COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

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Stellar Abstracts

Lithium and Rotation on the Subgiant Branch II. Theoretical Analysis of Observations

J. D. do Nascimento Jr [1,4], C. Charbonnel [1], A. Lèbre [2], P. de Laverny [3] and J.R. De Medeiros [4]

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Lithium abundances and rotation, determined for 120 subgiant stars in Lèbre *et al.* (1999) are analyzed. To this purpose, the evolutionary status of the sample as well as the individual masses have been determined using the HIPPARCOS trigonometric parallax measurements to locate very precisely our sample stars in the HR diagram. We look at the distributions of $A_{\rm Li}$ and *Vsini* with mass when stars evolve from the main sequence to the subgiant branch. For most of the stars in our sample we find good agreement with the dilution predictions. However, the more massive cool stars with upper limits of Li abundances show a significant discrepancy with the theoretical predictions, even if the Non-LTE effects are taken into account. For the rotation behaviour, our analysis confirms that low mass stars leave the main sequence with a low rotational rate, while more massive stars are slowed down only when reaching the subgiant branch. We also checked the connection between the observed rotation behaviour and the magnetic braking due to the deepening of the convective envelope. Our results shed new light on the lithium and rotation discontinuities in the evolved phase.

Accepted by A&A

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Doppler Imaging of Stellar Surface Structure. XIII. The Flaring RS CVn-binary HD 291095 = V1355 Orionis

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We present the first Doppler images of the newly discovered RS CVn binary HD 291095. The star is a synchronuously rotating subgiant in a 4-day spectroscopic binary with an unseen companion and is particularly interesting because it is one of the few evolved stars that show large flares. Three consecutive years of moderate-resolution KPNO spectra and continuous VI and *by* photometry with our APTs reveal a large, cool, and long-living asymmetric polar spot. Its temperature is approximately 1100 K below the average photospheric temperature. Several low latitude and even equatorial spots were evident at the same time. We interpret this latitudinal spot bimodality to be due to a combination of poleward meridional circulation and more frequent magnetic reconnections near the pole than near the equator.

During the 1998 Doppler-imaging observations, a strong flare in Hα was detected which coincided with a meridian passage of the most asymmetric part of the polar spot. We estimate a total flare energy of 5×10^{34} erg typical for flares on very active RS CVn systems. No photospheric heating is evident in our surface maps from optically thin spectral lines of various temperature sensitivities.

Accepted by A&A

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For preprints via ftp or WWW: http://www.astro.univie.ac.at/~kgs/publications/liste.html

The Contribution of the Micro-Turbulent Velocity on the Modelling of Chromospheric Lines in Late Type Dwarfs

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We discuss the influence of the non-thermal velocity (micro-turbulence) on the formation of chromospheric lines in the atmospheres of late type dwarfs. A review of previous work shows a variety of different approaches to the problem leading to different atmospheric structures and consequently different computed line profiles. In that light, we re-examine the formation of the Hydrogen Balmer lines and Na I D lines using twelve different distributions of the micro-turbulent velocity throughout the atmosphere. Our results show a wide range of possible line shapes. Using the analogy with the solar case and the latest results of the non-thermal component widths as derived from instruments on-board SOHO we model Hα and the Na I D lines in an active dMe star Gl 616.2.

Accepted by MNRAS

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Rotational Modulation and Flares on RS CVn and BY Dra Stars. XX. Photometry and Spectroscopy of CC Eri in Late 1989.

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The active flaring binary CC Eri was studied via multi-wavelength observations involving multi-based photometry and

ground- and space-based spectroscopy. Combining early spectroscopic data with the present implies an orbital period of $P = 1.5615$ days. Furthermore, the spectroscopic data suggests spectral types of K7 and M3 for the system. The optical photometry indicated a small spot coverage in late 1989, consistent with data taken a year later which showed CC Eri entering its brightest-to-date phase.

Two flares were detected in the ultraviolet spectral data. These flares radiated $2.7\,10^{31}$ erg and $1.6\,10^{31}$ erg in the C IV line alone, each with a total estimated radiative energy budget of $\approx 10^{36}$ erg. For the higher-temperature lines, such as C IV, there was no systematic variability with phase. The lower-temperature lines show a slight indication of rotational modulation. However, there is a much larger scatter in the individual measurements of the Mg II and C IV fluxes than would be expected from measurement errors alone, consistent with an atmosphere showing continual small-scale activity.

Accepted by MNRAS

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Galactic [O/Fe] and [C/Fe] Ratios: The Influence of New Stellar Parameters

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We consider the effects of recent NLTE gravities and Fe abundances on stellar [O/Fe] and [C/Fe] ratios. The NLTE parameters greatly reduce or eliminate the well-known discrepancy between CH- and CI-based C abundances in metal-poor stars, and previously seen trends of atomic-based [C/Fe] and [O/Fe] with $T_{\rm eff}$. With the NLTE parameters, the metal-poor molecular-based [C/Fe] ratio maintains its increase with declining [Fe/H]; this may also be demonstrated by the revised atomic-based ratios. [O/Fe] values derived from OH and OI features are considerably reduced and typically show improved agreement, but are 0.1-0.2 dex larger than those exhibited by the Lick-Texas syndicate's recent [OI]-based giant de terminations. The revised [O/Fe] ratios still show an increase down to at least [Fe/H]~ -2; we suggest that recent field giant data show an increase with similar slope. Combining what we believe the most reliable giant and dwarf data considered here, we find [O/Fe]$= -0.184(\pm 0.022)\times$[Fe/H]$+0.019$ with an rms scatter of only 0.13 dex; there is no indication of a break or slope change at intermediate [Fe/H]. The gentle slope is in very reasonable agreement with some chemical evolution models employing yields with small mass and metallicity dependences. Finally, two notes are made concerning Na abundance-spatial position and element-to-element correlations in M13 giants.

Accepted by AJ (August 2000 volume)

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The Magnetic Activity Cycle of II Pegasi: Results from Twenty-five Years of Wide-band Photometry

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We present an analysis of a sequence of light curves of the RS CVn-type binary II Pegasi extending from 1974 to 1998. The distribution of the spotted area versus longitude is derived by Maximum Entropy and Tikhonov regularized maps, assuming a constant spot temperature (Lanza et al. 1998a). The spot pattern on the active K2 IV star can be subdivided into a component uniformly distributed in longitude and a second unevenly distributed component, which is responsible for the observed photometric modulation. The uniformly distributed component appears to be possibly modulated with an activity cycle of ~ 13.5 yr. The unevenly distributed component is mainly concentrated around three major active longitudes. The spot activity appears practically permanent at one longitude, but the spot area changes with a cycle of ~ 9.5 yr. On the contrary, the spot activity is discontinuous at the other two longitudes, and it switches back and forth between them with a cycle of ~ 6.8 yr. However, before each switching is completed, a transition phase of ~ 1.05 yr, during which both longitudes are active, occurs. After this transient phase, spot activity remains localized at one of the two longitudes for ~ 4.7 yr untill another switching event occurs, which re-establishes spot activity at the other longitude. The longitude separation between the permanent and the switching active longitudes is closest during the switching phases and it varies along the ~ 6.8 yr cycle. Different time

scales characterize the activity at the permanent longitude and at the switching longitudes: a period of ~ 9.5 yr is related to the activity cycle at the permanent longitude, and a period of ~ 4.3 yr characterizes the spot life time at the switching longitudes in between switching events.

The photometric period of the active star changes from season to season with a relative amplitude of 1.5% and a period of ~ 4.7 yr. Such a variation of the photometric period may be likely associated with the phase shift of the light curves produced by the switching of spot activity from one active longitude to the other. The permanently active longitude shows a steady migration towards decreasing orbital phases, with an oscillating migration rate along the 9.5 yr cycle period and nearly in phase with the variation of its spotted area. The amplitude of the differential rotation derived from such a behaviour is of the order of $\sim 0.023\%$, about one order of magnitude smaller than estimated by Henry et al. (1995). The other two active longitudes migrates also towards decreasing orbital phase, but at a discontinuous rate. There appears to be no correlation between the location of the active longitudes with respect to the line joining the two components of the system and their activity level.

Accepted by A&A

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On the Late Spectral Types of Cataclysmic Variable Secondaries

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We investigate why the spectral type of most cataclysmic variable (CV) secondaries is significantly later than that of a ZAMS star with the same mean density. Using improved stellar input physics, tested against observations of low–mass stars at the bottom of the main sequence, we calculate the secular evolution of CVs with low–mass donors. We consider sequences with different mass transfer rates and with a different degree of nuclear evolution of the donor prior to mass transfer.

Systems near the upper edge of the gap ($P \sim 3-6$ h) can be reproduced by models with a wide range of mass transfer rates from $1.5 \times 10^{-9}\, M_{\odot}\mathrm{yr}^{-1}$ to $10^{-8}\, M_{\odot}\mathrm{yr}^{-1}$. Evolutionary sequences with a small transfer rate and donors that are substantially evolved off the ZAMS (central hydrogen content $0.05-0.5$) reproduce CVs with late spectral types above $P \gtrsim 6$ h. Systems with the most discrepant (late) spectral type should have the smallest donor mass at any given P.

Consistency with the period gap suggests that the mass transfer rate increases with decreasing donor mass for evolved sequences above the period gap. In this case, a single–parameter family of sequences with varying X_{c} and increasing mass transfer rate reproduces the full range of observed spectral types. This would imply that CVs with such evolved secondaries dominate the CV population.

Accepted by MNRAS

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EUV Flare Activity in Late-Type Stars

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Extreme Ultraviolet Explorer Deep Survey observations of cool stars (spectral type F to M) have been used to investigate the distribution of coronal flare rates in energy and its relation to activity indicators and rotation parameters. Cumulative and differential flare rate distributions were constructed and fitted with different methods. Power laws are found to approximately describe the distributions. A trend toward flatter distributions for later-type stars is suggested in our sample. Assuming that the power laws continue below the detection limit, we have estimated that the superposition of flares with radiated energies of about $10^{29} - 10^{31}$ ergs could explain the observed radiative power loss

of these coronae, while the detected flares are contributing only ≈ 10 %. While the power-law index is not correlated with rotation parameters (rotation period, projected rotational velocity, Rossby number) and only marginally with the X-ray luminosity, the flare occurrence rate is correlated with all of them. The occurrence rate of flares with energies larger than 10^{32} ergs is found to be proportional to the average total stellar X-ray luminosity. Thus, energetic flares occur more often in X-ray bright stars than in X-ray faint stars. The normalized occurrence rate of flares with energies larger than 10^{32} ergs increases with increasing L_X/L_{bol} and stays constant for saturated stars. A similar saturation is found below a critical Rossby number. The findings are discussed in terms of simple statistical flare models in an attempt to explain the previously observed trend for higher average coronal temperatures in more active stars. It is concluded that flares can contribute a significant amount of energy to coronal heating in active stars.

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Solar Abstracts

Supra-arcade Downflows in Long-Duration Solar Flare Events

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This report seeks to introduce the reader to a set of observations made during the decay phase of long duration event (LDE) flares on the Sun. In a number of events, the soft X-ray images from *Yohkoh* SXT indicate a downward directed flow field in the region immediately above the flare arcade. The prototypical event is the M5 flare of 20 January 1999, presented by McKenzie & Hudson (1999); since the time that paper was completed, eleven more events, all related to coronal mass ejections, have been found in the interval 01 January 1998 to 08 May 1999. As in the 20 January event, the speeds of downflow are 45 – 500 km s^{-1}, lower than both the freefall speed and the typically assumed Alfvén speed. A comparison is drawn between the SXT observations and the EUV and Hα data, where such are available. Important additions to our knowledge since the first paper are: (i) the motion is evidenced by both dark and bright (i.e., X-ray emitting) features, some of which may have a looplike morphology; (ii) no cool counterparts have been detected in Hα or EUV observations. The data are compared to the expected appearance according to two likely (and opposing) interpretations: an "above-the-arcade coronal rain" interpretation and a "shrinking magnetic flux tube" interpretation. In the current standard explanation of the formation of post-CME arcades, motion of the latter type may be related to outflow from a reconnection site. Movies depicting some of the flare events are on the accompanying CD-ROM.

Accepted by Solar Physics

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For preprints via ftp or WWW: http://solar.physics.montana.edu/mckenzie/vitae.html#publications

Brown Dwarf Abstracts

Hunting the Lowest Mass Brown Dwarfs

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The population of stellar-like objects, not massive enough to burn hydrogen like normal stars, are known as brown dwarfs. But how low-mass can these mysterious objects be? And how many of the lowest mass brown dwarfs are floating around undetected in our Galactic back yard, as well as in other galaxies? To search for these low-mass brown dwarfs, we have made an R- and I-band survey of the star forming region known as the Taurus molecular cloud, where brown dwarfs will be very young, and consequently relatively large, hot and bright. Infrared J-, H- and K-band measurements made for three of our survey candidates indicate that 2 of these objects are young brown dwarfs with masses of $\sim$20 and $<$10 Jupiter masses. We discuss the implications of these discoveries, and describe planned future work.

Submitted to The Irish Astronomical Journal

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New Neighbors from 2MASS: Activity and Kinematics at the Bottom of the Main Sequence

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We have combined 2MASS and POSS II data in a search for nearby ultracool (later than M6.5) dwarfs with $K_s < 12$. Spectroscopic follow-up observations identify 53 M7 to M9.5 dwarfs and seven L dwarfs. The observed space density is 0.0045 ± 0.0008 M8-M9.5 dwarfs per cubic parsec, without accounting for biases, consistent with a mass function that is smooth across the stellar/substellar limit. We show the observed frequency of Hα emission peaks at $\sim 100\%$ for M7 dwarfs and then decreases for cooler dwarfs. In absolute terms, however, as measured by the ratio of Hα to bolometric luminosity, none of the ultracool M dwarfs can be considered very active compared to earlier M dwarfs, and we show that the decrease that begins at spectral type M6 continues to the latest L dwarfs. We find that flaring is common among the coolest M dwarfs and estimate the frequency of flares at 7% or higher. We show that the kinematics of relatively active ($EW_{H\alpha} > 6$ Å) ultracool M dwarfs are consistent with an ordinary old disk stellar population, while the kinematics of inactive ultracool M dwarfs are more typical of a 0.5 Gyr old population. The early L dwarfs in the sample have kinematics consistent with old ages, suggesting that the hydrogen burning limit is near spectral types L2-L4. We use the available data on M and L dwarfs to show that chromospheric activity drops with decreasing mass and temperature, and that at a given (M8 or later) spectral type, the younger field (brown) dwarfs are less active than many of the older, more massive field stellar dwarfs. Thus, contrary to the well-known stellar age-activity relationship, low activity in field ultracool dwarfs can be an indication of comparative youth and substellar mass.

Accepted by AJ

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For preprints via ftp or WWW: http://xxx.lanl.gov/ps/astro-ph/0004361

The Missing Link: Early Methane (“T”) Dwarfs in the Sloan Digital Sky Survey

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We report the discovery of three cool brown dwarfs which fall in the effective temperature gap between the latest L dwarfs currently known, with no methane absorption bands in the 1—2.5 μm range, and the previously known methane (T) dwarfs, whose spectra are dominated by methane and water. The newly discovered objects were detected as very red objects in the Sloan Digital Sky Survey imaging data and have JHK colors between the red L dwarfs and the blue Gl 229B–like T dwarfs. They show both CO and CH_4 absorption in their near–infrared spectra in addition to H_2O, with weaker CH_4 absorption features in the H and K bands than those in all other methane dwarfs reported to date. Due to the presence of CH_4 in these bands, we propose that these objects are early T dwarfs. The three form part of the brown dwarf spectral sequence and fill in the large gap in the overall spectral sequence from the hottest main sequence stars to the coolest methane dwarfs currently known.

Accepted by ApJ Letters

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Ph.D. Thesis Abstract

Infrared Spectroscopic Investigations of Stellar Winds from Red Giants

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Ph.D dissertation directed by: Professor Bengt Gustafsson and Docent Kjell Eriksson

Ph.D degree awarded: March, 31 2000

Spectroscopic investigations of stellar winds from red giants are of interest for several reasons. The discussion on the cosmic build-up of elements needs information based on such investigations. Asymptotic Giant Branch (AGB) stars have a large mass loss which expels newly synthesised elements and enriches the interstellar medium from which a new generation of stars is formed. The circumstellar envelopes of AGB stars are also of interest in their own right. In recent years it has been possible to extend this research into the infrared wavelength regions as a result of the recent developments in space and detector technology. In our work, new infrared probes of the physical conditions in the envelopes surrounding AGB stars have been shown to be useful tools in the study of stellar winds.

The detection of gaseous, circumstellar CO_2 has initiated a discussion concerning the wind regions very close to AGB stars. It is suggested that the CO_2 bands probably are formed in two separate parts of the envelopes at different distances from the star.

More information on the circumstellar envelopes can be obtained by simultaneously modelling radio and far-IR observations of CO rotational lines, in a fashion resembling archaeology, studying different layers of the envelopes at different wavelengths. This method was applied for the first time to IRAS 15194-5115, a star of unknown evolutionary status. The history of the mass-loss rate of AGB stars is imprinted in the circumstellar envelopes and its variations can be studied and can provide clues to the evolutionary stage of the star.

Another way of studying the winds is to investigate spatially resolved, photospheric light scattered in infrared, vib-rot lines of CO, such as the observations of the circumstellar envelope of the AGB star Mira Ceti. The discussion and modelling of these observations has shed some light onto the inner regions ($\lesssim 100\,\mathrm{R}_*$) of the winds, for which little observational knowledge is available today. The scientific approach of combining observations (of high spectral and spatial resolution) of vib-rot transitions of CO, radio and FIR observations with a circumstellar wind model has proved to be powerful. Thus, further investigations along the same lines as those discussed in this thesis would certainly be rewarding.

Thesis-related Publications: Ap&SS, 255, 301; A&A, 341, 579; A&A, 345, 841; A&A, 347, L35

ANNOUNCEMENT

Release of the INES Archive

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 INTA (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:

1) an access catalog containing the parameters required to query the archive and evaluate the observations,

2) a publications catalog which links each spectrum to the publications in which it has been used via the ADS,

3) 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/amHelpDesk/.

Submitted by: Antonio Talavera

UPCOMING MEETING

Magnetic Fields Across the Hertzsprung-Russell Diagram

Santiago, Chile

January 15 - 19, 2001

SCIENTIFIC BACKGROUND:

Recent years have seen the design and construction of a wealth of new instruments and telescopes for both solar and stellar research. These have already demonstrated their potential and/or hold a lot of promise for providing new observational information on magnetic fields, unprecedented both in quantity and in quality.

This meeting will provide a timely overview of the current status of magnetic field studies in the general stellar context (including the sun), thereby ratifying the breakthroughs brought about by the already existing new instruments and emphasizing the importance of incoporating stellar magnetic field studies among the scientific drivers of upcoming facilities. Thanks in part to the progress already achieved in instrumentation, and driven by a growing body of evidence for the action of mechanisms plausibly related to magnetic fields, studies of stellar magnetism have over recent years expanded at an unprecedented pace both in the breadth of the domains covered and in the depth achieved in the studied problems.

Even in the best studied cases, and in spite of the recent advances in these areas, stellar magnetic field diagnosis is still far from achieving the level of detail reached in the study of solar magnetic fields. Yet, the diversity of physical properties covered by stars of various types is even greater than the variety of physical conditions prevailing in the different solar regions accessible through spatially resolved observations. Thanks to this, direct confrontation of the state of knowledge in the areas of solar and stellar magnetism is bound to provide new insight into the physical phenomena related to the presence of magnetic fields in the outer layers of both the sun and stars. The purpose of this workshop is to serve as a forum for such a confrontation.

SCIENTIFIC ORGANIZING COMMITTEE:

J.P. Cassinelli, P. Charbonneau, L. Ferrario, E. Landi Degl'Innocenti, J.D. Landstreet, G. Mathys (Chairman), S.H. Saar, M. Schuessler, S.K. Solanki, D.T. Wickramasinghe

PRELIMINARY LIST OF INVITED SPEAKERS:

S. Bagnulo, C.G. Campbell, J.P. Cassinelli, F. Cattaneo, P. Charbonneau, J.C. del Toro Iniesta, J.-F. Donati, E.D. Feigelson, L. Ferrario, S. Fineschi, E.W. Guenther, H. Henrichs, R. Ignace, P.G. Judge, C. Keller, V.L. Khokhlova, S.R. Kulkarni, E. Landi Degl'Innocenti, J.D. Landstreet, B.W. Lites, K.B. MacGregor, R.N. Manchester, G. Mathys, L. Mestel, F. Moreno-Insertis, H.P. Povel, R. Rosner, S.H. Saar, G.D. Schmidt, J.H.M.M. Schmitt, M. Schuessler, S.K. Solanki, H.C. Spruit, J.O. Stenflo, F. Vakili, A.A. van Ballegooijen, G.A. Wade, S.M. White, D.T. Wickramasinghe

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JOB OPENING

Postdoctral Research Assistant in Solar Physics: Transition Region & Coronal Dynamics

Armagh Observatory

Applications are invited for a three year postdoctoral research assistant in Solar Physics. The proposed PDRA work activities will be directed towards an extensive data reduction/interpretation & modelling programme using a variety of different datasets relating to ultraviolet explosive events, jets, transition region oscillations, coronal diagnostics and coronal holes. A knowledge of MHD and atomic processes would be an advantage as one of the aims is to explore the time dependence of the magnetic reconnection event leading to the explosive event and thus confronting the simulations and observations. Furthermore, we wish to enquire how such variability relates to the observed net line-shift of transition region and coronal lines.

Further information about Armagh Observatory, and in particular the current Solar Physics research, may be obtained by consulting the Observatory web-site

http://www.arm.ac.uk

or via email to Gerry Doyle (jgd@star.arm.ac.uk).

The closing date for applications is 15 June 2000. Prospective applicants should obtain an application pack from the Administrator and send this, together with a full curriculum vitae and bibliography, to:

The Administrator, Armagh Observatory, College Hill, Armagh BT61 9DG, N. Ireland

Tel. +44-(0)28-3752-2928, Fax. +44-(0)28-3752-7174, email lfy@star.arm.ac.uk.

Reference from three referees should also reach the Administrator by the same date.

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), brown dwarfs, 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` .