COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

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Stellar Abstracts

Analysis of the Carbon-rich Very Metal-poor Dwarf G77-61

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We present an analysis of the carbon dwarf G77-61, a known binary, based on high resolution Keck spectra. G77-61 has a very-low metallicity, although not as extreme as what was previously conjectured. This star is very carbon-enhanced, the spectra showing very strong CH, CN, and C_2 bands of both ^{13}C and ^{12}C isotopes. Atomic lines are sparse, and often blended, but we were able to derive abundances for Na, Mg, Ca, Cr, Mn, and Fe. Its [Fe/H] of -4.03±0.1 places it among the lowest metallicity stars known, and its very high [C/Fe]=+2.6 , and [N/Fe]=+2.6 among the most C and N-rich metal-poor stars. The carbon isotopic ratio is $^{12}C/^{13}C=5\pm1$. No overabundance of s- or r-process elements is detectable, but the upper limits that can be set on these overabundances are not very constraining.

Accepted by A&A

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For preprints via ftp or WWW: www.dstu.univ-montp2.fr/PERSO/plez/PUBLIS/g77-61-Plez.pdf

Chromospherically Active Stars. XXIV. The Giant Single-lined Binaries HD 37824, HD 181809, and HD 217188

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We have obtained spectroscopy and photometry of three chromospherically active, single-lined spectroscopic binaries, HD 37824 = V1149 Ori, HD 181809 = V4138 Sgr, and HD 217188 = AZ Psc. HD 37824 has a circular orbit with a period of 53.57 days. Its primary is a K0 III, while the secondary is likely a G or K dwarf. HD 181809 has an orbit with a period of 13.04667 days and a low eccentricity of 0.040. The primary has a spectral type of K0 III-IV,

and its secondary is probably an M dwarf. The orbit of HD 217188 has a period of 47.1209 days and a moderately high eccentricity of 0.470. The spectral type of the primary is K0 III, while the secondary is likely an M dwarf. All three systems are estimated to have near solar iron abundances. Photometric observations spanning 15–16 yr for all three stars yield mean photometric periods of 53.12, 59.85, and 90.89 days for HD 37824, HD 181809, and HD 217188, respectively. Thus, HD 37824 is rotating synchronously with the orbital period while HD 181809 and HD 217188 are both rotating considerably slower than synchronously. All three stars show long-term variations in mean brightness and photometric amplitude, but no correlations are observed between the seasonal mean brightness, photometric amplitude, and seasonal photometric period in any of the stars. No clear evidence for long-term periodic variations in any of these parameters is present. The circular orbit of HD 37824 and the synchronous rotation of its K giant argue that the star is in the core helium-burning phase of its evolution. The giant components of HD 181809 and HD 217188 are asynchronous rotators, and both systems have eccentric orbits. Thus, those two stars are likely first ascent giants.

Accepted by AJ

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Emission Measure Distribution in Loops Impulsively Heated at the Foot-points

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This work is prompted by the evidence of sharply peaked emission measure distributions in active stars, and by the claims of isothermal loops in solar coronal observations, at variance with the predictions of hydrostatic loop models with constant cross-section and uniform heating. We address the problem with loops heated at the foot-points. Since steady heating does not allow static loop models solutions, we explore whether pulse-heated loops can exist and appear as steady loops, on a time average. We simulate pulse-heated loops, using the Palermo-Harvard 1-D hydrodynamic code, for different initial conditions corresponding to typical coronal temperatures of stars ranging from intermediate to active ($T \sim 3$–10×10^6 K). We find long-lived quasi-steady solutions even for heating concentrated at the foot-points over a spatial region of the order of $\sim 1/5$ of the loop half length and broader. These solutions yield an emission measure distribution with a peak at high temperature, and the cool side of the peak is as steep as $\sim T^5$, in contrast to the usual $\sim T^{3/2}$ of hydrostatic models with constant cross-section and uniform heating. Such peaks are similar to those found in the emission measure distribution of active stars around 10^7 K.

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Evolution of the Solar Activity over Time and Effects on Planetary Atmospheres: I. High-energy Irradiances (1–1700 Å)

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We report on the results of the Sun in Time multi-wavelength program (X-rays to the UV) of solar analogs with ages covering ∼0.1–7 Gyr. The chief science goals are to study the solar magnetic dynamo and to determine the radiative and magnetic properties of the Sun during its evolution across the main sequence. The present paper focuses on the latter goal, which has the ultimate purpose of providing the spectral irradiance evolution of solar-type stars to be used in the study and modeling of planetary atmospheres. The results from the Sun in Time program suggest that the coronal X-ray–EUV emissions of the young main-sequence Sun were ∼100–1000 times stronger than those of the

present Sun. Similarly, the transition region and chromospheric FUV–UV emissions of the young Sun are expected to be 20–60 and 10–20 times stronger, respectively, than at present. When considering the integrated high-energy emission from 1 to 1200 Å the resulting relationship indicates that the solar high-energy flux was about 2.5 times the present value 2.5 Gyr ago and about 6 times the present value about 3.5 Gyr ago (when life supposedly arose on Earth). The strong radiation emissions inferred should have had major influences on the thermal structure, photochemistry, and photoionization of planetary atmospheres and also played an important role in the development of primitive life in the Solar System. Some examples of the application of the Sun in Time results on exoplanets and on early Solar System planets are discussed.

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Spectroscopic Determination of Photospheric Parameters and Chemical Abundances of 6 K-Type Stars

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High resolution, high-S/N-ratio optical spectra have been obtained for a sample of 6 K-type dwarf and subgiant stars, and have been analysed with three different LTE methods in order to derive detailed photospheric parameters and abundances and to compare the characteristics of analysis techniques. The results have been compared with the aim of determining the most robust method to perform complete spectroscopic analyses of K-type stars, and in this perspective the present work must be considered as a pilot study. In this context we have determined the abundance ratios with respect to iron of several elements. In the first method the photospheric parameters ($T_{\rm eff}$, $\log g$, and ξ) and metal abundances are derived using measured equivalent widths and Kurucz LTE model atmospheres as input for the MOOG software code. The analysis proceeds in an iterative way, and relies on the excitation equilibrium of the Fe I lines for determining the effective temperature and microturbulence, and on the ionization equilibrium of the Fe I and Fe II lines for determining the surface gravity and the metallicity. The second method follows a similar approach, but discards the Fe I low excitation potential transitions (which are potentially affected by non-LTE effects) from the initial line list, and relies on the $B-V$ colour index to determine the temperature. The third method relies on the detailed fitting of the 6162 Å Ca I line to derive the surface gravity, using the same restricted line list as the second method. Methods 1 and 3 give consistent results for the program stars; in particular the comparison between the results obtained shows that the Fe I low-excitation potential transitions do not appear significantly affected by non-LTE effects (at least for the subgiant stars), as suggested by the good agreement of the atmospheric parameters and chemical abundances derived. The second method leads to systematically lower $T_{\rm eff}$ and $\log g$ values with respect to the first one, and a similar trend is shown by the chemical abundances (with the exception of the oxygen abundance). These differences, apart from residual non-LTE effects, may be a consequence of the colour-$T_{\rm eff}$ scale used. The α-elements have abundance ratios consistent with the solar values for all the program stars, as expected for "normal" disk stars. The first method appears to be the most reliable one, as it is self-consistent, it always leads to convergent solutions and the results obtained are in good agreement with previous determinations in the literature.

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Coronal Mass Transfer in Interbinary Loops

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We consider the transfer of coronal mass between the members of a detached binary system along interconnecting rigid magnetic loops. We show that the asymmetry in the gravitational potential drives a flow from the star closer to fill its Roche lobe towards the other star. The loop base pressures, flow velocities and mass fluxes are not externally imposed but are a result of the heating rate along the loop. As the loop heating increases, the base pressures and mass transfer rates increase and the Mach number decreases. If the heating is not uniformly distributed along the loop, but is instead concentrated near one of the stars, then the mass transfer rate either increases or it decreases, and even changes direction, depending on which star the heating is concentrated on. We also discuss the effect of choosing different boundary conditions. Our model predicts mass transfer rates in reasonable agreement with existing observational estimates, but fails to explain the presence of chromospheric material detected between the stars. Additionally, the differential emission measure profile of the loop models is calculated and it is found to be higher in the loop leg close to the secondary star.

Accepted by A&A

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Direct Evidence for a Polar Spot on SV Cam

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We have used spectrophotometric data from the Hubble Space Telescope to eclipse-map the primary component of the RS CVn binary SV Cam over 9 HST orbits. We find from these observations and the HIPPARCOS parallax that the surface flux in the eclipsed low-latitude region of the primary is about 30% lower than computed from a PHOENIX model atmosphere at the effective temperature that best fits the spectral energy distribution of the eclipsed flux. This can only be accounted for if about a third of the primary's surface is covered with unresolved dark star-spots. Extending this to the full surface of the primary, we find that even taking into account this spot filling factor there is an additional flux deficit on the primary star. This can only be explained if there is a large polar spot on the primary star extending from the pole to latitude 48±6°.

Accepted by ApJ

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Flare X-ray observations of AB Dor: Evidence for Stellar Coronal Opacity

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X-ray spectra of the late-type star AB Dor, obtained with the *XMM-Newton* satellite are analysed. AB Dor was particularly active during the observations. An emission measure reconstruction technique is employed to analyse flare and quiescent spectra, with emphasis on the Fe XVII $15-17$ Å wavelength region. The Fe XVII 16.78 Å/15.01 Å line ratio increases significantly in the hotter flare plasma. This change in the ratio is opposite to the theoretical predictions and is attributed to the scattering of 15.01 Å line photons from the line-of-sight. The escape probability technique indicates an optical depth of ≈ 0.4 for the 15.01 Å line. During the flare, the electron density is $4.4^{+2.7}_{-1.6} \times 10^{10}$ cm^{-3} and the fractional Fe abundance is 0.5 ± 0.1 of the solar photospheric value. Using these parameters a path length of $\approx 8{,}000$ km is derived. There is no evidence for opacity in the quiescent X-ray spectrum of the star.

Accepted by ApJ Letters
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A Survey for Fe 6.4 keV Emission in Young Stellar Objects in ρ Oph: The Strong Fluorescence from Elias 29

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We report the results of a search for 6.4 keV Fe fluorescent emission in Young Stellar Objects (YSOs) with measured accretion luminosities in the ρ Oph cloud, using the existing emphChandra and XMM-*Newton* observations of the region. A total of nine such YSOs have X-ray data with sufficiently high S/N for the 6.4 keV line to be potentially detected if present. A positive detection of the Fe 6.4 keV line is reported for one object, Elias 29, in both the XMM-*Newton* and the emphChandra data. The 6.4 keV line is detected in Elias 29 both during quiescent and flaring emission, unlike all previously reported detections of 6.4 keV Fe fluorescence in YSOs which were made during intense flaring. The observed equivalent width of the fluorescent line is large, at $W_\alpha \simeq 160$ eV, ruling out fluorescence from diffuse circumstellar material. It is also larger than expected for simple reflection from a solar-composition photosphere or circumstellar disk, but it is compatible with being due to fluorescence from a centrally illuminated circumstellar disk. The X-ray spectrum of Elias 29 is also peculiar in terms of its high (ionized) Fe abundance, as evident from the very intense Fe XXV 6.7 keV line emission; we speculate on the possible mechanism leading to the observed high abundance.

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Editor's Note: The above abstract is being cross-listed in the *Star Formation Newsletter*, and is included here for those cool star researchers interested in X-ray line diagnostics.

Solar Abstracts

The Spectral Evolution of Impulsive Solar X-ray Flares. II. Comparison of Observations with Models

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We study the evolution of the spectral index and the normalization (flux) of the non-thermal component of the electron spectra observed by RHESSI during 24 solar hard X-ray flares. The quantitative evolution is confronted with the predictions of simple electron acceleration models featuring the soft-hard-soft behaviour. The comparison is general in scope and can be applied to different acceleration models, provided that they make predictions for the behavior of the spectral index as a function of the normalization. A simple stochastic acceleration model yields plausible best-fit model parameters for about 77% of the 141 events consisting of rise and decay phases of individual hard X-ray peaks. However, it implies unphysically high electron acceleration rates and total energies for the others. Other simple acceleration models such as constant rate of accelerated electrons or constant input power have a similar failure rate. The peaks inconsistent with the simple acceleration models have smaller variations in the spectral index. The cases compatible with a simple stochastic model require typically a few times 10^{36} electrons accelerated per second at a threshold energy of 18 keV in the rise phases and 24 keV in the decay phases of the flare peaks.

Accepted by A&A

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Overview of the Solar Activity During Solar Cycle 23

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A brief description and final results of the flare index and some other indices of solar activity for cycle 23 from 1 January 1996 to 31 December 2003 are given. It is found that there is enough evidence to support that the present cycle is magnetically weak. The patterns of similar activity indices that arise under different physical conditions during cycle 23 were compared with the flare index. The photospheric magnetic flux and flare activity show very low values at the maximum of the cycle 23 compared with the maximum phase of the cycle 22. The major flare production during this cycle is very low while quiet geomagnetic conditions are remarkably high during the rising and the maximum phase of the current cycle. The north-south asymmetry of CMEs, sunspot number, sunspot area and flare index were studied. N-S asymmetry had increased in favor of the southern hemisphere for the solar cycle 23 after the inverse polarities were installed. The intermediate-term periodicities in the daily flare index data for the northern and the southern hemispheres and full disc were calculated using the Fourier transform, and it was found that 64, 83, 125 days periodicities are in operation during the maximum phase of the solar cycle 23.

Accepted by Solar Phys.

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The Solar Surface Toroidal Magnetic Field

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The solar cycle of magnetic activity is thought to be a consequence of a dynamo process in which a dipole field produces a toroidal field from differential rotation called the Ω-effect and a twisting process called the α-mechanism that produces a dipole field from the toroidal field. These two magnetic field components are alternately destroyed and recreated in cycle that lasts in total 22 years. Although the dipole field of the sun has long been observed and studied, the toroidal field has never before been detected and measured. Our analysis uses solar rotation to yield meridional and east-west components of velocity and magnetic field vectors from the observed line-of-sight projection of the field. Our analysis of 18.5 years of data from the 150-foot solar tower telescope on Mount Wilson using this method reveals for the first time a clear signal of a reversing toroidal magnetic field on the solar surface with strength comparable to that of the well-observed dipole component of the global magnetic field. The meridional velocities show a zone of convergence near latitudes of 60° during much of the observed period. Such flow convergence implies the subsidence of the toroidally magnetized fluid in this zone. If the toroidal field occupies the bulk of the polar regions of the sun's convective envelope then there is enough magnetic flux to reverse and rebuild the toroidal field at the convective-radiative interface known as the tachocline that is at the inner boundary of the sun's convective envelope. These two steps - the creation of a toroidal field at high latitudes and a mechanism to reverse the tachocline toroidal field - are parts of the dynamo process that are prominent in models but that have not previously had direct observational support.

Accepted by ApJ Letters

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For preprints via ftp or WWW: http://www.astro.ucla.edu/~ulrich/papers/toroidal.pdf

X-ray Emission and Variability of Stars in Young Open Clusters

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Ph.D dissertation directed by: S. Serio

Ph.D degree awarded: February 2005

In this thesis I have studied the coronal emission of stars with age of $\sim$ 100 Myr belonging to the two open clusters Blanco 1 and NGC 2516. The age-rotation-activity relation determines the X-ray history of solar-like stars starting from the Zero-Age-Main-Sequence. In stellar open clusters we find natural laboratories where to observe how different physical properties determine the stellar activity. The study of several coeval open clusters allows to assess if the X-ray activity is influenced by other factors like, e.g., chemical composition or environmental conditions.

A significant fraction of this study has been based on X-ray data, obtained from XMM-Newton observations. In the framework of the analysis of XMM-EPIC images, I have participated to develop a code for source detection based on a wavelet convolution algorithm. The code has been used for the detection of sources in Blanco 1 and NGC 2516 fields of view.

Blanco 1 has been studied both in X-rays and in the optical band. It has an age similar to that of the well known Pleiades ($\sim$ 100 Myr); its high metallicity, its location far away from the Galactic disk – suggesting a peculiar origin – and its age make this cluster attractive to study X-ray activity in high metallicity young stars, perhaps formed in a different way with respect to typical open clusters population of the Galactic disk.

For this cluster I have first derived an optical catalog based on proper motions which extends to M-type stars the membership knowledge for this cluster. By analyzing previous ROSAT data and a recent 50 ks XMM-Newton observation, M-type stars appear more luminous than M-type stars of the Pleiades, suggesting a role of the metallicity in determining the X-ray emission in very low mass stars.

The analysis of X-ray spectra of the coronae of solar like stars are well described by two temperature models in which the cool temperature is at $\sim$ 0.3 keV while the hotter one is peaked at $\sim$ 1 keV, with comparable emission measures. Global abundances are always significantly below the solar metallicity ($\sim 0.3Z\odot$).

One A-late star exhibits a X-ray spectrum with a shape different from those of solar mass stars. The best fit is achieved with one temperature model at $\sim$ 0.6 keV. This suggests an intrinsic origin of the X-ray emission, rather than due to a unknown late companion star. Hence, this star could mark the onset of an efficient magnetic dynamo in stars with very shallow convective zones.

The variability on short time scales is a common feature of Blanco 1 X-ray sources. Flares are often detected, mostly in M-type stars, whereas some smooth variations are observed in solar mass stars. With the detailed analysis of two relatively intense flares we have inferred that an arcade, made of few tens of similar, small loops, with a surface coverage $\leq 15\%$, could host both flares.

By comparison with previous ROSAT data, I have assessed the lack of variability amplitudes on long time scales as large as expected on the Sun. Hence, any cycles, if they exist on young stars, have periods and amplitudes different than in the solar case.

I have complemented the X-ray study of Blanco 1 with optical spectroscopic analysis in order to measure radial velocities in the cluster region, rotational velocities and lithium abundances. The depletion of lithium abundance is a probe for the internal mixing and thus it is related to convection and dynamo, responsible for the coronal activity. The FLAMES data extend toward low mass stars the knowledge of lithium in Blanco 1, allowing us to trace the trend

with $T_{\rm eff}$ down to $\sim$4000 K and to observe a spread similar to that detected in Pleiades. A trend with rotational velocities among slow rotators with $4300 < T_{\rm eff} < 5000$ K is observed, implying a inhibition of the mixing efficiency already in stars rotating at $\sim$ 20 km/s and with high metal abundances.
I have studied the X-ray photometry and variability of NGC 2516, by means of a set of XMM-Newton observations. X-ray detection has been performed on the sum of 5 observations, combining both MOS and pn images, thus achieving a very deep survey for this cluster. Among the 458 X-ray detected sources, 237 of them are identified with cluster members. The detection limit for this cluster has been lowered by a factor greater than 5 with respect to recent Chandra observations in nearly the same field of view. The X-ray Luminosity Distributions (XLD) of G and K-type stars suffer by contamination by less active non members in the optical catalog. For M-type stars the contamination by field stars does not bias the results and a real under-luminosity with respect to M-types stars of Pleiades is observed. X-ray variability on short time scales is more frequent in M-type stars than in G-type stars, variable light curves being characterized mainly by impulsive events. The variability amplitudes on longer time scales ($\sim$ 20 months) in solar mass stars are much lower than those expected in the Sun on a similar time scale. Hence, 11-yr cycles are not detected in these young active stars.
Finally, I have compared the results for Blanco 1 and NGC 2516 with those of the Pleiades and IC 2391, observed also with XMM-Newton. This comparison shows that these clusters share the same X-ray spectral timing properties. Furthermore, while age seems the main driver of X-ray evolution of G- and K-type stars, chemical abundances seems to play a role in determining the X-ray emission level of M-type stars.

Thesis-related Publications: A&A 399, 919; A&A 421, 175; A&A 430, 155; A&A 430, 287

Upcoming Meeting

The Maunder Butterfly Diagram and Maunder Minimum: Solar Physics One Hundred Years Later

2nd Annual General Meeting of the Asia Oceania Geosciences Society (AOGS) in Singapore

20 - 24 June 2005

CALL FOR ABSTRACTS (due 1 Feb. 2005)

Meeting information http://www.asiaoceania-conference.org/index.html

Session Information http://www.asiaoceania-conference.org/st/sst4.htm

Abstracts, due February 1, 2005, can be submitted on-line at http://www.asiaoceania-conference.org/st/form_st4.htm or by email to wsoon@cfa.harvard.edu

The session reflects on the past, present and future of scientific developments arising from the work of E. Walter and Annie Maunder, including solar and stellar magnetism and solar-terrestrial influences.

Fee-waiver awards The AOGS Council has kindly made available 200 awards of fee waivers for conference attendees whose papers are accepted. The waivers are to be awarded by the Council and will be considered according to the following ranked criteria (from highest = 1 to lowest = 4 importance):

1. Special guests representing scientific organizations that provide similar support in kind to AOGS 2. Session Convenors who apply for support 3. Very limited number of invited speakers 4. Limited number of young scientists presenting oral papers

Please send a one-paragraph request to either of us (wsoon@cfa.harvard.edu or baliunas@cfa.harvard.edu) by February 25, 2005.

Please feel free to share this announcement with interested colleagues.

Both Maunders, said historian Mary Bruck, "deserve a place in the annals of the Sun" (in her review of "The Maunder Minimum and the Variable Sun-Earth Connection" http://www.wspc.com/books/physics/5199.html).

Thank you,

Willie Soon and Sallie Baliunas

Upcoming Meeting

The Sun: its Interior, Atmosphere and Wind

IUGG 2005 General Assembly

Toulouse, France

18 – 29 July 2005

http://www.iugg.org/IAGA/index.htm

CALL FOR ABSTRACTS

Continuous ground- and space-based observations of the Sun have provided detailed information on the solar interior, extended corona and solar wind. These observations offer a unique capability to investigate the physical processes responsible for the dynamic nature of the Sun. The combination of these observations with realistic modeling is reshaping our understanding of the solar magnetic field and solar activity, and the mechanisms by which the corona is heated and the solar wind is accelerated. The symposium invites contributions covering observations, theory and modeling of the different aspects of the Sun, including its interior, dynamo, magnetic field, atmosphere and wind. This broad scope is aimed at stimulating exchange and promoting discussion on physically connected phenomena which are seldom discussed in a single meeting.

Convener: Mari Paz Miralles, Harvard-Smithsonian Center for Astrophysics, 60 Garden St., MS-50, Cambridge, MA 02138, USA, tel: 1-617-496-7925, fax: 1-617-495-7455, mmiralles@cfa.harvad.edu

Co-conveners: Jorge Sanchez Almeida, Instituto de Astrofisica de Canarias, E-38200 La Laguna, Tenerife, Spain, tel: 34-922-605-200, fax: 34-922-605-210, jos@iac.es

K. Shibata, Kwasan Observatory, Kyoto University, Yamashina, Kyoto 607-8471, Japan, tel: 81-75-581-1235, fax: 81-75-593-9617, shibata@kwasan.kyoto-u.ac.jp

The Preliminary Program indicates that IAGA session GAIV.01 will be held on July 27-29, 2005. Since this session covers a very broad range of topics, we would appreciate hearing from those interested in attending. Please send either a title and/or abstract to the convener, so that we can plan the sessions and invited contributions based on interest and anticipated attendance.

Important dates: Deadline for paper abstracts submission: 13 March 2005 Deadline for electronic abstracts: 27 March 2005

For abstract submission, registration, and more information see http://www.iugg.org/IAGA/index.htm

JOB OPENING

Non-Tenure Track Lecturer Position (Astron. & Astrophysics)

Dept. of Physics

Univ. of Texas at Arlington

The Department of Physics at the University of Texas at Arlington (UTA) is seeking applications for a non-tenure track full-time Lecturer position starting in September 1, 2005. The selected candidate will teach undergraduate Astronomy and Astrophysics courses and labs each semester. A Ph.D. in Astronomy or Physics is highly preferred, but candidates with other degrees and exceptional qualification will also be considered. Experience in teaching undergraduate introductory level courses is highly desirable. The Physics & Astronomy Department is moving into a state-of-the-art science building hosting the largest planetarium in the Dallas-Fort Worth Metroplex. Further information concerning the department can be found at http://www.uta.edu/physics. Candidates should submit a letter of application, CV, statement of purpose, and at least three references to Dr. M. Cuntz, Chair of the Search Committee. Review of applications will begin on April 1, 2005 and continue until the position is filled. UTA is an Equal Opportunity and Affirmative Action Employer.

Conact information:

Department of Physics
Attn: Manfred Cuntz, Chair of the Search Committee
The University of Texas at Arlington
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Arlington, TX 76019
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Submitted by: Dr. Manfred Cuntz (cuntz@uta.edu)

Abstract Guidelines

Abstracts for *COOLNEWS* are solicited for papers that have been recently accepted by or submitted to refereed journals, and for recent Ph.D. theses. Abstracts for conference proceedings articles are *not* posted in *COOLNEWS*. The subject matter should pertain directly to cool stars (spectral types F,G,K,M or L), substellar objects, or the sun. Both theoretical and observational abstracts are appropriate.

Abstracts dealing with cool pre-main-sequence (PMS) stars will generally not be included in *COOLNEWS*, since they are already covered by the *Star Formation Newsletter*. Exceptions to this rule will be considered if the subject matter is truly cross-disciplinary. If you wish to submit a cross-disciplinary abstract on PMS stars, then first submit it to the *Star Formation Newsletter*. After doing so, submit the abstract to *COOLNEWS* accompanied by a short e-mail stating that it has already been submitted to the *Star Formation Newsletter*, and summarizing why it will be of interest to the cool star/solar community at large.

A monthly call for abstracts will be issued and abstracts received by the last day of the month will usually appear in the following month's newsletter. Announcements of general interest to the cool star and solar communities may also be submitted for posting in the newsletter. These might include (but are not restricted to) the following: (i) *Job Openings* directed toward cool star or solar researchers, (ii) announcements of *Upcoming Meetings*, (iii) announcements of *Upcoming Observing Campaigns* for which participation is solicited from the community at large, (iv) reviews of *New Books*, and (v) *General Announcements* that provide or request research-related information. Please send all correspondence to the editor at coolnews@jila.colorado.edu. Abstract templates and back issues can be obtained from the COOLNEWS Web-page at

`http://casa.colorado.edu/~skinners/coolnews.html` .

*** Please send abstracts in the body of the message and *not* as attachments.***