COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

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Stellar Abstracts

Coronal Density Diagnostics with Helium-like Triplets: CHANDRA–LETGS Observations of Algol, Capella, Procyon, ϵ Eri, α Cen A&B, UX Ari, AD Leo, YY Gem, and HR 1099

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We present an analysis of ten cool stars (Algol, Capella, Procyon, ϵ Eri, α Cen A&B, UX Ari, AD Leo, YY Gem, and HR 1099) observed with the Low Energy Transmission Grating Spectrometer (LETGS) on board the *Chandra* X-ray Observatory. This sample contains all cools stars observed with the LETGS presently available to us with integration times sufficiently long to warrant a meaningful spectral analysis. Our sample comprises inactive, moderately active, and hyperactive stars and samples the bulk part of activity levels encountered in coronal X-ray sources. We use the LETGS spectra to carry out density and temperature diagnostics with an emphasis on the H-like and the He-like ions. We find a correlation between line flux ratios of the Ly_α and He-like resonance lines with the mean X-ray surface flux. We determine densities using the He-like triplets. For active stars we find no significant deviations from the low-density limit for the ions of Ne, Mg, and Si, while the measured line ratios for the ions of C, N, and O do show evidence for departures from the low-density limit in the active stars, but not in the inactive stars. Best measurements can be made for the O VII triplet where we find significant deviations from the low-density limit for the stars Algol, Procyon, YY Gem, ϵ Eri, and HR 1099. We discuss the influence of radiation fields on the interpretation of the He-like triplet line ratios in the low-Z ions, which is relevant for Algol, and the influence of dielectronic satellite lines, which is relevant for Procyon. For the active stars YY Gem, ϵ Eri, and HR 1099 the low f/i ratios can unambiguously be attributed to high densties in the range 1–3 $10^{10}\,\mathrm{cm}^{-3}$ at O VII temperatures. We find our LETGS spectra to be an extremely useful tool for plasma diagnostics of stellar coronae.

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H_2O in Stellar Atmospheres II. ISO spectra of Cool Red Giants and Hydrostatic Models

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We present 26 ISO-SWS spectra taken from a sample of 13 M-type Semiregular, Lb and Mira variables and covering the wavelength range between 2.36 and 5 μm at a medium resolution. All of the studied objects show intense water bands producing a deep absorption dip around 2.5 μm. Features of CO, OH, SiO and CO_2 are also visible. Using the new H_2O linelist published in the first paper of this series and available opacity data for the other important molecules, we calculated a grid of hydrostatic MARCS atmospheres and the corresponding synthetic ISO-SWS spectra. Based on the comparison with these theoretical results the ISO observations can be divided into four classes. The first two groups include the spectra of the Semiregular (SRb) and Lb variables in our sample. For all of them the region between 2.36 and 4.2 μm can be quite well reproduced by our hydrostatic models. Only the predicted SiO bands above 4 μm are in some cases too strong which is due to known dynamical effects. Depending on the temperature (above or below 3000 K) of the atmosphere, which mainly determines the intensity of the water depression at 2.5 μm, the spectra of the Semiregular and Lb variables fall into the first or second class. The third group consists of observations of Mira stars obtained around maximum light where the range between 2.36 and 4.2 μm can be fitted with our MARCS models except for a strong emission bump appearing in the ISO-SWS data in the region of the SiO features and the slope very close to the short wavelength border. Finally, the last type of spectra corresponds to Mira variables during the phases around the minimum of their visual light curve. For this class the observed water absorption at 2.5 μm is much more intense than in any hydrostatic atmosphere with a realistic choice of effective temperature and surface gravity. Thus, we conclude that dynamical models are needed to explain the ISO-SWS data of Mira stars. For all of the cooler objects from our sample the predicted CO_2 bands between 4.2 and 4.6 μm are too weak which may be due to the opacity data.

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The Henize Sample of S Stars: IV. New Symbiotic Stars

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The properties of the few symbiotic stars detected among the 66 binary S stars from the Henize sample are discussed. Two stars (Hen 18 and Hen 121) exhibit both a strong blue-violet continuum and strong H_α emission (FWHM of 70 km s^{-1}), whereas Hen 134 and 137 exhibit weak H_α emission. The H_α profiles are typical of non-dusty symbiotic stars belonging to class S-3 as defined by Van Winckel et al. (1993, A&AS 102, 401). In that class as in the Henize symbiotic S stars, He I, [N II] or [S II] emission lines are absent, suggesting that the nebular density is high but the excitation rather low. The radial velocity of the centre of the H_α emission is identical to that of the companion star (at least for Hen 121 where this can be checked from the available orbital elements), thus suggesting that the H_α emission originates from gas moving with the companion star. For Hen 121, this is further confirmed by the disappearance of the ultraviolet Balmer continuum when the companion is eclipsed by the S star. Hen 121 is thus the second eclipsing binary star discovered among extrinsic S stars (the first one is HD 35155). A comparison of the available data on orbital periods and H_α emission leads to the conclusion that H_α emission in S stars seems to be restricted to binary systems with periods in the range 600 – 1000 d, in agreement with the situation prevailing for red symbiotic stars (excluding symbiotic novae). Symbiotic S stars are found among the most evolved extrinsic S stars.

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Li (and Other Light Elements) and Stellar Activity

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The study of light elements abundances can give fundamental clues on many astrophysical problems. It is still not clear if the large spread of Li abundances observed in both clusters and field stars reflects a genuine dispersion of abundances or if it is due to phenomena linked to stellar magnetic activity. In this paper both observational and theoretical results on Li abundance are presented and discussed. The picture that arises is complex and difficult to be understood in detail. Although activity alone does not seem able to account for the spread observed in Li abundances, it is, at least for late type stars, unsafe to assume that the spread is entirely due to genuine Li depletion. Recent data on Be abundance measurements in old clusters, that can shed further light on the activity vs. light elements abundances relationships, are also analyzed.

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Time-series Photometric Spot Modelling VI. A New Computer Code and Its Application to 23 Years of Photometry of the Active Giant IM Pegasi

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We present and apply a new computer program named SpotModeL to analyze single and multiple bandpass photometric data of spotted stars. It is based on the standard analytical formulae from Budding and Dorren. The program determines the position, size, and temperature of up to three spots by minimizing the fit residuals with the help of the Marquardt-Levenberg non-linear least-squares algorithm. We also expand this procedure to full time-series analysis of differential data, just as real observations would deliver. If multi-bandpass data are available, all bandpasses can be treated simultaneously and thus the spot temperature is solved for implicitly. The program may be downloaded and used by anyone. In this paper, we apply our code to an ≈23 year long photometric dataset of the spotted RS CVn giant IM Peg. We extracted and modelled 33 individual light curves, additionally, we fitted the entire V dataset in one run. The resulting spot parameters reflect the long term light variability and reveal two active longitudes on the substellar point and on the antipode. The radius and longitude of the dominant spot show variations with 29.8 and 10.4 years period, respectively. Our multicolour data suggests that the spot temperature is increasing with the brightening of the star. The average spot temperature from V, I_C is 3550 ± 150 K or approximately 900 K below the effective temperature of the star.

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X-Ray Evidence for Flare Density Variations and Continual Chromospheric Evaporation in Proxima Centauri

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Using the XMM-Newton X-ray observatory to monitor the nearest star to the Sun, Proxima Centauri, we recorded the weakest X-ray flares on a magnetically active star ever observed. Correlated X-ray and optical variability provide strong support for coronal energy and mass supply by a nearly continuous sequence of rapid explosive energy releases. Variable emission line fluxes were observed in the He-like triplets of O VII and Ne IX during a giant flare. They give

direct X-ray evidence for density variations, implying densities between $2\times10^{10}-4\times10^{11}$ cm^{-3} and providing estimates of the mass and the volume of the line-emitting plasma. We discuss the data in the context of the chromospheric evaporation scenario.

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Chandra, *EUVE*, and VLA Observations of the Active Binary System σ^2 Coronae Borealis

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We present the results of a coordinated observing campaign on the short-period RS CVn binary σ^2 Coronae Borealis (F6V+G0V; $P_{\rm orb}$ = 1.14 d) with the Very Large Array, the *Extreme Ultraviolet Explorer* and the *Chandra X-ray Observatory High Energy Transmission Grating Spectrometer (HETGS)*. The radio emission is consistent with previously determined quiescent gyrosynchrotron properties. Multiple flares were seen with *EUVE*, five occurring within two consecutive orbital periods. The first of these flares was observed with *Chandra*. The *Chandra* observations of σ^2 CrB showed no systematic variations of line fluxes, widths, or Doppler shifts with orbital phase, nor any response in line width or offset due to the flare. This is consistent with both stars being equally active coronal emitters. We have developed a self-consistent method of spectral analysis to derive information from the line and continuum emissions concerning the distribution of plasma with temperature and elemental abundances. A bimodal temperature distribution is appropriate for both quiescent and flare intervals, with a stable peak at 6–8 MK and another variable enhancement at higher temperatures, with evidence for significant contribution from temperatures up to 50 MK during the flare, compared with 30 MK during quiescence. The iron abundance is sub-solar during quiescence, but is enriched by about a factor of two during a large flare seen with *Chandra*. The noble gas elements neon and argon show elevated abundances with respect to iron; but there is no clear evidence for any first ionization potential (FIP)-based abundance pattern during quiescence or the flare. We have determined coronal electron densities from the helium-like ions O VII, Ne IX, Mg XI, and Si XIII, which imply densities $\geq 10^{10}$ cm^{-3}. There is a small enhancement in the electron densities derived for the flare, but it is not statistically significant. We call attention to electron temperature constraints provided by the ratios of $1s^2\ ^1S_0$–$1snp\ ^1P_1$ transitions of the helium-like ions O VII, Ne IX, Mg XI, and Si XIII. The derived coronal electron pressures change by one to two orders of magnitude over a 25% change in temperature, implying non-isobaric coronal conditions. We find no evidence for significant departures from the effectively thin coronal assumption. The electron densities inferred from the soft X-ray spectra are inconsistent with co-spatial gyrosynchrotron emission; further observations are necessary to discriminate the relative locations of the radio and soft X-ray emitting plasma.

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Space Telescope Imaging Spectrograph Survey of Far-Ultraviolet Coronal Forbidden Lines in Late-Type Stars

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We describe an extensive search with the Space Telescope Imaging Spectrograph (STIS) for ultraviolet coronal ($T >$ 10^6 K) forbidden lines in a sample of 29 F–M dwarfs, giants, and supergiants. Measuring coronal lines in the 1150–1700 Å band with STIS has important advantages of superior velocity resolution and an absolute wavelength calibration compared with using *Chandra* HETGS or *XMM*-Newton RGS to observe permitted transitions of the same ion stages in the kilovolt X-ray region.

Fe XII $\lambda\lambda$1242,1349 ($T\sim 2\times10^6$ K) and Fe XXI λ1354 (10^7 K) are well known from solar studies and have been

reported in previous stellar work. A search for other coronal forbidden lines in the 1200–1600 Å region was largely negative. The few candidate identifications (e.g., Ar XIII λ1330 and Ca XV λ1375) are too faint to be diagnostically useful.

We add new dwarfs to the list of Fe XII detections, including nearby solar twin α Cen A (G2 V). Clear detections of Fe XXI were obtained in dMe stars, active giants, a short-period RS CVn binary, and possibly in active solar-type dwarfs. We developed a semi-empirical method for removing the C I blend that partially affects the Fe XXI λ1354 profile.

As discussed recently by Johnson et al. (2002), Capella (α Aur: G8 III + G1 III) displays clear Fe XXI variability between GHRS and STIS observations four years apart, apparently due to a substantial decline in the contribution from the G8 primary. We present an alternative model of the GHRS and STIS era profiles using information in the two sets of lineshapes jointly, as well as knowledge of the behavior of Fe XXI profiles of other late-G "clump" giants similar to Capella G8. The full survey sample also provides a context for the apparent variability: the Fe XXI flux of the G8 star in the GHRS spectrum is nearly identical (in $L_{\rm Fe\ XXI}/L_{\rm bol}$) to other clump giants of similar $L_{\rm X}/L_{\rm bol}$, but had dropped at least a factor of six in the STIS measurement. The He II λ1640 Bα feature—which is thought to be responsive to coronal irradiation—also showed significant changes between the GHRS and STIS epochs, but the decrease in the G8 star was much smaller than Fe XXI.

The Fe XII flux displays a correlation with the *ROSAT* 0.2–2 keV X-ray flux which can be described by an $\alpha = 0.5$ power law. Fe XXI exhibits a steeper, perhaps linear ($\alpha = 1$), correlation with the *ROSAT* flux down to an activity level of $L_{\rm X}/L_{\rm bol} \sim 10^{-5}$, below which detections of the coronal forbidden line are rare. There is no evidence of large, systematic Doppler shifts in either Fe XII λ1242 or Fe XXI λ1354. This suggests that the emissions arise dominantly in confined structures, analogous to magnetic loops on the Sun, rather than, say, in a hot wind. The Fe XII and Fe XXI line widths generally are close to thermal (FWHM$\sim$ 40–90 km s^{-1} at $T \sim 10^{6.2-7.0}$ K), except for Hertzsprung gap giants 31 Comae (G0 III) and Capella G1, and the K1 subgiant primary of HR 1099, all of which show evidence for excess broadening in Fe XXI (Fe XII is not detected in these objects owing to broad NV λ1242 features). If the excess broadening is rotational, it implies that the hot coronae of "X-ray deficient" 31 Com and Capella G1 are highly extended, contrary to the compact structures suggested by recent density estimates in a number of active coronal sources.

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Solar Abstracts

Temporal Variability in the Doppler-shift of Solar Transition Region Lines

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High cadence datasets taken in C III 977Å, O VI 1032Å and Ne VIII 720Å were analysed in an effort to establish the extent of the variability in the Doppler-shift of typical mid-transition region lines. The shortest time-scale variability seems to occur in the network boundary regions where the line-shift can vary by $7-8$ $km\ s^{-1}$ in less than 1 min. The internetwork region also shows variability although this tends to be longer lived, $\sim 2-3$ mins. The average line-shift in C III is a red-shift which ranges from ~ 2 $km\ s^{-1}$ to ~ 20 $km\ s^{-1}$ with an average value for all regions selected being around 10 $km\ s^{-1}$ in very good agreement with that derived by others. The red-shift values indicate a clear difference between network and internetwork regions, with the largest red-shift being present at the network boundary. For O VI, this gives an average red-shift ranging from 5 to 10 $km\ s^{-1}$. For Ne VIII, there is a 13 $km\ s^{-1}$ difference between internetwork and bright network plasma with the bright network being more red-shifted. This could imply

that the bright network regions are dominated by spicule down-flow.
In the second part we present results from 2-dimensional (2D) dissipative magnetohydrodynamic (MHD) simulations of the response of the solar transition region to micro-scale energy depositions. A variety of temperatures at which the energy deposition takes place as well as the amount of energy deposited are examined. This work is a continuation of previous related simulations where small-scale energy depositions were modelled in 1D hydrodynamics. The observable consequences of such transient events are then computed for three transition region lines, namely C IV 1548 Å, O VI 1032 Å, and Ne VIII 770 Å, under the consideration of non-equilibrium ionization.

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Flare Activity in Solar Active Region 8421 Observed by the TRACE Satellite

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Due to the wide range of wavelengths examined and to the high angular and temporal resolution, TRACE allows one to carry out a spatial and temporal analysis of active regions during highly transient phenomena such as flares. This provides new input to the study the mechanisms involved in these phenomena. We have studied 3 flares that occurred in AR 8421 between 29 and 30 December 1998 by comparing white light, 1600 Å, and 171 Åimages obtained by TRACE with BBSO H_α images, Mitaka magnetograms and Yohkoh hard X-ray data. The flares, characterized by sudden intensity enhancements in EUV loops and by moss brightenings, have been interpreted in the framework of the two canonical flare models: i.e. simple loop and two ribbon flares. Our analysis has shown that flare No.1 may be interpreted as a two-ribbon flare triggered by reconnection between a sheared arcade and a new emerging flux tube. The analysis of flare No.2 strongly supports the model of two-ribbon flares characterized by reconnection occurring at higher and higher levels as time proceeds. Finally, the analysis of flare No. 3 has given the opportunity to relate moss brightening with a probable process of chromospheric evaporation.

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Continuum Analysis of an Avalanche Model for Solar Flares

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We investigate the continuum limit of a class of self-organized-critical lattice models for solar flares. Such models differ from the classical numerical sandpile model in their formulation of stability criteria in terms of the curvature of the nodal field, and are known to belong to a different universality class. A fourth-order nonlinear hyperdiffusion equation is reverse-engineered from the discrete model's redistribution rule. A dynamical renormalization-group analysis of the equation yields scaling exponents which compare favorably with those measured in the discrete lattice model within the relevant spectral range dictated by the sizes of the domain and the lattice grid. We argue that the fourth-order nonlinear diffusion equation that models the behavior of the discrete model in the continuum limit is in fact compatible with magnetohydrodynamics of the flaring phenomenon in the regime of strong magnetic field and effective magnetic diffusivity characteristic of strong MHD turbulence.

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Microflares and Hot Component in Solar Active Regions

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Open-shutter RHESSI observations of 3–15 keV X-rays are found to exhibit active region transient brightenings and microflares at a rate of at least 10 per hour occurring even during the periods of lowest solar activity so far in the mission. A thermal component fitted by temperatures of 6–14 MK dominates from 3 keV to about 9 keV, but can be traced up to 14 keV in some cases, and has an average duration of 131($\pm$103) seconds at 7–8 keV. The duration increases with decreasing photon energy. The peak count rate defined by cross-correlation is delayed at low energies. The temperature peaks early in the event and then decreases, whereas the emission measure increases throughout the event. The properties are consistent with thermal conduction dominating the evolution. In some of the bigger events, a second component was found in the 11–14 keV range extending down to 8 keV in some cases. The duration is typically 3 times shorter and ends near the peak time of the thermal component consistent with the Neupert effect of regular flares. Therefore the second component is suggested to be of non-thermal origin, presumably causing the beam-driven evaporation of the first component. The two components can be separated and analyzed in detail for the first time. Low-keV measurements allow a reliable estimate of the energy input by microflares necessary to assess their relevance for coronal heating.

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Acceleration and Enrichment of ^{3}He in Impulsive Solar Flares by Electron Firehose Waves

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A new mechanism for acceleration and enrichment of ^{3}He during impulsive solar flares is presented. Low-frequency electromagnetic plasma waves excited by the Electron Firehose Instability (EFI) can account for the acceleration of ions up to 1 MeV amu^{-1} energies as a single stage process. The EFI arises as a direct consequence of the free energy stored in a temperature anisotropy ($T_\parallel^e > T_\perp^e$) of the bulk energized electron population during the acceleration process. In contrast to other mechanisms which require special plasma properties, the EFI is an intrinsic feature of the acceleration process of the bulk electrons. Being present as a side effect in the flaring plasma, these waves can account for the acceleration of ^{3}He and ^{4}He while selectively enhancing ^{3}He due to the spectral energy density built up from linear growth. Linearized kinetic theory, analytic models and test-particle simulations have been applied to investigate the ability of the waves to accelerate and fractionate. As waves grow in both directions parallel to the magnetic field, they can trap resonant ions and efficiently accelerate them to the highest energies. Plausible models have been found that can explain the observed energies, spectra and abundances of ^{3}He and ^{4}He.

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Dynamics of the Solar Granulation. - VIII. Time and Space Development.

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We study the evolution of the granulation dynamics from the observational point of view. Based on series of excellent spectrograms taken at the VTT, Observatorio del Teide (Tenerife), in 1999, we calculated *temporal - spatial maps* of the Doppler velocity, line width, and intensity in order to track the dynamical behavior of these observables at

different positions along the spectrograph slit. The Doppler velocity map reveals a granular dynamical time – the characteristic time associated with the decay of the Doppler velocity – of approximately 2 min, while the line width map does not show any characteristic time scale but rather a strong intermittence. The intensity map reveals the life time of the granulation as it is given in the literature. The granular dynamical time is practically equal to the value determined from spectrograms taken at the solar minimum 1994; so the dynamical time does not show any change over the solar cycle. The stochastic properties of the Doppler velocity and intensity data samples are studied (i) by means of their statistical moments and (ii) theoretically using presupposed model distributions. For the latter we estimated the distributions' parameters by means of the maximum likelihood method. The histograms of the Doppler velocity variations point to an asymmetric model distribution, while the histograms of the intensity variations infer a symmetric one. The intensity variations can be described well by a Gaussian probability density function, while the Doppler velocity variations are described by the double exponential (Gumbel) distribution, an asymmetric probability function. A remarkable result of the statistical analysis based on both series of observations in 1994 and 1999 is the unambiguous lack of flows with large velocity amplitudes within the intergranular space.

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Atomic Data Abstracts

CHIANTI – an Atomic Database for Emission Lines. Paper VI: Proton Rates and Other Improvements

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The CHIANTI atomic database contains atomic energy levels, wavelengths, radiative transition probabilities and electron excitation data for a large number of ions of astrophysical interest. Version 4 has been released, and proton excitation data is now included, principally for ground configuration levels that are close in energy. The fitting procedure for excitation data, both electrons and protons, has been extended to allow 9 point spline fits in addition to the previous 5 point spline fits. This allows higher quality fits to data from close-coupling calculations where resonances can lead to significant structure in the Maxwellian-averaged collision strengths. The effects of photoexcitation and stimulated emission by a blackbody radiation field in a spherical geometry on the level balance equations of the CHIANTI ions can now be studied following modifications to the CHIANTI software. With the addition of H I , He I and N I, the first neutral species have been added to CHIANTI. Many updates to existing ion data-sets are described, while several new ions have been added to the database, including Ar IV, Fe VI and Ni XXI. The two-photon continuum is now included in the spectral synthesis routines, and a new code for calculating the relativistic free-free continuum has been added. The treatment of the free-bound continuum has also been updated.

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Ref: 02/F895A

School of Mathematics and Physics

This post, funded by the Particle Physics and Astronomy Research Council, is available initially for up to three years, commencing as soon as possible, to support research undertaken as part of a PPARC Astrophysics Rolling Grant. Applicants must hold, or be about to obtain, a PhD in astrophysics, have experience of ground- or satellite-based astronomical observing, and expertise in the reduction and analysis of astronomical data.

Current astrophysics research programmes include studies of hot and cool stars, the interstellar medium, the Sun, solar system objects and ultra-wide-field astronomy. However applicants with experience outside these areas are encouraged to apply.

Resources will be made available to allow the successful applicant to spend some of their time pursuing their own independent research programmes.

Information on the Astrophysics Research Division may be obtained at http://star.pst.qub.ac.uk/

Commencing salary range: 17,628 - 26,493 pounds per annum, placing depending on age, experience and qualifications.

Applicants, quoting Ref. 02/F895A, may obtain further particulars from the Personnel Department, The Queen's University of Belfast, Northern Ireland, BT7 1NN. Tel: 02890 273044, FAX: 02890 324944, e-mail: personnel@qub.ac.uk, website: www.qub.ac.uk/pers

Closing date: 5.00pm, Friday 18 October 2002.

The University is committed to equal opportunities and to selection on merit. It therefore welcomes applications from all sections of society.

Job Opening

Postdoctoral Position (Close Interacting Binary Stars)

Department of Astronomy & Astrophysics
Pennsylvania State University (USA)

A postdoctoral research position is available in the Department of Astronomy and Astrophysics at The Pennsylvania State University. The successful applicant will work with Prof. Mercedes Richards on the study of mass transfer in close binary star systems. Topics of interest include hydrodynamic simulations of mass transfer in interacting binaries, Doppler tomography, analysis of multiwavelength (X-ray, uv, optical, infrared) spectra, analysis of radio flare data, magnetic fields in interacting binaries, the solar-stellar connection, and the planning and implementation of observing programs. A PhD is required. Prior experience with hydrodynamic simulations, tomography, or the analysis of UV/IR/optical spectra would be useful. Information about the department can be found at http://www.astro.psu.edu .

The initial appointment is for one year, renewable to a total of three years. Applicants should send a curriculum vitae, list of publications, statement of research interests, and letters of recommendation from three referees to Prof. Mercedes Richards, Penn State, Dept. of Astronomy & Astrophysics, 525 Davey Lab., University Park, PA 16802. Questions should be directed to mrichards@astro.psu.edu. Applications will receive immediate consideration. The position will be filled as soon as a suitable candidate is identified. Penn State is committed to affirmative action, equal opportunity and the diversity of its workforce.

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.***