COOLNEWS

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Stellar Abstracts

Deep X-ray Survey of the Young Open Cluster NGC 2516 with XMM-Newton

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We report on a deep X-ray survey of the young ($\sim$ 140 Myr), rich open cluster NGC 2516 obtained with the EPIC camera on board the XMM-Newton satellite. By combining data from six observations, a high sensitivity, greater than a factor 5 with respect to recent Chandra observations, has been achieved. Kaplan-Meier estimators of the cumulative X-ray luminosity distribution are built, statistically corrected for non members contaminants and compared to those of the nearly coeval Pleiades. The EPIC spectra of the X-ray brightest stars are fitted using optically thin model plasma with one or two thermal components. We detected 431 X-ray sources and 234 of them have as optical counterparts cluster stars spanning the entire NGC 2516 Main Sequence. On the basis of X-ray emission and optical photometry, we indicate 20 new candidate members of the cluster; at the same time we find 49 X-ray sources without known optical or infrared counterpart. The X-ray luminosities of cluster stars span the range $\log \mathrm{L_X}$ (erg s^{-1}) = 28.4 – 30.8. The representative temperatures span the 0.3 – 0.6 keV (3.5 – 8 MK) range for the cool component and 1.0 - 2.0 keV (12 – 23 MK) for the hot one; similar values are found in other young open clusters like the Pleiades, IC 2391, and Blanco 1. While no significant differences are found in X-ray spectra, NGC 2516 solar type stars are definitely less luminous in X-rays than the nearly coeval Pleiades. The comparison with a previous ROSAT survey evidence the lack of variability amplitudes larger than a factor 2 in solar type stars in a $\sim$ 11 yr time scale of the cluster and thus activity cycles like in the Sun are probably absent or different by period and amplitude in young stars.

Accepted by A&A

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A Comparative Study of Flaring Loops in Active Stars

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Dynamo activity in stars of different types is expected to generate magnetic fields with different characteristics. As a result, a differential study of the characteristics of magnetic loops in a broad sample of stars may yield information about dynamo systematics. In the absence of direct imaging, certain physical parameters of a stellar magnetic loop can be extracted if a flare occurs in that loop. In this paper, we employ a simple non-hydrodynamic approach introduced by Haisch (1983), to analyze a homogeneous sample of all the flares we could identify in the EUVE/DS database: a total of 134 flares which occurred on 44 stars ranging in spectral type from F to M, and in luminosity class from V to III. All of the flare light curves which have been used in the present study were obtained by a single instrument (EUVE/DS). For each flare, we have applied Haisch's simplified approach (HSA) in order to determine loop length, temperature, electron density, and magnetic field. For each of our target stars, a literature survey has been performed to determine quantitatively the extent to which our results are consistent with independent studies. The results obtained by HSA are found to be well supported by results obtained by other methods. Our survey suggests that, on the main sequence, short loops (with lengths $\leq 0.5 R_*$) may be found in stars of all classes, while the largest loops (with lengths up to $2R_*$) appear to be confined to M dwarfs. Based on EUVE data, the transition from small to large loops on the main sequence appears to occur between spectral types K2 and M0. We discuss the implications of this result for dynamo theories.

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The Coronal Structure of Speedy Mic - I: A Densely Packed Prominence System Beyond Co-rotation

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We present new observations of the prominence system on the K3 dwarf Speedy Mic (BO Mic, HD 197890). Using an improved technique to track the absorption features in Hα we find a very active prominence system with approximately ten prominences on the observable hemisphere per rotation. From a total of 25 prominence disc crossings we find an average axial distance of $(2.85 \pm 0.54) R_*$ which is twice the co-rotation radius above the stellar surface. We discuss the consequences of these observations on the nature of the supporting magnetic structures. Two consecutive nights, with complete phase coverage, combined with a further night after a three night gap allow us to study the evolution of the prominence system on two different timescales. Several of the prominences have counterparts at similar phases on consecutive nights. During this interval many prominences show evidence for evolution in their heights and phases of observation. Five nights (13 rotation cycles) later we recover some prominences at approximately the same phases. Whilst individual prominences change axial distances or appear/re-appear from night-to-night the underlying prominence supporting structures appear to be stable over as many as 13 stellar rotations.

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The Nearest Young Moving Groups

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The latest results in the research of forming planetary systems have led several authors to compile a sample of candidates for searching for planets in the vicinity of the sun. Young stellar associations are indeed excellent laboratories for this study, but some of them are not close enough to allow the detection of planets through adaptive optics techniques. However, the existence of very close young moving groups can solve this problem. Here we have compiled the members

of the nearest young moving groups, as well as a list of new candidates from our catalogue of *late-type stars possible members of young stellar kinematic groups*, studying their membership through spectroscopic and photometric criteria.

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An *XMM-Newton* Observation of the Young Open Cluster NGC 2547: Coronal activity at 30 Myr

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We report on *XMM-Newton* observations of the young open cluster NGC 2547 which allow us to characterise coronal activity in solar-type stars, and stars of lower mass, at an age of 30 Myr. X-ray emission is seen from stars at all spectral types, peaking among G-stars at luminosities (0.3–3 keV) of $L_{\rm x} \simeq 10^{30.5}$ erg s^{-1} and declining to $L_{\rm x} \leq 10^{29.0}$ eg s^{-1} among M-stars with masses $\geq 0.2\,M_{\odot}$. Coronal spectra show evidence for multi-temperature differential emission measures and low coronal metal abundances of $Z \simeq 0.3$. The G- and K-type stars of NGC 2547 follow the same relationship between X-ray activity and Rossby number established in older clusters and field stars, although most of the solar-type stars in NGC 2547 exhibit saturated or even super-saturated X-ray activity levels. The median levels of $L_{\rm x}$ and $L_{\rm x}/L_{\rm bol}$ in the solar-type stars of NGC 2547 are very similar to those in T-Tauri stars of the Orion Nebula cluster (ONC), but an order of magnitude higher than in the older Pleiades. The spread in X-ray activity levels among solar-type stars in NGC 2547 is much smaller than in older or younger clusters.

Coronal temperatures increase with $L_{\rm x}$, $L_{\rm x}/L_{\rm bol}$ and surface X-ray flux. The most active solar-type stars in NGC 2547 have coronal temperatures intermediate between those in the ONC and the most active older ZAMS stars. We show that simple scaling arguments predict higher coronal temperature in coronally saturated stars with lower gravities. A number of candidate flares were identified among the low-mass members and a flaring rate (for total flare energies [0.3–3 keV] $> 10^{34}$ erg) of 1 every 350^{+350}_{-120} ks was found for solar-type stars, which is similar to rates found in the ONC and Pleiades. Comparison with *ROSAT* HRI data taken 7 years previously reveals that only 10–15 percent of solar-type stars or stars with $L_{\rm x} > 3 \times 10^{29}$ erg s^{-1} exhibit X-ray variability by more than a factor of two. This is comparable with clusters of similar age but less than in both older and younger clusters. The similar median levels of X-ray activity and rate of occurrence for large flares in NGC 2547 and the ONC demonstrate that the X-ray radiation environment around young solar-type stars remains relatively constant over their first 30 Myr.

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Hubble Space Telescope observations of SV Cam - I. The Importance of Unresolved Star-spot Distributions in Light-curve Fitting

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We have used maximum entropy eclipse mapping to recover images of the visual surface brightness distribution of the primary component of the RS CVn eclipsing binary SV Cam, using high-precision photometry data obtained during three primary eclipses with STIS aboard the Hubble Space Telescope. These were augmented by contemporaneous ground-based photometry secured around the rest of the orbit. The goal of these observations was to determine the filling factor and size distribution of starspots too small to be resolved by Doppler imaging. The information content of the final image and the fit to the data were optimised with respect to various system parameters using the χ^2 landscape method, using an eclipse mapping code that solves for large-scale spot coverage. It is only with the unprecedented photometric precision of the HST data (0.00015 mag) that it is possible to see strong discontinuities at the four contact points in the residuals of the fit to the lightcurve. These features can only be removed from the

residual lightcurve by the reduction of the photospheric temperature, to synthesise high unresolvable spot coverage, and the inclusion of a polar spot. We show that this spottedness of the stellar surface can have a significant impact on the determination of the stellar binary parameters and the fit to the lightcurve by reducing the secondary radius from $0.794 \pm 0.009\,R_\odot$ to $0.727 \pm 0.009\,R_\odot$. This new technique can also be applied to other binary systems with high precision spectrophotometric observations.

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Hubble Space Telescope Observations of SV Cam: II. First Derivative Lightcurve Modelling Using PHOENIX and ATLAS Model Atmospheres

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The variation of the specific intensity across the stellar disc is essential input parameter in surface brightness reconstruction techniques such as Doppler imaging, where the relative intensity contributions of different surface elements are important in detecting starspots. We use PHOENIX and ATLAS model atmospheres to model lightcurves derived from high precision (S/N $\simeq$ 5000) HST data of the eclipsing binary SV Cam (F9V + K4V), where the variation of specific intensity across the stellar disc will determine the contact points of the binary system lightcurve. For the first time we use χ^2 comparison fits to the first derivative profiles to determine the best-fitting model atmosphere. We show the wavelength dependence of the limb darkening and that the first derivative profile is sensitive to the limb-darkening profile very close to the limb of the primary star. It is concluded that there is only a marginal difference ($< 1\sigma$) between the χ^2 comparison fits of the two model atmospheres to the HST lightcurve at all wavelengths. The usefulness of the second derivative of the light-curve for measuring the sharpness of the primary's limb is investigated, but we find that the data are too noisy to permit a quantitative analysis.

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X-ray Emission from T Tauri Stars

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We have modelled the X-ray emission of T Tauri stars assuming that they have isothermal, magnetically-confined coronae. These coronae extend outwards until either the pressure of the hot coronal gas overcomes the magnetic field, or, if the corona interacts with a disk before this happens, by the action of the disk itself. This work is motivated by the results of the Chandra Orion Ultradeep Project (COUP) that show an increase in the X-ray emission measure with increasing stellar mass. We find that this variation (and its large scatter) result naturally from the variation in the sizes of the stellar coronae. The reduction in the magnitude of the X-ray emission due to the presence of a disk stripping the outer parts of the stellar corona is most pronounced for the lower mass stars. The higher mass stars with their greater surface gravities have coronae than typically do not extend out as far as the inner edge of the disk and so are less affected by it. For these stars, accretion takes place along open field lines that connect to the disk. By extrapolating surface magnetograms of young main sequence stars we have examined the effect on the X-ray emission of a realistic degree of field complexity. We find that the complex fields (which are more compact) give densities of some $(2.5 - 0.6) \times 10^{10}\mathrm{cm}^{-3}$. This is consistent with density estimates of $(1 - 8) \times 10^{10}\mathrm{cm}^{-3}$ from modelling of individual flares. A simple dipole field in contrast gives densities typically an order of magnitude less. For the complex

fields, we also find surface hotspots at a range of latitudes and longitudes with surface filling factors of only a few percent. We find that the dipolar fields give a relationship between X-ray emission measure and stellar mass that is somewhat steeper than observed, while the complex fields give a relation that is shallower than observed. This may suggest that T Tauri stars have coronal fields that are slightly more extended than their main sequence counterparts, but not as extended as a purely dipolar fields.

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Editor's Note: The above abstract is being cross-listed with the Star Formation Newsletter.

Solar Abstracts

Moving Magnetic Tubes: Fragmentation, Vortex Streets and the Limit of the Approximation of Thin Flux Tubes

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Aim: We study the buoyant rise of magnetic flux tubes in a stratified layer over a range of Reynolds numbers ($25 \leq Re \leq 2600$) by means of numerical simulations. Special emphasis is placed on studying the fragmentation of the rising tube, its trailing wake and the formation of a vortex street in the high-Reynolds number regime. Furthermore, we evaluate the relevance of the thin flux tube approximation with regards to describing the evolution of magnetic flux tubes in the simulations. *Method*: We used the FLASH code, which has an adaptive mesh refinement (AMR) algorithm, thus allowing the simulations to be carried out at high Reynolds numbers. *Result*: The evolution of the magnetic flux tube and its wake depends on the Reynolds number. At Re up to a few hundred, the wake consists of two counter-rotating vortex rolls. At higher Re, the vortex rolls break up and the shedding of flux into the wake occurs in a more intermittent fashion. The amount of flux retained by the central portion of the tube increases with the field line twist (in agreement with previous literature) and with Re. The time evolution of the twist is compatible with a homologous expansion of the tube. The motion of the central portion of the tube in the simulations is very well described by the thin flux tube model whenever the effects of flux loss or vortex forces can be neglected. If the flux tube has an initial net vorticity, it undergoes asymmetric vortex shedding. In this case, the lift force accelerates the tube in such a way that an oscillatory horizontal motion is super-imposed on the vertical rise of the tube, which leaves behind a vortex street. This last result is in accordance with previous simulations reported in the literature, which were carried out at lower Reynolds number.

Accepted by A&A

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Dynamic 3D Reconnection in a Separator Geometry with Two Null Points

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The dynamic behaviour of disturbances in the vicinity of a pair of magnetically connected 3D null points is examined. The aim is to investigate how non-linear disturbances lead to strong localized currents that initiate magnetic reconnection at the separator. Current accumulation and magnetic reconnection at such separators are thought to be important processes in the Solar corona. The problem is formulated in an incompressible cylindrical geometery by superposing arbitrary disturbance fields onto a "background" two-null field. Two different regimes are found for the dynamic evolution, depending on the relative strengths of the background magnetic and velocity fields. In one regime, disturbance pulses split into ingoing and outgoing components, which propagate along the background field lines. In

the other "flux pile-up" regime, a strong driving flow localises the disturbances towards the null point pair. Current structures aligned with the spines, fans and separator present in the field are found to result, and the structure of these currents and their scaling with resistivity is investigated.

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RHESSI and SOHO/CDS Observations of Explosive Evaporation

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Simultaneous observations of explosive chromospheric evaporation are presented using data from the *Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI)* and the Coronal Diagnostic Spectrometer (CDS) onboard *SOHO*. For the first time, co-spatial imaging and spectroscopy have been used to observe explosive evaporation within a hard X-ray emitting region. *RHESSI* X-ray images and spectra were used to determine the flux of non-thermal electrons accelerated during the impulsive phase of an M2.2 flare. Assuming a thick-target model, the injected electron spectrum was found to have a spectral index of $\sim$7.3, a low energy cut-off of $\sim$20 keV, and a resulting flux of $\geq 4\times10^{10}$ ergs cm^{-2} s^{-1}. The dynamic response of the atmosphere was determined using CDS spectra, finding a mean upflow velocity of 230$\pm$38 km s^{-1} in Fe XIX (592.23 Å), and associated downflows of 36$\pm$16 km s^{-1} and 43$\pm$22 km s^{-1} at chromospheric and transition region temperatures, respectively, relative to an averaged quiet-Sun spectra. The errors represent a 1σ dispersion. The properties of the accelerated electron spectrum and the corresponding evaporative velocities were found to be consistent with the predictions of theory.

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Simulation of Quiet Sun Waves in the Ca II Infrared Triplet

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The Ca II infrared triplet lines around 8540 Å are good candidates for observing chromospheric magnetism. Model spectra of these lines are obtained by combining a radiation hydrodynamic simulation with a Stokes synthesis code. The simulation shows interesting time-varying behavior of the Stokes V profiles as waves propagate through the formation region of the lines. Disappearing and reappearing lobes in the Stokes V profiles as well as profile asymmetries are closely related to the atmospheric velocity gradients.

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The Transparency of Solar Coronal Active Regions

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Resonance scattering has often been invoked to explain the disagreement between the observed and predicted line ratios of Fe XVII 15.01 A to Fe XVII 15.26 A (the "3C/3D" ratio). In this process photons of 15.01, with its much higher

oscillator strength, are preferentially scattered out of the line of sight, thus reducing the observed line ratio. Recent laboratory measurements, however, have found significant inner-shell Fe XVI lines at 15.21 and 15.26 Angstroms, suggesting that the observed 3C/3D ratio results from blending. Given our new understanding of the fundamental spectroscopy, we have re-examined the original solar spectra, identifying the Fe XVI 15.21 line and measuring its flux to account for the contribution of Fe XVI to the 15.26 flux. Deblending brings the 3C/3D ratio into good agreement with the experimental ratio; hence, we find no need to invoke resonance scattering. Low opacity in Fe XVII 15.01 also implies low opacity for Fe XV 284.2, ruling out resonance scattering as the cause of the fuzziness of TRACE and SOHO EIT 284-Angstrom images. The images must, instead, be unresolved due to the large number of structures at this temperature. Insignificant resonance scattering implies that future instruments with higher spatial resolution could resolve the active region plasma into its component loop structures.

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The Relationship Between Flux Rope Acceleration and Thermal Energy Release in a Model of Eruptive Solar Phenomena

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In this paper, we examine the relationship between the thermal energy release rate and the flux rope acceleration in a loss of equilibrium CME model. The model consists of a flux rope in equilibrium in the corona and two point sources at the chromosphere. As the point sources are brought together quasi-statically, the equilibrium state of the flux rope is disturbed, and an eruption occurs. After the eruption begins, a current sheet forms under the flux rope. The thermal energy release rate is assumed to be equal to the Poynting flux swept into the current sheet as the flux rope accelerates. We find that the flux rope acceleration and the thermal energy release rate are well correlated when the background magnetic field is high and the reconnection rate is fast. They are not well correlated for events with low magnetic fields and slow reconnection rates.

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Low-Mass and Substellar Abstracts

Seventy-One New L and T Dwarfs from the Sloan Digital Sky Survey

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We present near-infrared observations of 71 newly discovered L and T dwarfs, selected from imaging data of the Sloan Digital Sky Survey (SDSS) using the i-dropout technique. Sixty-five of these dwarfs have been classified spectroscopically according to the near-infrared L dwarf classification scheme of Geballe et al. and the unified T dwarf classification scheme of Burgasser et al. The spectral types of these dwarfs range from L3 to T7, and include the latest types yet found in the SDSS. Six of the newly identified dwarfs are classified as early- to mid-L dwarfs according to their photometric near-infrared colors, and two others are classified photometrically as M dwarfs. We also present new near-infrared spectra for five previously published SDSS L and T dwarfs, and one L dwarf and one T dwarf discovered by Burgasser et al. from the Two Micron All Sky Survey. The new SDSS sample includes 27 T dwarfs and 30 dwarfs with spectral types spanning the complex L-T transition (L7-T3). We continue to see a large (0.5 mag) spread in J-H for L3 to T1 types, and a similar spread in H-K for all dwarfs later than L3. This color dispersion is probably due to

a range of grain sedimentation properties, metallicity, and gravity. We also find L and T dwarfs with unusual colors and spectral properties that may eventually help to disentangle these effects.

Accepted by AJ

For preprints via ftp or WWW: http://xxx.lanl.gov/abs/astro-ph/0601089

Ph.D. Thesis Abstracts

Investigation of the Impulsive Phase of Solar Flares in X-ray and UV Ranges

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Ph.D dissertation directed by: Michał Tomczak

Ph.D degree awarded: December 2005

This thesis contains results of the investigation of the solar flare footpoints observed during the impulsive phase in several wavelength ranges: HXRs, SXRs, EUVs and UVs. In summary, 78 flares have been investigated. The investigation has been referred to basic properties of non-thermal electron beams and a chromosphere response to these electrons observed at different heights.The first chapter presents a short description of the impulsive phase of solar flares from observational and theoretical points. In the second chapter I present a description of instruments installed onboard *Yohkoh*, *TRACE* and *RHESSI* satellites which observations were used for the analysis.

The third chapter describes methods and results of the analysis of the impulsive SXR brightening in flare footpoints. It has been found that the impulsive SXR brightenings show similar appearance for different flares giving us a strong limitation for theoretical models. The typical impulsive SXR brightening lasts about $20-70$ s and its maximum is delayed in comparision with the HXR burst less than 80 s. The region of the SXR response has diameter of about $2''$–$8''$, its temperature is below 10 MK and the electron density is about $4-10\times10^{10}$ cm^{-3}. The detailed analysis of lightcurves made for each pixel in the particular footpoint gave a possibility to calculate velocities of the chromospheric evaporation directly from images. Obtained values falls into the interval of $130-720$ km/s.

The fourth chapter presents a quantitative analysis of SXR and HXR fluxes in flare footpoints. Several proofs have been presented which support the scenario in which the impulsive SXR reaction is caused by low-energy electrons, which do not penetrate deeply the chromosphere. Using spatially resolved fluxes we obtained a relatively high correlation between the energy deposited by non-thermal electrons and the thermal energy contained in the plasma that was heated by these electrons. The estimation of the low energy cut-off of the electron spectrum shows that it may vary from flare to flare and may even vary during a given flare. The majority of the obtained values of the cut-off energy fall within the interval of $10-22$ keV.

For the investigation of deeper chromosphere levels the *TRACE* observations of flare footpoints obtained in EUVs (171 Å) and UVs (1600 Å) have been included. Results are presented in the fifth chapter. The *TRACE* 171 Å images have been desaturated using the method based on the diffraction pattern properties. The typical impulsive EUV brightening lasts about $20-80$ s and is delayed in comparision with the HXR burst less than 30 s. For the impulsive UV brightenings these values were about $4-16$ s and less than 3 s, respectively. The quantitative analysis of EUVs and UVs with regard to HXRs was limited to the fluxes comparision only due to plasma diagnostic problems of the *TRACE* instrument. Results show that there is a good correlation between the spatially resolved EUV/UV and HXR fluxes. The correlations between the HXR photon energy and the thermal reaction observed in EUV/UV ranges clearly show that the more energetic electrons penetrate deeper into the chromosphere.

The sixth chapter presents results of the investigation of the energy - height relation for the HXR footpoint sources which is directly connected to the different depths of penetration by the electrons of different energies. Observational characteristics obtained for this relation show that the thickness of the layer in which electrons are stopped is about 1500 – 6000 km and that they can reach as deep levels as the temperature minimum region. The temporal evolution of the energy - height relation has been found giving an opportunity to estimate the velocity of the chromospheric evaporation in deeper, than for SXT observations, levels. Obtained values are less than 150 km/s.

In the last, seventh chapter, a summary is presented and a short description of the future investigation as well.

Thesis-related Publications: A&A 415, 377

Job Opening

Postdoctoral Fellowships

Solar Physics

Armagh Observatory (N. Ireland)

Applications are invited for 1–2 short-term (12 month) postdoctoral fellowships in Solar Physics to be held at Armagh Observatory beginning April 2006 as soon as possible thereafter The PDRA's work activities will be directed towards reduction/interpretation of SoHO/SUMER data and/or MHD modelling relating to various transient features.

Further information about Armagh Observatory, and in particular the current Solar Physics research programme, may be obtained by consulting the Observatory's web-site or via email to Gerry Doyle (jgd@arm.ac.uk).

The closing date for applications is 27 February 2006. Armagh Observatory have an excellent in-house computing facility plus access to super-computing facilities via the Irish Grid. Prospective applicants should obtain an application pack from the Administrator or it may be downloaded from here. The completed application form, together with a full curriculum vitae and bibliography should be sent 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 lfystar.arm.ac.uk]. Applicants are asked to ensure that references from a referee(s) familiar with the applicants research should also reach the Administrator by the same date.

Job Opening

Postdoctoral Research Associate
Solar Physics
Imperial College (U.K.)

Imperial College, Department of Physics, Astrophysics Group: Research Associate in solar atmospheric physics and irradiance variations.

A Research Associate position has become available to work on Solar Irradiance Variations within the Astrophysics Group at Imperial College London. This research position is funded by the Natural Environment Research Council as part of a consortium project on Solar Influences on Climate involving 11 institutions from the UK, Germany and the USA. For further enquiries regarding the project, please contact Dr Yvonne Unruh, Email: y.unruh@imperial.ac.uk

Your task will be the calculation of solar irradiance from solar surface images and solar proxies. This will involve the analysis of time-series data, the development of model atmospheres for different solar features the synthesis of their spectra.

You should have a PhD, preferably in astro- or solar physics, and be familiar with spectral synthesis methods. A background in computational astrophysics and/or knowledge of non-LTE methods would be particularly advantageous.

The post is available for up to three years starting from 1 June 2006, to be in post no later than 1 October 2006. Salary will be in the range 22,870 to 33,330 per annum, depending on qualifications and experience.

A job description and an application form can be obtained from the following website:
http://www.imperial.ac.uk/employment/research/index.htm

Alternatively, please contact Ms Diana Moore, Email: diana.moore@imperial.ac.uk Completed application forms including a CV, list of publications and the names of two referees should be sent to Ms Diana Moore, Astrophysics Group, Blackett Laboratory, Prince Consort Rd, Imperial College London, SW7 2AZ, UK.

Closing date: 30 April 2006

Valuing diversity and committed to equality of opportunity.

Asst. Professor (Astrophysics)

Utrecht University (Netherlands)

The Astronomical Institute is looking to expand its stellar physics group with a successful applicant who will carry out numerical simulations of stellar atmospheres that can be compared directly to observations. Experts in the fields of realistic 3-D magnetohydrodynamic and/or radiative transfer calculations of stellar photospheres, chromospheres, and coronae are particularly encouraged to apply. Research at our Institute presently covers a range of subjects: solar and stellar physics, compact objects, supernovae, star clusters, high energy processes and cosmic ray physics as well as the development of astronomical instruments. The Institute is part of the largest Department of Physics and Astronomy in the Netherlands with about 15 to 20 astronomy students per year, many of excellent quality. The faculty operates a 64-processor Linux cluster, and applicants will be able to apply for time at the Dutch supercomputer center SARA. The Institute has close ties with the adjacent SRON Laboratory for Space Research and has access to the telescopes at ESO, La Palma, JCMT and the Westerbork radiotelescopes. The Astronomical Institute is part of the Dutch Research School for Astronomy (NOVA). Terms of employment We offer a full-time tenure-track position. Gross salary will range between 2950,- and 4605,- per month, depending on qualifications and experiences, (salary scale 11 or 12) according to the Collective Employment Agreement of the Dutch Universities. The salary is supplemented with a holiday bonus of 8year-end bonus of 2addition we offer: a pension scheme, a health insurance allowance; partially paid parental leave, facilities for child care, flexible employment conditions in which you may trade salary for vacation days or vice versa. Conditions are based on the Collective Employment Agreement of the Dutch Universities. Further details Information about this position can be obtained from Prof.dr. Christoph Keller, email C.U.Keller@astro.uu.nl. More information about the Department of Physics and Astronomy can be found on http://www.phys.uu.nl. How to apply Applications, including a research statement, a current CV, a list of publications, and the names and contact information of three references should be sent to the Personnel Office, Department of Physics and Astronomy, P.O. Box 80000, 3508 TA Utrecht, the Netherlands or submit by e-mail to: p&o@phys.uu.nl. Please mention vacancy number 63517. Deadline for applications is 28 February 2006.

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.***