COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

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Stellar Abstracts

Further Results of TiO-band Observations of Starspots

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We present measurement of starspot parameters (temperature and filling factor) on five highly active stars, using absorption bands of TiO, from observations made between 1998 March and 2001 December. We determined starspot parameters by fitting TiO bands using spectra of inactive G and K stars as proxies for the unspotted photospheres of the active stars, and spectra of M stars as proxies for the spots. For three evolved RS CVn systems, we find spot filling factors between 0.28 and 0.42 for DM UMa, 0.22 and 0.40 for IN Vir, and 0.31 and 0.35 for XX Tri; these values are similar to those found by other investigators using photometry and Doppler imaging. Among active dwarfs, we measured a lower spot temperature (3350 K) for EQ Vir than found in a previous study of TiO bands, and for EK Dra, a lower spot temperature (≈3800 K) than found through photometry. For all these active stars but XX Tri, we achieved good phase coverage throughout a stellar rotational period. We also present our final, extensive grid of spot and non-spot proxy stars.

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Oscillation Frequencies and Mode Lifetimes in α Centauri A

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We analyse our recently-published velocity measurements of α Cen A (Butler et al. 2004). After adjusting the weights on a night-by-night basis in order to optimize the window function to minimize sidelobes, we extract 42 oscillation frequencies with $l = 0$–3 and measure the large and small frequency separations. We give fitted relations to these frequencies that can be compared with theoretical models and conclude that the observed scatter about these fits is due to the finite lifetimes of the oscillation modes. We estimate the mode lifetimes to be 1–2 d, substantially shorter than in the Sun.

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For preprints via ftp or WWW: http://arXiv.org/abs/astro-ph/0406471

X-ray Properties of Pre–Main-Sequence Stars in the Orion Nebula Cluster with Known Rotation Periods

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We re-analyze all archival *Chandra/ACIS* observations of the Orion Nebula Cluster (ONC) to study the X-ray properties of a large sample of pre–main-sequence (PMS) stars with optically determined rotation periods. Our goal is to elucidate the origins of X-rays in PMS stars by seeking out connections between the X-rays and the mechanisms most likely driving their production—rotation and accretion. Stars in our sample have L_X/L_{bol} near, but below, the "saturation" value of 10^{-3}. In addition, in this sample X-ray luminosity is significantly correlated with stellar rotation, in the sense of *decreasing* L_X/L_{bol} with more rapid rotation. These findings suggest that stars with optical rotation periods are in the "super-saturated" regime of the rotation-activity relationship, consistent with their Rossby numbers. However, we also find that stars with optical rotation periods are significantly biased to high L_X. This is not the result of magnitude bias in the optical rotation-period sample but rather to the diminishingly small amplitude of optical variations in stars with low L_X. Evidently, there exists in the ONC a population of stars whose rotation periods are unknown and that possess lower average X-ray luminosities than those of stars with known rotation periods. These stars may sample the linear regime of the rotation-activity relationship. Accretion also manifests itself in X-rays, though in a somewhat counterintuitive fashion: While stars with spectroscopic signatures of accretionshow *harder* X-ray spectra than non-accretors, they show *lower* X-ray luminosities and no enhancement of X-ray variability. We interpret these findings in terms of a common origin for the X-ray emission observed from both accreting and non-accreting stars, with the X-rays from accreting stars simply being attenuated by magnetospheric accretion columns. This suggests that X-rays from PMS stars have their origins primarily in chromospheres, not accretion.

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The Chandra Deep Field-North Survey: XVII. Evolution of Magnetic Activity in Old Late-type Stars

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The extremely sensitive Chandra Deep Field-North (CDF-N) pencil-beam X-ray survey is used to identify and characterize the X-ray emission from old high-latitude main sequence Galactic stars. Our principal goal is to investigate the expected long-term decay of magnetic activity of late-type stars due to the gradual spindown of stellar rotation from a magnetized stellar wind.

Thirteen X-ray sources are associated with late-type stars; 11 of these constitute a well-defined sample for statistical analysis. This sample consists of 2 G, 2 K0−K4, and 7 M2−M5 stars with median V-band magnitude around 19 and median distance around 300 pc. X-ray luminosities are typically $\log L_x \simeq 27$ erg s^{-1} but are substantially higher in two cases. The combination of large-amplitude variations on timescales of hours and plasma temperatures around $5 - 30$ MK indicates that the observed X-ray emission is dominated by magnetic reconnection flares rather than quiescent coronal emission. These X-ray properties are quantitatively similar to those seen in the active contemporary Sun.

The CDF-N stellar sample is compared to simulations based on convolution of X-ray luminosity functions (XLFs) with the known spatial distribution of old disk stars. The model indicates that the CDF-N stars are the most magnetically active old disk stars. A substantial decline in X-ray luminosities over the $1 < t < 11$ Gyr age interval is required: 39 rather than 11 stars should have been detected if the XLF does not evolve over this time interval. This is the first demonstration that the coronal and flaring components of stellar magnetic activity – and presumably the interior magnetic dynamos responsible for the reconnecting fields at the stellar surface – exhibit long-term decay over the age of the Galactic disk. The model that best fits the magnitudes, spectral types and X-ray luminosities of the sample has $L_x \propto t^{-2}$ erg s^{-1} which is faster than the t^{-1} decay rate predicted from widely accepted rotational spindown rates and X-ray-activity relations.

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Do We Know of Any Maunder Minimum Stars?

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Most stars previously identified as Maunder minimum stars are old stars evolved off of the main sequence. Analysis of activity measurements from the California and Carnegie Planet Search program stars and Hipparcos parallaxes implies that the canonical age-chromospheric activity relation breaks down for stars older than 6 Gyr when activity is calculated from Mount Wilson S values. Stars only 1 magnitude above the main sequence exhibit significantly suppressed activity levels which have been mistaken for examples of Maunder minimum behavior.

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The Photospheric Abundances of Active Binaries III. Abundance Peculiarities at High Activity Levels

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We report the determination from high-resolution spectra of the atmospheric parameters and abundances of 13 chemical species (among which lithium) in 8 single-lined active binaries. These data are combined with our previous results for 6 other RS CVn systems to examine a possible relationship between the photospheric abundance patterns and the stellar activity level. The stars analyzed are generally found to exhibit peculiar abundance ratios compared to inactive, galactic disk stars of similar metallicities. We argue that this behaviour is unlikely to be an artefact of errors in the determination of the atmospheric parameters or non-standard mixing processes along the red giant branch, but diagnoses instead the combined action of various physical processes related to activity. The most promising candidates are cool spot groups covering a very substantial fraction of the stellar photosphere or NLTE effects arising from nonthermal excitation. However, we cannot exclude the possibility that more general shortcomings in our understanding of K-type stars (e.g. inadequacies in the atmospheric models) also play a significant role. Lastly, we call attention to the unreliability of the $(V-R)$ and $(V-I)$ colour indices as temperature indicators in chromospherically active stars.

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Beryllium Anomalies in Solar-type Field Stars

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We present a study of beryllium (Be) abundances in a large sample of field solar-type dwarfs and sub-giants spanning a large range of effective temperatures. The Be abundances, computed using a very uniform set of stellar parameters and near-UV spectra obtained with 3 different instruments, are used to study the depletion of this light element. The analysis shows that Be is severely depleted for F stars, as expected by the light-element depletion models. However, we also show that Beryllium abundances decrease with decreasing temperature for stars cooler than $\sim$6000 K, a result that cannot be explained by current theoretical models including rotational mixing, but that is, at least in part, expected from the models that take into account internal wave physics. In particular, the light element abundances of the coolest and youngest stars in our sample suggest that Be, as well as lithium (Li), has been already burned early during their evolution. Furthermore, we find strong evidence for the existence of a Be-gap for solar-temperature stars. The analysis of Li and Be abundances in the sub-giants of our sample also shows the presence of one case that has still detectable amounts of Li, while Be is severely depleted. Finally, we compare the derived Be abundances with Li abundances derived using the same set of stellar parameters. This gives us the possibility to explore the temperatures for which the onset of Li and Be depletion occurs.

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Subgiants as Probes of Galactic Chemical Evolution

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Chemical abundances for 23 candidate subgiant stars have been derived with the aim at exploring their usefulness for studies of galactic chemical evolution. High-resolution spectra from ESO CAT-CES and NOT-SOFIN covered 16 different spectral regions in the visible part of the spectrum. Some 200 different atomic and molecular spectral lines have been used for abundance analysis of $\sim$ 30 elemental species. The wings of strong, pressure-broadened metal lines were used for determination of stellar surface gravities, which have been compared with gravities derived from Hipparcos parallaxes and isochronic masses. Stellar space velocities have been derived from Hipparcos and Simbad data, and ages and masses were derived with recent isochrones. Only 12 of the stars turned out to be subgiants, i.e. on the "horizontal" part of the evolutionary track between the dwarf- and the giant stages. The abundances derived for the subgiants correspond closely to those of dwarf stars. With the possible exceptions of lithium and carbon we find that subgiant stars show no "chemical" traces of post-main-sequence evolution and that they are therefore very useful targets for studies of galactic chemical evolution.

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Non-thermal Mg I Emission at 12 μm from Procyon

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We report on stellar Mg I emission at 12 μm from α CMi (Procyon), a star slightly hotter than the Sun. Solar Mg I emission is well-known and its formation was successfully explained in detail by Carlsson et al. (1992). Here, for the first time, we compare synthetic spectra of the emission lines at 12 μm with observations of a star other than the Sun. The use of these lines as stellar diagnostics has been anticipated for 10 years or more. We find that the model reproduces the observed emission in Procyon quite well. We expect that high-resolution spectrographs on $8 - 10$ m telescopes will finally be able to exploit these new diagnostics.

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V1647 Ori (IRAS 05436-0007) in Outburst: The First Three Months

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We report on photometric (BVRIJHK) and low dispersion spectroscopic observations of V1647 Ori, the star that drives McNeil's Nebula, between 10 February and 7 May 2004. The star is photometrically variable atop a general decline in brightness of about 0.3-0.4 magnitudes during these 87 days. The spectra are featureless, aside from Hα and the Ca II infrared triplet in emission, and a Na I D absorption feature. The Ca II triplet line ratios are typical of young stellar objects. The Hα equivalent width may be modulated on a period of about 60 days. The post-outburst extinction appears to be less than 7 mag. The data are suggestive of an FU Orionis-like event, but further monitoring will be needed to definitively characterize the outburst.

Accepted by AJ

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Solar Abstracts

New Views of the Solar Wind with the Lambert W Function

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This paper presents closed-form analytic solutions to two illustrative problems in solar physics that have been considered not solvable in this way previously. Both the outflow speed and the mass loss rate of the solar wind of plasma particles ejected by the Sun are derived analytically for certain illustrative approximations. The calculated radial dependence of the flow speed applies to both Parker's isothermal solar wind equation and Bondi's equation of spherical accretion. These problems involve the solution of transcendental equations containing products of variables and their logarithms. Such equations appear in many fields of physics and are solvable by use of the Lambert W function, which is briefly described. This paper is an example of how new functions can be applied to existing problems.

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Evaluation of the Short-Term Periodicities in the Flare Index Between the Years 1966-2002

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The short-term periodicities of the flare index are investigated in detail using Fourier and wavelet transforms for the full-disc and for the northern and the southern hemispheres of the Sun separately over the epoch of almost 4 cycles (1966-2002). The most pronounced power peaks were found by the Fourier transform to be present at 25.6, 27.0, 30.2, and 33.8 days. The wavelet transform results show that the occurence of periodicities of flare index power is highly intermittent in time. A comparison of the results of the Fourier transform and the time-period wavelet transform of the flare index time series has clarified the importance of different periodicities, whether they are or are not the harmonics of the basic ones, as well as the temporal location of their occurrence. Because we found that the modulation of the flare index due to the 27-day solar rotation is more pronounced during the declining portion of solar cycle than during the rising portion.

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Multiband Modelling of the Sun as a Variable Star from VIRGO/SoHO Data

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The time series of total solar irradiance (TSI) and optical spectral irradiance at 402, 500 and 862 nm (SSIs) obtained by the VIRGO experiment on board the satellite SoHO are analysed in order to model their variability in the framework of a purely stellar-like approach. The different time scales of variability are estimated by means of the pooled variance method revealing the growth and decay of sunspots and faculae in active regions, as well as their rotationally modulated visibility. The determination of the rotation period of the Sun from the time modulation of the TSI and SSIs is made difficult by the short lifetimes of photospheric brightness inhomogeneities in comparison to the rotation period. Only during the phases with the lowest level of activity of solar cycle 23, when the variability is dominated by long-lived faculae, is it possible to determine the truly solar synodic period. The simultaneous modelling of the rotational modulation of the TSI and SSIs can be performed by means of a simple stellar-like approach which extends the model we previously applied to the TSI modulation alone (Lanza et al. 2003). Our model yields residuals about 20-30 times smaller than the amplitudes of the TSI and SSI variations in all the phases of the 11-yr activity cycle. The determination of the model parameters, including the temperature of the surface brightness inhomogeneities and the trade-off among them are discussed and compared with the results obtained with different modelling approaches. The advantages and the drawbacks of applying the model to other stars are also considered.

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The Coronal Heating Mechanism as Identified by Full-Sun Visualizations

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We constrain the properties of the mechanism(s) responsible for the bulk of the heating of the corona of the Sun by simulating, for the first time, the appearance of the entire solar corona. Starting from full-sphere magnetic field maps for 1 and 8 December 2000, when the Sun was moderately active, we populate nearly 50,000 coronal field lines with quasi-static loop atmospheres. These atmospheres are based on heating flux densities $F_{\rm H}$ that depend in different ways on the loop half length L, on the field strength B at the chromospheric base, on the loop expansion with height, and on the heating scale height. The best match to X-ray and EUV observations of the corona over active regions and their environs is found for $F_{\rm H} \approx 4 \times 10^{14} B^{1.0\pm0.3}/L^{1.0\pm0.5}$ (in erg/cm^2/s, for B in Mx/cm^2 and L in cm), while allowing for substantial loop expansion with increasing height, and for a heating scale height that is at least a sizeable fraction of the loop length. This scaling for coronal heating points to DC reconnection at tangential discontinuities as the most likely coronal heating mechanism, provided that the reconnection progresses proportional to the Alfvén velocity. The best-fit coronal filling factor equals unity, suggesting that most of the corona is heated most of the time. We find evidence that loops with half lengths exceeding $\sim 100,000$ km are heated significantly more than suggested by the above scaling, possibly commensurate with the power deposited in the open field of coronal holes.

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Low-Mass and Substellar Abstracts

Simultaneous *Chandra* and *VLA* Observations of Young Stars and Protostars in ρ Ophiuchus Cloud Core A

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A 96-ks *Chandra* X-ray observation of ρ Ophiuchus cloud core A detected 87 sources, of which 60 were identified with counterparts at other wavelengths. The X-ray detections include 12 of 14 known classical T Tauri stars (CTTS) in the field, 15 of 17 known weak-lined TTS (WTTS), and 4 of 15 brown dwarf candidates. The X-ray detections are characterized by hard, heavily absorbed emission. Most X-ray detections have visual extinctions in the range $A_V \approx$ 10 - 20 mag, but several sources with visual absorptions as high as $A_V \approx$ 40 - 56 mag were detected. The mean photon energy of a typical source is $\langle E \rangle \approx 3$ keV, and more than half of the detections are variable. Prominent X-ray flares were detected in the unusual close binary system Oph S1, the X-ray bright WTTS DoAr 21, and the brown

dwarf candidate GY 31 (M5.5). Time-resolved spectroscopic analysis of the DoAr 21 flare clearly reveals a sequence of secondary flares during the decay phase which may have reheated the plasma. We find that the X-ray luminosity distributions and spectral hardnesses of CTTS and WTTS are similar. We also conclude that the X-ray emission of detected brown-dwarf candidates is less luminous than T Tauri stars, but spectroscopically similar.

Simultaneous multifrequency *VLA* observations detected 31 radio sources at 6 cm, of which ten were also detected by *Chandra*. We report new radio detections of the optically invisible IR source WLY 2-11 and the faint Hα emission line star Elias 24 (class II). We confirm circular polarization in Oph S1 and report a new detection of circular polarization in DoAr 21. We find no evidence that X-ray and radio luminosities are correlated in the small sample of TTS detected simultaneously with *Chandra* and the *VLA*.

We describe a new non-parametric method for estimating X-ray spectral properties from unbinned photon event lists that is applicable to both faint and bright X-ray sources. The method is used to generate $f_{\rm X}$, $\log T$ and $L_{\rm X}$ light curves. In addition, we provide a publically-available electronic database containing multi-wavelength data for 345 known X-ray, IR, and radio sources in the core A region.

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Editor's Note: The above abstract is being cross-listed in the Star Formation Newsletter and is posted here for those interested in X-rays from low-mass objects.

X-ray Emission from a Brown Dwarf in the Pleiades

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We report the first detection of X-ray emission from a brown dwarf in the Pleiades, the M7-type Roque 14, obtained using the EPIC detectors on *XMM-Newton*. This is the first X-ray detection of a brown dwarf intermediate in age between ≈ 12 and ≈ 320 Myr. The emission appears persistent, although we cannot rule out flare-like behaviour with a decay time-scale > 4 ks. The time-averaged X-ray luminosity of $L_{\rm X} \approx 3.3 \pm 0.8 \times 10^{27}$ erg s^{-1}, and its ratios with the bolometric ($L_{\rm X}/L_{\rm bol} \approx 10^{-3.05}$) and H$\alpha$ ($L_{\rm X}/L_{\rm H\alpha} \approx 4.0$) luminosities suggest magnetic activity similar to that of active main-sequence M dwarfs, such as the M7 old-disc star VB 8, though the suspected binary nature of Roque 14 merits further attention. No emission is detected from four proposed later-type Pleiades brown dwarfs, with upper limits to $L_{\rm X}$ in the range 2.1–3.8 $\times 10^{27}$ erg s^{-1} and to $\log(L_{\rm X}/L_{\rm bol})$ in the range -3.10 to -2.91.

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Ph.D. Thesis Abstracts

Analysis of a Structure and an Evolution of Long-Duration Arcade Flares

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Ph.D degree awarded: February 2004

In this thesis three solar long-duration arcade flares (LDAFs) are studied. These flares occurred on 7th and 14th May 1993 and on 27th April 1998. The elements of this analysis are as follows:

1. study of LDAFs morphology and evolution in soft and hard X-rays,
2. calculation of the physical parameters of the loop-top flare kernels (brightness, temperature, emission measure, density),
3. investigation of the flares and their kernels evolution on the diagnostic diagram,
4. calculation of the energy balance of the kernels in their decay phase.

In the analysis were mainly used X-ray observations made by following instruments: GOES/SEM, Yohkoh/SXT, Yohkoh/HXT. Ondřejov Hα images and Kitt Peak magnetograms were also used.

LDAFs have more complicated structure than compact flares. But they last longer and are much bigger. Taking time and angular resolution of present-day X-ray observations into account, these characteristics of LDAFs make them good object of study, which can help us to understand solar flares.

The most important conclusions of this thesis are as follows.

1. LDAFs loop-top kernels always occur at the crossings of an arcade channel and arcade loops. This suggests that kernels are a result of an interaction of two magnetic flux tubes: arcade loop and channel. Typical size of kernels is about 12 000 km. Some kernels can endure during whole flare but most of kernels last shorter. In some flares when one kernel disappears another can be formed.
2. Height of LADFs arcade loops is growing during a flare with velocity decreasing from several km s^{-1} at the flare beginning to < 1 km s^{-1} at late decay phase. At the end of flare the height may reach almost 100 000 km.
3. Calculated energy balance for LDAFs kernels indicates that kernels are heated during their whole decay phase. Maximum value of heating function (E_H) for these kernels is in the order of $0.1 - 1$ erg cm^{-3} s^{-1}. The kernels usually cease to exist when (E_H) is dropping below ≈ 0.01 erg cm^{-3} s^{-1}.
4. The inclination, $\zeta = d\log(T)/d\log(N)$, of the decay-phase branch of LDAFs kernels on temperature-density diagnostic diagram is always smaller than 0.3. This small inclination confirms that kernels are heated. However, obtained ζ is significantly smaller then theoretical value, $\zeta = 0.5$. This low values of ζ can be due to the following factors:
   - Kernels are multithermal. Because the SXT temperature diagnostics is more sensitive to cooler plasma, this property of kernels decreases the ζ value. This effect is confirmed when one compares temperature

obtained from Al12/Al.1 diagnostics to temperature obtained from Be119/Al12 diagnostics. The first one gives systematically lower temperatures and smaller inclination ζ. This is in agreement with the fact that the Al.1 intensities are more sensitive to the cooler plasma than Be119 intensities.

- The structure of the flare is expanding. Theoretical value $\zeta = 0.5$ is calculated for non-expanding flare loop. Upward expansion of a flare structure causes the decrease of the ζ value.

Thesis-related Publications: AdSpR, vol.30 issue 3, 665, 2002; ESA SP-506, vol.2, 665, 2002

Upcoming Meeting

Solar Coronal Loops Workshop and SOLAR-B Discussion

Palermo, Italy
1 – 3 September, 2004

Several basic aspects of the physics of coronal loops are still under debate. Nevertheless, recent analyses of high quality observations (images and spectra) and development of theoretical models are yielding significant progresses in the field.

We announce the second Coronal Loops Workshop devoted to the discussion of properties of observed loops and of the advances in the interpretation of the underlying physical processes ruling the coronal plasma. The workshop addresses the structuring, dynamics, and heating of coronal loops. Both observational findings and modeling achievements will be discussed. One day of the workshop will be devoted to the presentation and discussion of the SOLAR-B instrument features. The workshop will take place at the Hotel "La Torre" in Mondello (Palermo, Italy), September 1-3, 2004.

The time will be divided approximately equally between presentations and discussion. The aim of the workshop is to bring about discussions and intense interaction between observers and theorists; participation is open to everyone willing to contribute to the discussion.

The topics addressed at the workshop comprise: - Analysis of multi-band loop observations - DEM analysis - Loop structure and dynamics models - Solar-B

Logistical information (hotels, etc.) can be found at the website http://www.astropa.unipa.it/EVENTS/LOOPW/ The *deadline for registration* (including title of any proposed contribution) is *July 16*. Abstract of contributed talks can be submitted by July 31. The registration form is available at the website of the workshop. For early registration there will be no registration fee. Late registrations will be charged of a registration fee of 50 Euro. Note that September is tourist season in Sicily so we strongly suggest you to register and make the hotel reservation by the deadline.

We hope to see you in Palermo.

Scientific Organizing Committee G. Peres, J.A. Klimchuk, H.E. Mason, K. Bocchialini, L. Golub

Upcoming Meeting

Dynamos of the Sun, Stars, and Planets

Second Announcement

Freiburg, Germany
4 – 6 October, 2004

From 4 – 6 October 2004 the Kiepenheuer Institute for Solar Physics in Freiburg, Germany will host a scientific meeting on *Dynamos of the Sun, Stars, and Planets*. The meeting will be focused on theoretical aspects of the dynamo problem, covering the following topics:

* solar dynamo and activity cycle, * the role of flux tubes and the tachocline for the dynamo, * dynamos of the Earth and other planets, * stellar dynamos and cycles. Invited speakers are Nigel Weiss, Axel Brandenburg, Peter Gilman, Manfred Schssler, Ulrich Christensen, Friedrich Busse, Wolfgang Dobler, and Klaus Strassmeier

REGISTRATION and ABSTRACTS Registration (free of charge) and abstract submission is through e-mail to dynamo@kis.uni-freiburg.de. For the abstract please use a LaTeX template provided at our web page. The deadline for registration and abstracts is 22 August 2004.

PROCEEDINGS We are planning to publish proceedings of this workshop in Astronomische Nachrichten (Astronomical Notes; http://www.aip.de:8080/AN/). All contributions will be fully peer reviewed.

ACCOMODATION Accomodation is available through the regular Freiburg tourist office. Please visit their web site at http://www.freiburg.de/2/2/201/index.php.

As Freiburg is an attractive place, both for tourists and for scientific meetings it may be difficult to find accomodation on short notice. Unfortunately, the tourist office page is available only in german... If you have any problems, please contact us and we will do our best to find a suitable accomodation. In case of problems please contact us at dynamo@kis.uni-freiburg.de.

DETAILED INFORMATION on the programme, as well as on travel, accomodation, registration and abstract submission can be found at our web site http://www.kis.uni-freiburg.de/dynamo2004/.

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.***