MACHO project is a search for dark matter in the form of massive compact halo objects (MACHOs). The project has photometrically monitored tens of millions of stars in the Large Magellanic Cloud (LMC), Small Magellanic Cloud (SMC), and Galactic bulge in search of rare gravitational microlensing events caused by these otherwise invisible objects. In 5.7 years of observations toward the LMC some 13–17 microlensing events have been observed by the MACHO survey, allowing powerful
statements to be made about the nature of the dark population in the halo of our Galaxy. A critical component of these statements is an accurate determination of the survey’s detection efficiency. The detection efficiency is a complicated function of temporal sampling, stellar crowding (the luminosity function), image quality, photometry, time-series analysis, and criteria used to select the microlensing candidates. Such a complex interdependence is most naturally solved using a Monte Carlo approach. Here we describe the details of the Monte Carlo used to calculate the efficiency presented in the MACHO 5.7-year LMC results. A similar calculation was performed for MACHO’s 1-year and 2-year results. Here we correct several shortcomings of these past determinations, including (1) adding fainter source stars (2.5 magnitudes below our faintest detected “stars”), (2) an up-to-date luminosity function for the LMC, (3) better sampling of real images in both stellar density and observing conditions, (4) an improved scheme for adding artificial microlensing onto a random sample of real lightcurves, and many other improvements. The Monte Carlo technique presented here realistically simulates the negative effects of severe crowding (blending) that is a fact of microlensing surveys.

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For preprints, contact vandehei@astrophys.ucsd.edu
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Constraining the Location of Microlensing Objects
by using the Finite Source Effect in EAGLE events

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We propose a new method to constrain the location of microlensing objects using EAGLE (Extremely Amplified Gravitational LEnsing) events. We have estimated the rate of EAGLE events by taking the finite-source effect into account. We found that the EAGLE event rate for using a 1-m class telescope whose limiting magnitude is $V \approx 21$ is the same as or higher than that of the ordinary microlensing events which have been found to date. We have also found that the fraction of transit EAGLE events is large enough to detect: between 4 ~ 80% depending on the lens location. Since the lens proper motion can be measured for a transit event, one can distinguish whether the lens is a MACHO (MAssive Compact Halo Object) in our halo or one of the known stars in the Large Magellanic Cloud (LMC) from the proper motion measurement for each transit EAGLE event. Moreover, we show that the fraction of transit EAGLEs in all EAGLE events significantly depends on the lensing locations: the transit EAGLE fraction for the self-lensing case is $2 \sim 15$ times larger than that for halo MACHOs. Thus, one can constrain the location of lens objects by the statistics of the transit events fraction. We show that we can reasonably expect $0 \sim 6$ transit events out of 21 EAGLE events in 3 years. We can also constrain the lens population properties at a greater than 99% confidence level depending on the number of transit events detected. We also present the duration of EAGLE events, and show how an hourly observational mode is more suitable for an EAGLE event search program.

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For preprints, contact tsumi@stelab.nagoya-u.ac.jp
While the following paper does not deal with the Magellanic Clouds specifically, I invited its submission due to its importance for calibrating photometric observations including those of the Magellanic Clouds. In particular I expect this paper to be invaluable for anyone doing photometry of regions in the Magellanic Clouds using the new large southern telescopes.

Eva Grebel

Homogeneous Photometry for Star Clusters and Resolved Galaxies.

II. Photometric Standard Stars

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Stars appearing in CCD images obtained over 224 nights during the course of 69 observing runs have been calibrated to the Johnson/Kron-Cousins $BVRI$ photometric system defined by the equatorial standards of Landolt (1992, AJ, 104, 340). More than 15,000 stars suitable for use as photometric standards have been identified, where “suitable” means that the star has been observed five or more times during photometric conditions and has a standard error of the mean magnitude less than 0.02 mag in at least two of the four bandpasses, and shows no significant evidence of intrinsic variability. Many of these stars are in the same fields as Landolt's equatorial standards or Graham's (1982, PASP, 94, 244) southern E-region standards, but are considerably fainter. This enhances the value of those fields for the calibration of photometry obtained with large telescopes. Other standards have been defined in fields containing popular objects of astrophysical interest, such as star clusters and famous galaxies, extending Landolt-system calibrators to declinations far from the equator and to stars of sub-Solar chemical abundances. I intend to continue to improve and enlarge this set of photometric standard stars as more observing runs are reduced. The full current database of photometric indices is being made freely available via a site on the World-Wide Web, or by direct request to the author. Although the contents of the database will evolve in detail, at any given time it should represent the largest sample of precise $BVRI$ broad-band photometric standards available anywhere.

Accepted by: Publications of the Astronomical Society of the Pacific

For preprints, contact  Peter.Stetson@nrc.ca
Job Opportunities

Postdoctoral Research Appointment
at the University of Virginia, Charlottesville

Applications are invited for a postdoctoral research appointment with some flexibility in starting date, but with a starting date as soon as June 2000 possible and preferable. The appointment would be for one year, with possibility of renewal for one more year, subject to favorable half-year review, and for continuing years subject to favorable reviews and funding availability. The emphasis of the research is on stellar populations in the Milky Way, and science related to the Space Interferometry Mission (SIM) and the SIM Astrometric Grid. Observational astronomers are especially encouraged to apply.

Applicants should submit a vita, a statement of research interests and experience, and their bibliography. They should also arrange to have three letters of recommendation sent. The University of Virginia is an Affirmative Action/Equal Opportunity employer. Full consideration will be given to completed applications received no later than 12 May 2000, or until the position is filled. Please send all documents to:

Dr. Steven R. Majewski
University of Virginia
Department of Astronomy
P.O. Box 3818
Charlottesville, VA 22903-0818, USA
E-mail: srm4n@didjeridu.astro.virginia.edu

Data Analyst / Research Assistant
at the University of Virginia, Charlottesville

Applications are invited for a full time research support position for applicants at the BA/BS degree level. There is some flexibility in starting date, but a starting date as soon as June 2000 is preferred. The appointment would be for one year, with possibility of renewal for continuing years subject to favorable reviews and funding availability. The position will involve analysis of data relating to research on stellar populations in the Milky Way, and survey data related to the Space Interferometry Mission (SIM) and the SIM Astrometric Grid. Applicants should have a BA/BS degree in Physics or Astronomy as well as basic computer skills, including programming ability (C, C++ or Fortran) and familiarity with the UNIX environment and IRAF. Previous experience with CCD reductions, either imaging or spectroscopy, would be especially useful.

Applicants should submit a vita, a statement of research experience, and their bibliography. They should also arrange to have three letters of recommendation sent. The University of Virginia is an
Affirmative Action/Equal Opportunity Employer. Full consideration will be given to completed applications received no later than 12 May 2000, or until the position is filled. Please send all documents to:

Dr. Steven R. Majewski
University of Virginia
Department of Astronomy
P.O. Box 3818
Charlottesville, VA 22903-0818, USA
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Postdoctoral Research Associate
at the University of Cardiff, U.K.

The Department of Physics and Astronomy at the University of Cardiff invites applications for a postdoctoral research associate position on a fixed-term contract limited to three years.

You will be working with Dr. Jon Davies on galaxy populations in the nearby Universe. From previous work by the Cardiff group it seems clear that there are large numbers of very low surface brightness low luminosity galaxies in nearby clusters. This leads to a very steep luminosity function consistent with numerical simulations of structure formation. If these galaxies have large (M/L) they may represent the major mass component of the cluster. Given that clusters only represent about 10% of the mass of the Universe, it is important to study these low luminosity galaxies in other environments, i.e., groups and the general field. We have been awarded large amounts of observing time to use large CCD arrays and 21cm multi-beam instruments and we are actively pursuing more observational data. The research group currently consists of 5 researchers (3 postdoctoral and 2 postgraduate). You should hold a PhD in Astronomy or related topics, or have submitted your thesis before starting the appointment.

The Cardiff astronomy group consists of 12 academic members of staff and totals about 45 researchers. Interests range from extra-galactic astronomy, to gravity waves and star formation.

Closing date for applications is May 19, 2000. The start date is as soon as possible. For informal discussion contact Dr. Jon Davies at the phone number of e-mail address given below.

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For an application form quote reference 0116 and call 44 (0) 29 2087 4017 or e-mail Persad@cf.ac.uk.