COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

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TABLE OF CONTENTS

Editor's Note: No June Issue

Due to travel and the lack of computer access during late May and all of June, I will not be sending out a June newsletter. The next issue will be sent out in the first or second week of July, and will include all abstracts received during May and June. Thanks to all of you who have continued to send in abstracts.
Steve Skinner

Stellar Abstracts

The ROSAT All-sky Survey Catalogue of Optically Bright Main-sequence Stars and Subgiant Stars

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We present X-ray data for all main-sequence and subgiant stars of spectral types A, F, G, and K and luminosity classes IV and V listed in the Bright Star Catalogue that have been detected as X-ray sources in the ROSAT all-sky survey; several stars without luminosity class are also included. The catalogue contains 980 entries yielding an average detection rate of 32 percent. In addition to count rates, source detection parameters, hardness ratios, and X-ray fluxes we also list X-ray luminosities derived from *Hipparcos* parallaxes.

Accepted by A&AS

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UBVRI Photometric and Polarimetric Observations of the Spotted Red Dwarf Star MS Ser

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Photometric observations (1991 – 1997) and polarimetric UBVRI observations (1996 - 1997) of the spotted dwarf star HD 143313 (MS Ser) have been obtained. These observations have confirmed the BY Dra - type variability of star (ΔV is up to $0.^m15$, $\Delta < V >$ is up to $0.^m18$) and show intrinsic linear polarization (P is about 0.24 ± 0.02 %), which is variable in the U band. On the basis of all photometric observations, we constructed models of the stellar zonal spottedness, which agree with the polarimetric data. According to these models, spot areas cover up to 15% of the total stellar surface, with a temperature difference of about 1500 K.

Submitted to Astron.Rep.

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ORFEUS Observations of Luminous Cool Stars

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The ORFEUS telescope obtained far ultraviolet spectra ($\lambda\lambda$ 912–1218) of 3 luminous cool stars: β Dra (HD 159181), and two hybrid stars α Aqr (HD 209750), and α TrA (HD 150798). Most striking is the detection of blue-shifted O VI (λ1032), and C III (λ977) emission relative to Si III (λ1206), indicating outward motion, and the markedly narrow resonance line profiles of C III and Si III in the two hybrid objects as compared to the coronal star β Dra. The observed Doppler shifts suggest that a warm wind of at least 3×10^5 K occurs in the hybrid stars with outflows $\sim$100–200 $km\ s^{-1}$; narrow lines of C III and Si III are consistent with signatures of wind absorption. The asymmetric profile of C III in β Dra might also result from wind absorption, although the acceleration would have to begin at higher temperatures (T$\sim$70000 K) in this coronal star as compared to the hybrids since its chromospheric Mg II profiles show no asymmetry due to wind absorption. Electron densities determined from C III multiplets in β Dra and α TrA indicate values between 8.3–8.6 dex (cm^{-3}), giving a pressure of $\sim 2 \times 10^{13}\ cm^{-3}$K, at T$\sim 7 \times 10^4$ K. Wind absorption and interstellar extinction must be considered when applying emission line diagnostics in this wavelength region.

Accepted by ApJ Letters

For preprints via ftp or WWW: ftp to 131.142.10.30, cd to pub/dupree

Doppler Imaging: The Polar Spot Controversy

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Doppler imaging studies have revealed that most rapidly rotating cool stars have high-latitude spots, which in many cases cover the stellar poles. The spectroscopic signature of polar spots is a filling in of the cores of spectral lines, which become flat-bottomed and may show bumps. Although the existence of polar spots is corroborated by spectroscopic and photometric measurements, and although theoretical models predict polar spots, they remain controversial. Most notably, it has been proposed that the line core filling in might also be caused by chromospheric activity. We present a NLTE radiative transfer analysis of 14 of the most-used Doppler-imaging lines which demonstrates that chromospheric activity can produce filling in of the observed line profiles only in a few of these lines. Moreover, such filling in is in general not of the type observed in the spectra of active stars. We are able to produce a flat-bottomed line core by concentrating the chromospheric activity near the poles, but only for two of the strongest lines, Fe I 5497 Å and Fe I 6430 Å. In the observations, however, also the weaker lines have flat-bottomed cores. Therefore, it is unlikely that polar spots are an artifact due to misinterpretation of the spectral signature of chromospheric activity. Nevertheless, we cannot exclude that chromospheric activity provides part of the filling in of the cores of some stronger lines; we present a diagnostic that may help to separate the contributions of chromospheric activity and spots.

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The Li Dip : A Probe of Angular Momentum Transport in Low Mass Stars

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We use the measures of Li and rotational velocities in F Hyades stars to assess the role of the wind-driven meridian circulation and of shear turbulence in the transport of angular momentum in stars of different masses. Our models include both element segregation and rotation-induced mixing, and we treat simultaneously the transport of matter and angular momentum as described by Zahn (1992) and Maeder (1995).

We show that the hot side of the Li dip in the Hyades is well explained within this framework, which was also successfully used to reproduce the C and N anomalies in B type stars (Talon et al. 1997). On the cool side of the dip, another mechanism must participate in the transport of angular momentum; its efficiency is linked to the depth of the surface convection zone. That mechanism should also be responsible for the Sun's flat rotation profile.

Accepted by A&A

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Mixing Processes During the Evolution of Red Giants With Moderate Metal Deficiencies : the Role of Molecular-weight Barriers

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We have assembled accurate abundance data for Li, C, and N as well as the $^{12}C/^{13}C$ ratio for five field giants with $[Fe/H] \simeq -0.6$ including Arcturus and two stars in the globular cluster 47 Tuc. Using their very precise M_{bol} values obtained from HIPPARCOS parallaxes, we can place them into an evolutionary sequence. The sequence shows that the $^{12}C/^{13}C$ ratios drops from ~ 20 to near 7 between $M_{bol} = +1$ and $+0.5$, while Li disappears. At the same time the $^{12}C/^{14}N$ ratio diminishes by 0.2 to 0.4 dex. The two stars in 47 Tuc with Mbol near -2.0 show even lower $^{12}C/^{14}N$ ratios by 0.4 dex indicating further mixing as they evolved to the top of the red giant branch.

These observations confirm the existence of an extra-mixing process that becomes efficient on the red giant branch only when the low-mass stars reach the so-called luminosity function bump. We use the values of the carbon isotopic ratio observed in our sample to get constraints on the μ-barriers that may shield the central regions of a star from extra-mixing. We show that the same value of the critical gradient of molecular weight leads to $^{12}C/^{13}C$ ratios observed at different metallicities. This "observational critical μ-gradient" is in very good agreement with the one which is expected to stabilize meridional circulation. This result provides strong clues on the nature of the extra-mixing which occurs on the RGB, and indicates that it is related to rotation.

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Element Segregation in Low Metallicity Stars and the Primordial Lithium Abundance

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Observational constraints on the primordial lithium abundance are important for the evaluation of the baryonic density of the universe. Its precise determination however suffers from uncertainties due to the possible depletion of this element inside the stars. Here we present and discuss new results on the lithium abundances in Pop II stars obtained with most recent stellar models including the best available physics. We show that it is possible to account for the general behavior of lithium observed in Pop II stars without any free parameters. Macroscopic motions inside the stars are needed but it is not necessary to specify their exact nature to interpret the observational data. This constatation allows to derive a parameter-free value for the lithium primordial abundance : $\log \mathrm{Li}_p = 2.35 \pm .10$ in the $\log \mathrm{H} = 12$ scale.

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X-ray Activity and Evolutionary Status of Late-type Giants

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We study the evolution of stellar activity in a volume-limited sample of single giants within 35 pc distance from the Sun as measured by the amount of soft X-ray emission. This sample of 36 stars is assumed to be complete for absolute magnitude $M_{\mathrm{V}} \leq 3.0$ and for X-ray luminosities $L_{\mathrm{x}} \geq 1.5 \times 10^{28}$ erg s^{-1}. We use ROSAT data to determine stellar activity, *Hipparcos* parallaxes to place stars into the HRD, and the empirically well tested evolutionary code by P. Eggleton (see Pols et al. 1998) together with Kurucz colour tables to derive individual masses and ages. Based on more X-ray data and much improved HR diagram positions, we confirm the suggestion by Hünsch & Schröder (1996), that stellar activity evolution is strongly coupled to stellar mass and that it is a very common feature among giants with $M \geq 1.3 M_{\odot}$.

Most pointed ROSAT observations on the giant branch (GB) and also in the "K giant clump" (with masses betweeen about 1.3 and 2.3 $M_{\odot}$) resulted in detections at typically solar levels. This indicates that magnetic activity mostly (for $M \geq 1.3 M_{\odot}$) even survives the He-flash and, possibly, also persists on the asymptotic giant branch. The more massive stars ($\geq 3 M_{\odot}$) show even a larger amount of activity in their advanced evolutionary stages (blue loop giants).

Accepted by A&A

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Lithium in the Young Cluster NGC 2264

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We use moderate resolution and S/N spectroscopy to derive Li abundances for six F- and G-stars in the young (few Myr) cluster NGC 2264. These are combined with consistently determined abundances of five NGC 2264 G- and K-stars having published Li data. The mean NLTE abundance, calculated with photometric temperatures, is log N(Li)= 3.27±0.05. This is essentially identical to the meteoritic value, providing no evidence of Galactic Li enrichment over the past 4.6 Gyr– at least to the extent the meteoritic value represents a typical "cosmic" value at that time. The scatter of 0.16 dex is well within the expected uncertainties and does not indicate any unexpected differential Li depletion. Our mean Li abundance is 0.2-0.3 dex larger than that in the hotter stars of IC 2602 (30 Myr) and the Pleiades (100 Myr), which have consistently determined abundances. This might indicate prior modest differential enrichment, very recent Galactic Li enrichment which is not a global process, or the increasing effect of Li depletion at the young ages of these clusters; such depletion can not be satisfactorily understood in terms of extant standard or rotational stellar models. The flatness of Li with T_{eff} (mass) persists to 4000 K ($\sim$0.5 M$_{\odot}$), a morphology in agreement with both standard and rotational stellar models having ages $\leq$4 Myr. Some spectral-type-based T_{eff} scales lead to Li abundances in our five cooler cluster stars which are 0.3-0.8 dex larger than abundances in the six hotter stars. Such behavior also is inferred for the near-initial Li-T_{eff} (mass) morphology of IC 2602 and the Pleiades when model depletion factors are mapped onto their observed current abundances. We believe these odd patterns are

due to deficiencies in the model depletion predictions and errant spectral type-based relative $T_{\rm eff}$ values; comparison of independent spectral classifications and the effects of their differences on the derived Li abundances provide direct support for the latter.

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Elemental Abundances in Giants in NGC 3201, a Globular Cluster with a Retrograde Orbit

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We report on the results of our analysis of high-quality spectroscopic and photometric observations of 18 giants in NGC 3201. We have included α Boo and the cool, metal-poor field star, HDE 232078 as comparison objects. We find evidence of a significant extinction gradient across the cluster with a range in $E(B-V)$ of about 0.1 mag, which has not been taken into account in previous studies. The mean value of [Fe/H] for the cluster is -1.42 ± 0.03 ($\sigma = 0.14$). The Na and Al abundances correlate with each other and anti-correlate with the O abundances in a pattern similar to that reported recently in other globular clusters. The [O/H], [Na/H], and [Al/H] values range from -1.5 to -0.8, -0.7 to -1.5, and -0.5 to -1.5, respectively. The α-elements (even-even nuclei from Mg to Ti) show the usual excess relative to iron for metal-poor stars.

The heavy element abundance patterns are dominated by contributions from an r-process reservoir. The relative s-process contribution to the NGC 3201 giants is less than or equal to that of α Boo, and it is significantly less than in the Sun. In contrast, the relative s-process contribution to the halo star HDE 232078 is nearly as large as in the Sun. There is a hint that the relative r- and s-process contributions correlate with the O abundance (in the sense that the low-O stars have a larger relative s-process component). Lee 1312, the star for which our analysis is most complete, has a very similar distribution of s-process species as does α Boo.

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The Mass of the Pleiades

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A membership catalogue for the Pleiades is divided into four mass bins, and a tidally truncated King profile is fitted to each bin with good agreement to the data. The tidal radius of the cluster is found to be 13.1pc, and the total mass of the cluster down to the stellar limit is calculated to be $735 M_{\odot}$.

The spread of stars in each bin, as well as the relaxation and crossing times show the Pleiades to be an approximately relaxed cluster with equilibrium between the density and velocity distributions. The cluster kinetic energy and binding energy are consistent with the virial theorem indicating no large unseen population of brown dwarfs. However, the 1σ errors in the cluster parameters provide an upper limit to the mass of any brown dwarf population of $131 M_{\odot}$, which would show up in deep CCD surveys as $\leq$5.5 brown dwarfs per 10x10 arc-minute field in the cluster centre.

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Detection of the Li I 6104 Angstrom Transition in the Population II Star HD 140283

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Lithium is one of the few primordially produced elements. The value of the primordial Li is taken to be that observed in metal–poor dwarfs, where it is not contaminated by stellar Li sources which act on longer time scales. The atmospheric

abundance is currently derived from the LiI $\lambda\lambda 6707\AA$ resonance transition and the validity of the models employed has been questioned (Kurucz 1995). In this letter we report the first detection of the Li I $\lambda\lambda 6104\AA$ $2^2P - 3^2D$ subordinate transition in the prototype population II star HD 140283. The same Li abundance of (Li/H) = 1.4×10^{-10} is found consistent with both the resonance and subordinate lines. The two lines form at different depths in the atmosphere implying that the 1-D homogeneous atmospheric models used in the abundance determination are essentially correct. When coupled with the standard big bang yields, the Li in the halo dwarfs provides two solutions for the baryon-to-photon ratio $\eta_{10} = n_b/n_\gamma \times 10^{10}$ and for the present baryon density $\Omega_b h_{70}^2 = 0.0748\eta_{10}$: a) a first solution at $\eta_{10} \approx 1.8$, consistent with the η_{10} implied by the high deuterium values $D/H \approx 2 \times 10^{-4}$ observed in some quasar absorption systems (Webb et al 1997) and b) a second solution at $\eta_{10} \approx 4$ which is consistent, within the errors, with the low deuterium D/H =3.4×10^{-5} measured in other quasar absorption systems (Burles & Tytler 1998)

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Ultraviolet and Optical Flares on Gliese 866

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We present simultaneous ultraviolet and optical observations of five flares on the very late type M dwarf Gl 866 (dM5.5e). A procedure to estimate the physical parameters of the flaring plasma has been developed using a simplified model of the flare and a comparison of observed and computed Balmer decrements. With this procedure we have determined the optical thickness, electron temperature and electron density of the flaring plasma at flare maximum for three spectroscopically observed flares. The three spectroscopically observed flares cover up to 5 percent of the stellar surface and have areas similar to solar flares.

Accepted by A&A

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Evolutionary models for Solar Metallicity Low-mass Stars: Mass-magnitude Relationships and Color-magnitude Diagrams

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We present evolutionary models for low mass stars from 0.075 to 1 $M_\odot$ for solar-type metallicities [M/H]= 0 and -0.5. The calculations include the most recent interior physics and the latest generation of *non-grey* atmosphere models. We provide mass-age-color-magnitude relationships for both metallicities. The mass-M_V and mass-M_K relations are in excellent agreement with the empirical relations derived observationally. The theoretical color-magnitude diagrams are compared with the sequences of globular clusters (47 Tucanae) and open clusters (NGC2420 and NGC2477) observed with the Hubble Space Telescope. Comparison is also made with field star sequences in M_V-$(V-I)$, M_K-$(I-K)$ and M_K-$(J-K)$ diagrams. These comparisons show that the most recent improvements performed in low-mass star atmosphere models yield now reliable stellar models in the near-infrared. These models can be used for metallicity, mass, temperature and luminosity calibrations. Uncertainties still remain, however, in the optical spectral region below $T_{eff} \sim 3700K$, where predicted (V-I) colors are too blue by 0.5 mag for a given magnitude. The possible origins for such a discrepancy, most likely a missing source of opacity in the optical and the onset of grain formation are examined in detail

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ftp: ftp.ens-lyon.fr/pub/users/CRAL/ibaraffe/BCAH98.ps

Nonlinear Spherical Alfvén Waves

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We present an one-dimensional numerical study of Alfvén waves propagating along a radial magnetic field. Neglecting losses, any spherical Alfvén wave, no matter how small its initial amplitude is, becomes nonlinear at sufficiently large radii. From previous simulations of Alfvén waves in plane parallel atmospheres we did expect the waves to steepen and produce current sheets in the nonlinear regime, which was confirmed by our new calculations. On the other hand we did find that even the least nonlinear waves were damped out almost completely before 10 solar radii. A damping of that kind is required by models of Alfvén wave-driven winds from old low-mass stars as these winds are mainly accelerated within a few stellar radii.

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Solar Abstracts

First Measurements of the Magnetic Field in a Coronal Hole as Based on Solar Radio Observations with the Radio Telescope RATAN-600

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The first measurements of the magnetic field strength in a coronal hole in the low corona have been made on the basis of the spectral-polarization solar observations at microwaves 2–30 cm on the RATAN-600 radiotelescope with high spatial and spectral resolution. The circular polarized radio emission associated with the isolated equatorial coronal hole has been registered during two solar rotations (CPM – 12.10.1996 and 9.11.1996) at wavelengths longer than 8 cm. The measured degrees of polarization turned out to be between 0.2% (at 9 cm) and 3–4% (at 30 cm). The magnetic field strength (for longitudinal component) was calculated in the frame of thermal bremsstrahlung (free-free emission) of the solar plasma in the presence of the weak magnetic field. Taking into account the magnetic field measurements at the photospheric level (Stanford data), we have came to conclusion about an increase of the longitudinal component of the magnetic field strength in the coronal hole with height from 0.2 G at the photosphere level to 7–10 G at the level of the generation of radio emission at 18 cm, with further stabilization or a small decrease in this value up to the region of generation of 30 cm emission.

Submitted to Pisma v AZh (Astronomy Letters)

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Gravity Waves in a Magnetized Shear Layer

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We use the equations governing the propagation of a gravity wave in the presence of a background flow and magnetic field to derive, in the Boussinesq approximation, dispersion relations for plane wave solutions in certain special cases. We show how, under conditions typical of the interior of the sun, the addition of a magnetic field may prevent certain

wave vectors from propagating and alter the existence and position of any critical layer which might absorb the gravity wave.

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Solar Flare Cellular Automata Interpreted as Discretized MHD Equations

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We show that the Cellular Automaton (CA) model for Solar flares of Lu and Hamilton (1991) can be understood as the solution to a particular partial differential equation (PDE), which describes diffusion in a localized region in space if a certain instability threshold is met, together with a slowly acting source term. This equation is then compared to the induction equation of MHD, the equation which governs the energy release process in solar flares. The similarities and differences are discussed. We make some suggestions how improved Cellular Automaton models might be constructed on the basis of MHD, and how physical units can be introduced in the existing respective Cellular Automaton models. The introduced formalism of recovering equations from Cellular Automata models is rather general and can be applied to other situations as well.

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Observational Evidence for Coronal Mass Injection by "Evaporation" of Spicular Plasma

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Despite being a common feature of the solar chromosphere, spicules are still a poorly understood phenomenon. Not much is known about their impact on the physics of the transition region and corona, for which spicules are believed to be the dominant mechanism for mass injection. We recently observed the spatial plasma structure of polar spicules in a large temperature range with the EUV spectrometer SUMER onboard the SOHO spacecraft. The spectrometer slit was placed tangentially to the polar limb at various projected heights < 22 arcsecs. Our spectra in the wavelength range of 748–792 Å simultaneously record emission lines which are formed in a wide temperature range between 30 000 and 600 000 K.We find that the typical structure of spicular plasma grows, horizontally and vertically, with increasing emission-line temperature, reaching ≈ 20 arcsecs at $1-2\cdot10^5$K. This suggests an "evaporation" of spicular plasma into the transition region (TR) and corona, for which we find further evidence from an emission measure analysis.

Accepted by A&A (Letters)

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Properties of the Quiet Sun EUV Network.

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Observations of the quiet Sun network in a small region at Sun centre taken with the Coronal Diagnostic Spectrometer (CDS) on board *SOHO* are reported for EUV lines with T_e between $\sim 10^4$ and 10^6 K. The changing structure of the network in the upper chromosphere, transition region, up to the corona was examined using intensity distributions which were decomposed into two normal components using a mixture-modelling technique. This enabled areas of high

and low intensities to be separated, and hence averaged network properties including area, intensity, contrast, and fractal dimension to be derived as a function of ion temperature.

The network area and emission were found to be more concentrated in the transition region than in the chromosphere and in the corona, although the results for the chromospheric He lines appear to be affected by resonance scattering. At $\sim 10^6$ K, the area and emission of bright structures dramatically increase, partly due to the appearance of small coronal loops. There is also a discrete change in the fractal dimension at coronal temperatures, signifying a change from network to simpler coronal structures. Furthermore, the contrast of bright to dark regions is at a maximum for $T_e \sim 2.5 \times 10^5$ K and falls to its lowest values for coronal temperatures. The properties of several individual network structures were found to follow the same general behaviour as in the statistical analysis. Our results including physical dimensions are broadly consistent with the transition region model of Gabriel, although we cannot exclude the existence of low-lying loops as in the model of Dowdy et al.

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JOB OPENING

Postdoctoral Position in Cool Star Research

Smithsonian Astrophysical Observatory
Cambridge, MA 02138 USA

A postdoctoral appointment for 2 years or more is expected to be available to study various aspects of cool star atmospheres and mass loss working with spectroscopic and imaging observations of single and binary star systems. A recent Ph.D. in physics or astronomy and demonstrated expertise in spectroscopy, radiative transfer, radiative hydrodynamics, theoretical modeling, or related areas as applied to plasmas is desired. Please send a resume, names of 3 references, and a letter/email describing areas of research interest and experience to:

A. K. Dupree
Harvard-Smithsonian Center for Astrophysics
MS-15, 60 Garden St.
Cambridge, MA 02138 USA

E-mail: adupree@cfa.harvard.edu

JOB OPENING

Research Astronomer
Armagh Observatory, N. Ireland

Position beginning October 1998

A five-year Research Astronomer position funded by the Department of Education Northern Ireland (DENI) is available from 1 October 1998 for a suitably qualified candidate to work at Armagh Observatory. The Observatory has full access to all UK facilities, and is eligible for research grants from the Particle Physics and Astronomy Research Council (PPARC) and other fund awarding organizations. Facilities for computing and data reduction are excellent and include a local PPARC-funded Starlink node.

Applicants should have a PhD in an appropriate discipline, experience of post-doctoral research in astronomy, and preferably experience of managing or running research programmes. Candidates with research experience in any branch of astrophysics are encouraged to apply, but preference will be given to those with experience of observational or theoretical work in stellar astrophysics, particularly the cool star area. The successful candidate will be expected to develop an independent research programme in his or her field of expertise, to make a leading contribution to the Observatory's research profile, and to play a full role in various Observatory activities.

The salary, which is pensionable, is based on the Northern Ireland Civil Service (NICS) Grade 7, currently in the range £26154 – £40990. Starting salary will depend on qualifications and experience, and progession on the scale will be based on performance in accordance with NICS regulations. At the completion of the first five-year appointment the Board of Governors of the Armagh Observatory and Planetarium reserves the right to offer the successful candidate a renewal appointment for a further term or conversion to an established post.

Enquiries and requests for further information may be made to the Director, Professor M.E. Bailey, at the address below, or by e-mail to meb@star.arm.ac.uk. Information about the Armagh Observatory may be obtained by consulting the Armagh Observatory web-site: www.arm.ac.uk.

The closing date for receipt of applications is 15 July 1998. Applicants should obtain an application pack from the Administrator and send this together with a full curriculum vitae, a statement of research interests and complete bibliography to: The Administrator, Armagh Observatory, College Hill, Armagh BT61 9DG, Northern Ireland (Tel: +44-(0)1861-522928; FAX: +44-(0)1861-527174; e-mail: lfy@star.arm.ac.uk). References from three referees should also be sent to the Administrator by the closing date.

Armagh Observatory is an equal opportunities employer and welcomes applications from candidates irrespective of ethnic origin, religion, gender, political opinion, marital status, sexual orientation, or disability.

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, or M) 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` .