COOLNEWS

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Stellar Abstracts

The Active Corona of HD 35850 (F8 V)

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We present *Extreme Ultraviolet Explorer* spectroscopy and photometry of the nearby F8 V star HD 35850 (HR 1817). The *EUVE* short-wavelength 75–175 Å and medium-wavelength 160–365 Å spectra reveal 28 emission lines from Fe IX and Fe XV to Fe XXIV. The Fe XXI $\lambda\lambda 102, 129$ ratio yields an upper limit for the coronal electron density, $\log n_{\rm e} < 11.6$ cm^{-3}. The *EUVE* SW spectrum shows a small but clearly detectable continuum. The 75–150 Å line-to-continuum ratio indicates approximately solar Fe abundances, with $0.8 < Z < 1.6$ (90% confidence interval). Upper limits have been derived for a dozen high-emissivity Fe XX through Fe XIV lines. The resulting EM distribution is characterized by two broad temperature components at $\log T$ of 6.8 and 7.4. Over the course of the 1-week observation, large-amplitude, long-duration flares were not seen in the *EUVE* Deep Survey light curve, though the light curve does show signs of persistent, low-level flaring, and possible rotational modulation.

The *EUVE* spectra have been compared with non-simultaneous *ASCA* SIS spectra of HD 35850 obtained in 1995. The SPEX DEM analysis of the SIS spectrum indicate the same temperature distribution as the *EUVE* DEM analysis. However, the SIS spectra suggest sub-solar abundances, $0.34 < Z < 0.81$. Although some of the discrepancy may be the result of incomplete X-ray line lists, we cannot explain the disagreement between the *EUVE* line-to-continuum ratio and the *ASCA*-derived Fe abundance.

The X-ray surface flux on HD 35850 is comparable to that of cooler dwarfs of comparable age and rotation like EK Draconis (G0 V) and AB Doradus (K1 V). Given its youth ($t \approx 100$ Myr), its rapid rotation ($v \sin i \approx 50$ km s^{-1}), and its high X-ray activity ($L_{\rm X} \approx 1.5 \times 10^{30}$ ergs s^{-1}), HD 35850 may represent an activity extremum for single, main-sequence F-type stars. The variability and EM distribution can be reconstructed using the continuous flaring model of Güdel provided that the flare distribution has a power-law index $\alpha \approx 1.8$. Similar results obtained for

other young solar analogs suggest that continuous flaring is a viable coronal heating mechanism on rapidly rotating, late-type, main-sequence stars.

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A Search for Solar-like Oscillations and Granulation in α Cen A

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We report the most sensitive search yet made for solar-like oscillations. We observed the star α Cen A in Balmer-line equivalent widths over six nights with both the 3.9 m Anglo-Australian Telescope and the ESO 3.6 m telescope. We set an upper limit on oscillations of 1.4 times solar and found tentative evidence for p-mode oscillations. We also found a power excess at low frequencies which has the same slope and strength as the power seen from granulation in the Sun. We therefore suggest that we have made the first detection of temporal fluctuations due to granulation in a solar-like star.

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The Nature of the Circumstellar CO_2 Emission from M Giants

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The $13 - 16\mu$m region observed by the Infrared Space Observatory (ISO) of several ABG stars are discussed. We present and analyse spectra of seven M giants which show carbon dioxide features. To explain the features of the bands, we suggest they originate from two different circumstellar layers, one being a warm and high density layer close to the star, possibly making the 15μm band optically thick, and the other being a large, cold and optically thin layer extending far out in the wind. This could explain the difference in temperatures of the different bands found in the analysis of the spectra and the number of molecules needed for the emission. It is demonstrated that in spite of the bands probably not being formed in vibrational LTE, the temperatures can be estimated from the widths of the bands.

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The Origin of Carbon, Investigated by Spectral Analysis of Solar-type Stars in the Galactic Disk

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Abundance analysis of carbon has been performed in a sample of 80 late F and early G type dwarf stars in the metallicity range $-1.06 \leq [Fe/H] \leq 0.26$ using the forbidden [C I] line at 8727Å. This line is presumably less sensitive to temperature, atmospheric structure and departures from LTE than alternative carbon criteria. We find that [C/Fe] decreases slowly with increasing [Fe/H] with an overall slope of -0.17 $\pm$ 0.03. Our results are consistent with carbon enrichment by superwinds of metal-rich massive stars but inconsistent with a main origin of carbon in low-mass stars. This follows in particular from a comparison between the relation of [C/O] with metallicity for the Galactic stars and the corresponding relation observed for dwarf irregular galaxies. The significance of intermediate-mass stars for the production of carbon in the Galaxy is still somewhat unclear.

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X-ray Spectroscopy of the Active dM Stars: AD Leo and EV Lac

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We present results of an analysis of new observations of the active M dwarfs AD Leo (GJ 388) and EV Lac (GJ 873), performed with the X-ray satellite SAX, and compare them with both published and new analyses of ROSAT PSPC observations of these stars. The PSPC spectra can be fitted with one- (EV Lac) or two-component (AD Leo) isothermal MEKAL models, and very low metallicity ($\sim$ 0.1 solar); we have found clear evidence of spectral variations in correspondence of a large flare observed during one of the PSPC observations of EV Lac, requiring the addition of a second component with log T $\sim$ 7.5 to fit the flare spectrum. The SAX light-curves of AD Leo and EV Lac also show the occurrence of several flares. A two-component model does not provide an adequate fit of the SAX spectra, regardless of the value of coronal metallicity. These spectra require at least three thermal MEKAL components and best-fit coronal plasma metallicity below solar for AD Leo and only marginally below solar for EV Lac, with 90% confidence ranges on $Z/Z_\odot$ = 0.22-0.35 and 0.36-1.11, respectively.

We have also fitted the SAX spectra of AD Leo and EV Lac with model spectra from constant cross-section static coronal loops. One-loop models fail to fit the observed spectra. A second loop component, that accounts for most of the plasma emission at high energy, is required to obtain a fit of statistical quality just slightly worse than the 3-T fits. In the case of EV Lac both the 2-loop and the 3-T fits are unable to reproduce the observed emission below 0.5 keV. The available evidence points toward the existence of various (at least two) main classes of coronal emitting structures: the dominant one is composed of hundreds of compact loops, with relatively low maximum temperature and length smaller than 0.1 the stellar radius, covering no more than 1% of stellar surface; the second class, responsible for the high energy emission, is composed at least of tens of quite elongated loops, covering a very small fraction of stellar surface. We find no-evidence of loops with length comparable to the stellar radius.

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Modelling the Spectral Energy Distribution and SED Variability of the Carbon Mira R Fornacis

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We have developed a new method to determine the physical properties and the local circumstances of dust shells surrounding Carbon- and Oxygen-rich stars for a given pulsation phase. The observed mid-IR dust emission feature(s), in conjunction with *IRAS* BB photometry and coeval optical and near-IR BB photometry, are modelled from radiative transport calculations through the dust shell using a grid of detailed synthetic model input spectra for M-S-C giants. From its application to the optical Carbon Mira R For we find that the temperature of the inner shell boundary exceeds 1000 K, ranging between 1200 K and 1400 K. The optical depth of the shell at 11.3 μm is determined at $\tau_{11\mu m}$=0.105 with $T_{\rm eff}$=3200±200 K for the central star in the considered phase of variability. By-products of the analysis are the shell composition of 90% amorphous carbon and only 10% SiC grains with rather small average radii of 0.05±0.02 μm. The dust density distribution assumes a power law of r^{-2} for a steady-state wind with a geometrical thickness

ranging between 10^4 and $5\,10^4$ times the inner boundary shell radius and with a high gas mass-loss rate of 3-4 10^{-6} $M_\odot\,\mathrm{y}^{-1}$ derived by radiation pressure onto the dust. We show that the optical and near-IR light curves are strongly affected by small changes of $T_{\rm eff}$ and of the shell optical depth with pulsation. A comparison of high resolution optical spectra of R For and medium/low resolution spectra of other carbon stars with the selected model input spectrum is also provided.

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Lifetime of Surface Features and Stellar Rotation: A Wavelet Time-Frequency Approach

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We explore subtle variations in disk-integrated measurements spanning $\lesssim$ 18 years of stellar surface magnetism by using a newly developed time-frequency gapped wavelet algorithm. We present results based on analysis of the Mount Wilson Ca II H and K emission fluxes in four, magnetically-active stars (HD 1835 [G2V], 82885 [G8IV-V], 149661 [K0V] and 190007 [K4V]) and sensitivity tests using artificial data.

When the wavelet basis is appropriately modified (i.e., when the time-frequency resolution is optimized), the results are consistent with the existence of spatially localized and long-lived Ca II features (assumed here as activity regions that tend to recur in narrowly-confined latitude bands), especially in HD 1835 and 82885. This interpretation is based on the observed persistence of relatively localized Ca II wavelet power at a narrow range of rotational time scales, enduring as long as $\gtrsim$ 10 years.

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The ROSAT All-sky Survey of the Nearby Stars

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We present X-ray data for all entries of the Third Catalogue of Nearby Stars (Gliese and Jahreiß 1991) that have been detected as X-ray sources in the ROSAT all-sky survey. The catalogue contains 1252 entries yielding an average detection rate of 32.9 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.

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Optical and UV Observations of a Strong Flare in the Young, Single K2-dwarf LQ Hya

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We present high resolution optical echelle spectra and IUE observations during a strong flare on 1993 December 22 in the very active, young, rapidly rotating, single K2 dwarf LQ Hya. The initial impulsive phase of the flare, which started sometime between 2:42 UT and 4:07 UT, was characterized by strong optical continuum enhancement and blue-shifted emission lines with broad wings. The optical chromospheric lines reached their maximum intensity at ≈5:31 UT, by which time the blue-shift vanished and the optical continuum enhancement had sharply decreased. Thereafter, the line emission slowly decreased and the lines red-shift in a gradual phase that lasted at least two more hours. The Mg II lines behaved similarly. Quiescent C IV flux levels were not recovered until 21 hours later, though a data gap and a possible second flare make the interpretation uncertain. In addition to the typically flare-enhanced emission lines (e.g., Hα and Hβ), we observe He I D_3 going into emission, plus excess emission (after subtraction of the quiescent spectrum) in other He I and several strong neutral metal lines (e.g., Mg I b). Flare enhancement of the far UV continuum generally agrees with a Si I recombination model. We estimate the total flare energy, and discuss the broad components, asymmetries, and Doppler shifts seen in some of the emission lines.

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New Neighbours. I. 13 New Companions to Nearby M Dwarfs

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We present preliminary results of a long-term radial-velocity search for companions to nearby M dwarfs, started in September 95. The observed sample is volume-limited, and defined by the 127 northern ($\delta > -16°$) M dwarfs listed in the Gliese and Jahreiss (CNS3) catalogue with d≤9pc and V≤15. Observations are obtained with the ELODIE spectrograph on the 1.93-m telescope of the Observatoire de Haute-Provence. The typical accuracy ranges between 10 m s^{-1} (the instrumental stability limit) for the brighter stars and 70 m s^{-1} at our limiting magnitude. We complement the ELODIE velocities with older measurements extracted from the CORAVEL database to extend our time base, albeit obviously with lower precision. Simultaneously, we perform adaptive optics imaging at CFHT and ESO to look for close (a >0.05-0.1") visual companions in a larger volume-limited sample. For stellar companions the two techniques together cover the full separation range, to beyond the limiting distance of the sample. We will therefore eventually obtain a statistically meaningful inventory of the stellar multiplicity of nearby M-dwarf systems. We also have useful sensitivity to giant planets, as illustrated by our recent detection of a planetary companion to Gl 876.

After 2.5 years, we have discovered 12 previously unknown components in this 127 stars sample, plus a companion to an additional star beyond its southern declination limit. 7 of these are actually beyond the 9 pc limit, as they belong to systems included in the sample on the basis of CNS3 photometric parallaxes which were biased-down by the unrecognized companion. The remaining 5 companions are true additions to the 9 pc inventory. More are certainly forthcoming, given our present selection bias towards short periods and relatively massive companions.

We have derived orbital elements for 7 of the new systems, as well as for some known binaries with previously undetermined orbits. One system, G 203-47, associates an M3.5V star with a white dwarf in a rather tight orbit ($a_1 \sin i \;=\; 15\,R_\odot$) and represents a Post-Common-Envelope system. Some of the new M-dwarf binaries will over the next few years provide very precise mass determinations, and will thus better constrain the still poorly determined lower main-sequence mass-luminosity relation. The first such results are now being obtained, with some preliminary accuracies that range between 2% at 0.4-0.6 $M_\odot$ and 10% at 0.1 $M_\odot$. We have also discovered the third known detached M-dwarf eclipsing binary, and determined its masses with 0.4% accuracy.

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Solar Abstracts

Solar Oscillations and Convection: II. Excitation of Radial Oscillations

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Solar p-mode oscillations are excited by stochastic, non-adiabatic gas pressure fluctuations, which are produced by small instantaneous local imbalances between the divergence of the radiative and conductive fluxes near the solar surface. We evaluate the expression for the radial mode excitation rate derived by Nordlund and Stein (1998) using numerical simulations of near surface solar convection. Excitation occurs mainly in the intergranular lanes and near the boundaries of granules. The frequency dependence of the mode excitation is due to effects of the mode structure and the pressure fluctuation spectrum. Excitation is small at low frequencies due to mode properties – the mode compression decreases and the mode mass increases at low frequency. Excitation is small at high frequencies due to the pressure fluctuation spectrum – pressure fluctuations become small at high frequencies because they are due to convection which is a long time scale phenomena compared to the dominant p-mode frequencies.

Submitted to ApJ

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Photospheric Magnetic Reconnection and Canceling Magnetic Features on the Sun

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Parameters describing quasisteady reconnecting current sheets in the plasma of the solar photosphere and chromosphere are computed using the VAL–C atmospheric model. In particular, the inflow speed for the Sweet–Parker magnetic reconnection is found for a sheet whose width is determined by the density scale height. The resulting speed of several tens of meters per second corresponds closely to the speeds implied by observations of canceling magnetic features on the Sun. This and other arguments support photospheric magnetic reconnection as the cancellation mechanism. The reconnection process should be most efficient around the temperature minimum region about 600 km above the lower photospheric boundary.

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Magnetic and Radiative Variability of Solar Surface Structures: I. Image Decomposition and Magnetic-Intensity Mapping

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In order to specify quantitatively the contributions to irradiance variability by specific types of solar surface structure, we analyzed full-disk magnetograms and CaII K images from the NSO and BBSO for two sets of several days in early 1992 and mid-1993. These test days were chosen at maxima and minima of the rotational modulation in the Ly-α irradiance from the UARS/SOLSTICE spectrometer. For the eight days, we isolated Active Regions, Decaying Active Regions, Enhanced Network, Network, and the Quiet Atmosphere based on their magnetic flux strength and distribution, filling factor, and association with sunspots. Transfer of these image decompositions to CaII K images gives magnetic flux vs intensity ($|B|$ *vs* δK) relationships for four structures with measurable magnetic flux. In the range from 30 to 400 Mx/cm^2, these log-log curves are linear with a slope of 0.5, which suggests that the CaII K residual intensity is proportional to the half power of the magnetic flux density. The separation into quiet and active Sun structures gives a prediction of the variation of the $|B|$ *vs* δK relation for the ensemble of our four principal structures from minimum to maximum in the activity cycle of the Sun viewed as a Star.

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Sunspot Transition Region Oscillations in NOAA 8156

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Based on observations obtained with the *Solar and Heliospheric Observatory - SOHO* joint observing program for velocity fields in sunspot regions, we have detected 3 min transition region umbral oscillations in NOAA 8156. Simultaneous recordings of O v λ629 and N v λ1238, λ1242 with the SUMER instrument give the spatial distribution of power in the 3 min oscillations, both in intensity and line-of-sight velocity. Comparing loci with the same phase we find that the entire umbral transition region oscillates. The observed maxima in peak line intensity are nearly in phase with the maxima in velocity directed towards the observer. We discuss the suggestion that the waves are upward propagating acoustic waves.

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Upwelling in a Young Sunspot

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An upflow with a velocity exceeding 0.5 km$\cdot$s^{-1} is found in the umbra of the preceding spot in a young active region with ongoing flux emergence. A weak downflow is indicated in the corresponding spot of follower polarity. Such a flow pattern is consistent with the counter-rotation flow along a rising magnetic flux loop driven by the Coriolis force as predicted by numerical simulations.

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The O V 1213.9 A Forbidden Line in the Quiet Sun

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We present the first unambiguous detection of the O v 1213.9 Å ($2s^2\ ^1S_0 \rightarrow 2s2p\ ^3P_2$) forbidden line in the solar spectrum, using observations obtained with the SUMER instrument on board SOHO. The wavelength separation of the forbidden to the ($2s^2\ ^1S_0 \rightarrow 2s2p\ ^3P_1$) intercombination line at 1218.35 Å is 4.5$\pm$0.1 Å in excellent agreement with theoretical predictions. The observed line ratio, combined with the latest calculations, allows us to derive an electron density of $\log N_e/\mathrm{cm}^{-3} = 8.5 \pm 0.15$ for the quiet Sun. However, the O v 1213.9 Å line was not detected in the *HST* spectra of Procyon and we can only place a lower limit of $\log N_e/\mathrm{cm}^{-3} \geq 7.8$ to the electron density in this object.

A& A, 340, L15 – L17

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Dynamics of the Solar Chromosphere. II. Ca II H_{2V} and K_{2V} Grains versus Internetwork Fields

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We use the Advanced Stokes Polarimeter at the NSO/Sacramento Peak Vacuum Tower Telescope to search for spatio-temporal correlations between enhanced magnetic fields in the quiet solar internetwork photosphere and the occurrence of Ca II H_{2V} grains in the overlying chromosphere. We address the question of whether the shocks that produce the latter are caused by magnetism-related processes, or whether they are of purely hydrodynamic nature. The observations presented here are the first in which sensitive Stokes polarimetry is combined synchronously with high-resolution Ca II H spectrometry. We pay particular attention to the nature and significance of weak polarization signals from the internetwork domain, obtaining a robust estimate of our magnetographic noise level at an apparent flux density of only 3 $\mathrm{Mx\,cm^{-2}}$. For the quiet Sun internetwork area analyzed here, we find no direct correlation between the presence of magnetic features with apparent flux density above this limit and the occurrence of H_{2V} brightenings. This result contradicts the one-to-one correspondence claimed by Sivaraman & Livingston (1982). We also find no correspondence between H_{2V} grains and the horizontal-field internetwork features discovered by Lites et al. (1996).

Accepted by ApJ

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Searching for Weather in Brown Dwarfs

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We have used an innovative tuneable filter technique to carry out a search for the variability signatures of meterological processes in the atmospheres of two nearby brown dwarfs. We find no evidence for variability in the L-type brown dwarf DENIS-P J1228-1547 in an observations spanning approximately half a rotation period (3 hours), and evidence for variability in the M-type brown dwarf LP 944-20 in multiple observations spanning approximately one third of a rotation period (1.5 hours).

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Ph.D. Thesis Abstract

3D Modeling of Solar Convection and Atmosphere Dynamics

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Ph.D dissertation directed by: Mats Carlsson

Ph.D degree awarded: October 1998

Results from non-magnetic numerical 3D simulations of the solar atmosphere and the convection zone below are presented. I find that transient acoustic wave trains in the atmosphere are excited by smaller granular cells that undergo a rapid collapse in the sense that upflow is reversed to downflow on a timescale shorter than the atmospheric acoustic cutoff period. An extended downdraft between larger cells is formed at the site of the collapse.

The main wave excitation sources are found at the top of the convective layer (the cooling layer) and immediately above in the convective overshoot layer. The excitation lasts for 2-3 minutes as the upflow in the granule reverses to downflow.

The following vertical wave components are long wavelength, gravity modified acoustic waves with periods close to the 3 minute eigenoscillation of the solar atmosphere. These waves shock at chromospheric layers. The oscillation is initially horizontally localized with a size of about 1 Mm. The wave amplitude decay in time as energy is transported horizontally and vertically away from the site of the event. This is the only convectively generated wave source I find that shows a clear correlation to large scale atmospheric wave motions.

Observed darkening of intergranular lanes and the associated photospheric wave motions, the so called "acoustic events" could be explained by this purely hydrodynamical process. Furthermore, the observed "internetwork bright grains" in the CaII H and K line cores and associated shock wave trains in the chromosphere can also be linked to this wave train.

The simulation is an extended Nordlund and Stein model of solar convection, so as to include the chromosphere. A large part of the work has been spent on developing a new method for calculating radiative flux divergence in the simulation, in which I treat photon scattering in atmospheric layers. The previous NS-model used the Planck function as source function, while the improved method includes a scattering term, which introduces a global radiation problem, requiring an iterative solution at each timestep in the simulation.

By assuming opacity in LTE and coherent isotropic scattering, I calculate group mean opacity coefficients to be used in a group mean source function. This source function contains an approximate scattering term and an exact contribution from thermal emissivity.

The resulting three dimensional scattering problems are solved by iteration using a new method based on a one-ray approximation in the angle integral for the mean intensity. The equations to be iterated are tri-diagonal matrix equations which require a minimum of computer time.

I have compared exact wavelength integrated monochromatic solutions with the corresponding approximate group mean solutions for solar conditions. I find that the total flux divergence obtained from groups deviates with less than 10 % from the exact solution. Flux divergence in individual groups can deviate with typically 30 % in atmospheric layers. When using these groups, the CPU time is reduced by a factor of about 100 in a test case for solar conditions.

The main difference for the atmospheric dynamics between LTE and scattering solutions, is that the wave amplitudes in the chromosphere are larger with scattering. This is because the radiative damping is smaller than in LTE for a given wave amplitude. The convection dynamics and therefore the convective wave sources are almost unaltered, since the radiative cooling that drives the convection is mainly unchanged. Collapsing granules is therefore also expected in LTE, but the chromospheric response would be of smaller amplitude, and the shock train would form at higher altitudes.

Announcement (New Telescope Proposal)

MONS: Measuring Oscillations in Nearby Stars

We are proposing a space telescope for asteroseismology, as part of the Danish Small Satellite Programme. The proposal, which will be submitted on 1 February 1999, is for a 30-cm telescope that will perform CCD photometry on bright nearby stars. The primary aim is to measure oscillations in solar-like stars, with secondary targets being δ Scuti stars, roAp stars and other types of 'classical' variables.

For more information about the MONS project, see:
`http://www.obs.aau.dk/~hans/mons`

In particular, we have produced a two-page Mission Outline:
`http://www.obs.aau.dk/~hans/mons/summary.ps`

To help our case, we are seeking letters of support from individuals and institutes interested in the scientific program. For details on the type of letter that we have in mind, see:

`http://www.obs.aau.dk/~hans/mons/support_request.txt`

Please don't hesitate to contact us with any questions and comments. In the first instance, please contact Tim Bedding (`bedding@physics.usyd.edu.au`).

Job Announcement

Postdoctoral Position
Monash University (Australia)

A Postdoctoral position is available with the Astrophysics Group at Monash University, Australia. The successful candidate will join an active group working on stellar evolution and nucleosynthesis, with particular emphasis on AGB stars. Salary is within the range $AUD 41,993 to $AUD 45,076. Relocation expenses may be available, including air-fare. The position is of 2 years duration.

Detailed information can be found at

http://www.maths.monash.edu.au/~johnl/Astro/job.html/

For any queries please send email to John Lattanzio at *johnl@flash.maths.monash.edu.au*

Applications close on Dec 31 1998, and must include a CV, a list of publications, a statement of research interests and experience and at least three letters of recommendation. All should be sent to

Dr John Lattanzio
Dept of Mathematics and Statistics
Monash University
Clayton
Victoria 3168
Australia

Job Announcement

POSTDOCTORAL POSITION

Centre for Astrophysics
University of Porto - Portugal

CAUP accepts candidates for **one post-doctoral position in Stellar Astrophysics**, namely in areas of stellar evolution and activity, circumstellar medium and young objects, astro-tomography and inversion techniques, helio and astero-seismology. Priority will be given to candidates with experience in multi-wavelength observations.

The position is for one year with possible extension up to three years, and is expected to start in **February 1999**. The deadline for applications is the **20th of December 1998**. The monthly salary is 270.000$00 (PTE) after taxes.

Applicants should forward a curriculum vitae, list of publications, a brief description of past experience and of research interests, a proposal for future research projects at **CAUP** as well as the name/address of three referees.

Inquiries about the positions and CAUP can be directed to

Prof M.T.V.T. Lago (mtlago@astro.up.pt)
Centro de Astrofísica
Universidade do Porto
Rua das Estrelas s/n
P-4150 Porto, PORTUGAL
Fax 351-2-6089831

For more information see also "**http://www.astro.up.pt/**".

Job Announcement

Scientific Staff Position (AAVSO)

The American Association of Variable Star Observers (AAVSO) invites applications from astronomers for a scientific staff position, to assist in the management of scientific activities and conduct research at AAVSO Headquarters in Cambridge, Massachusetts, USA. Ongoing projects include support for space missions and ground-based observing programs, scientific collaborations with other astronomical organizations worldwide, and analysis of variable star data. Resources for research include the AAVSO International Database containing over 9 million variable star observations going back nearly a century. Initial appointment is for a term of 1-3 years. Full benefits package is provided. Minimum requirements include Ph.D. in astronomy or astrophysics and experience in analyzing astronomical data.

Applicants should send (or fax - 617 354 0665) a letter of application, list of research interests, a CV, and three letters of recommendation to Dr. Janet A. Mattei, Director, AAVSO, 25 Birch Street, Cambridge, MA 02138, USA. Applications will be considered until February 15, 1999 or until the position is filled. AAVSO is a small, scientific and non-profit organization and an equal opportunity employer.

Visit http://www.aavso.org for a description of the organization and its activities.

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` .