COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

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Stellar Abstracts

Dust Shell of Symbiotic Nova HM Sagittae

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The variations of light and color of HM Sge are investigated based on the data of our photometric observations in visible and near infrared acquired over many years. The models of a spherically symmetric dust shell were fitted to low resolution mid-infrared stellar spectra observed by IRAS (the middle 1983) and ISO (October 1, 1996) using the DUSTY (version 2.0) code. For the grain size distribution we adopted the standard MRN model. The dust composition was accepted to be the warm silicate, and the grain number density $n(r) \propto r^{-2}$. Two extreme cases of dust heating were examined: by the Mira variable only (model 1), and by a summary radiation of both hot and cold component ignoring the absorption of short-wave quanta in a gas envelope (model 2). It is shown that the observational data can be well represented only by the model 1. The derived parameters of this model are (in brackets from the ISO data): the luminosity of the Mira variable, $10600 L_\odot$; the effective temperature, 2600 K; the optical depth of the dust shell at wavelength 0.55 micron, 10.1 (12.5); the inner shell radius, $3.42(5.85) \times 10^{14}$ cm; the temperature of the dust at inner radius, 900 (700) K; the distance, 2.0 (2.6) kpc; the velocity of the stellar wind, 11.2 (8.3) km s^{-1}; the upper limit of the mass of a central body, $2.0(2.0) M_\odot$; the total mass-loss rate, $1.0(1.5) \times 10^{-5} M_\odot\,\mathrm{yr}^{-1}$. It is possible that the variations of the dust shell parameters are connected with an evolution of the hot component. The observed decrease of its luminosity is favorable to the formation of dust grains in atmosphere of the Mira variable.

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Evidence for Solar-like Oscillations in Beta Hydri

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We have made a clear detection of excess power, providing strong evidence for solar-like oscillations in the G2 subgiant β Hyi. We observed this star over five nights with the UCLES echelle spectrograph on the 3.9-m Anglo-Australian Telescope, using an iodine absorption cell as a velocity reference. The time series of 1196 velocity measurements shows an rms scatter of $3.30\,\mathrm{m\,s^{-1}}$, and the mean noise level in the amplitude spectrum at frequencies above 0.5 mHz is $0.11\,\mathrm{m\,s^{-1}}$. We see a clear excess of power centred at 1.0 mHz, with peak amplitudes of about $0.5\,\mathrm{m\,s^{-1}}$, in agreement with expectations for this star. Fitting the asymptotic relation to the power spectrum indicates the most likely value for the large separation is $56.2\,\mu$Hz, also in good agreement with the known properties of β Hyi.

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For preprints via ftp or WWW: http://arXiv.org/abs/astro-ph/0012417

Crystallinity Versus Mass-loss Rate in Asymptotic Giant Branch stars

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Infrared Space Observatory (ISO) observations have shown that O-rich Asymptotic Giant Branch (AGB) stars exhibit crystalline silicate features in their spectra only if their mass-loss rate is higher than a certain threshold value. Usually, this is interpreted as evidence that crystalline silicates are not present in the dust shells of low mass-loss rate objects. In this study, radiative transfer calculations have been performed to search for an alternative explanation to the lack of crystalline silicate features in the spectrum of low mass-loss rate AGB stars. It is shown that due to a temperature difference between amorphous and crystalline silicates it is possible to include up to 40% of crystalline silicate material in the circumstellar dust shell, without the spectra showing the characteristic spectral features. Since this implies that low mass-loss rate AGB stars might also form crystalline silicates and deposit them into the Interstellar Medium (ISM), the described observational selection effect may put the process of dust formation around AGB stars and the composition of the predominantly amorphous dust in the Interstellar Medium in a different light. Our model calculations result in a diagnostic tool to determine the crystallinity of an AGB star with a known mass-loss rate.

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X-rays from the Open Cluster NGC 6633

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NGC 6633 is a young, open cluster with a similar age to the Hyades and Praesepe, but probably a lower metallicity.

We present the results of *ROSAT* HRI observations of an *optically selected* catalogue of likely members of NGC 6633. Eight out of fifty-one NGC 6633 members have been detected, with main-sequence spectral types A to G, above a threshold X-ray luminosity of $\approx 6 - 12 \times 10^{28}\,\mathrm{erg\,s^{-1}}$. We find that NGC 6633 does not contain cool stars which are as X-ray luminous as the most active objects in the Hyades and that the median X-ray luminosity of F-G stars in NGC 6633 is less than that in the Hyades, but probably greater than in Praesepe. However, when X-ray activity is expressed as the X-ray to bolometric flux ratio we find that NGC 6633 and the Hyades are very similar and display similar peak levels of coronal activity. We attribute this discrepancy to a number of possible wide binary systems with higher X-ray (and bolometric) luminosities in the Hyades sample and either a low metallicity in NGC 6633, which makes its cool stars both X-ray and bolometrically less luminous at the same colour, or that the distance to NGC 6633 has been underestimated, which would decrease stellar X-ray luminosities without changing X-ray to bolometric flux ratios.

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On the Formation of Polar Spots in Sun-like Stars

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We simulate the photospheric magnetic field on very active cool stars using a flux-injection and surface-distribution model with strictly solar parameters, including an 11-year sunspot cycle and associated butterfly pattern. The only free parameter is the magnitude of the cycle. We demonstrate that the combination of supergranulation-driven dispersal and meridional advection of the field on a very active Sun-like star leads to a strong polar-cap field. The polar caps contain so much flux that in comparable environments on the Sun convection is suppressed; it appears inevitable that this leads to the formation of (clusters of) starspots within large unipolar areas that form at high latitudes. The model exhibits a peak total flux in the polar-cap regions that is roughly proportional to the cycle amplitude for active regions $\mathcal{A}_0$, whereas the total absolute flux covering the stellar surface has a significantly weaker than linear dependence on $\mathcal{A}_0$. We find, for example, that for a star with a rotation period of $P \sim 6\,\mathrm{d}$, the total absolute flux on the star is $\sim 10\times$ that characteristic of the active Sun, while the peak polar-cap flux is stronger by a factor of ~ 30. Within the polar caps of such active stars, flux concentrations coagulate to form relatively larger clusters. The tendency for larger flux concentrations to disperse more slowly causes the polar-cap flux to be concentrated in a more restricted latitude range with increasing activity; the corresponding longitudinally-averaged flux density in the polar caps of the simulated star with $P \sim 6\,\mathrm{d}$ reaches $\sim 300 - 500\,\mathrm{Mx\ cm^{-2}}$. The polar-cap field in these simulations displays a ring of one polarity at high latitudes around a polar patch of the opposite polarity during much of the spot cycle. This bipolar pattern forms a persistent flux reservoir, so that the cycle modulation of the polar-cap flux of an active star is relatively weak, consistent with observations of polar-cap spot coverage on active cool stars. Based on these model results, we propose that polar spots are consistent with a dynamo like that of the Sun for a sufficiently enhanced emergence frequency of active regions.

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Flares at the Cool End of the M Dwarfs: The Case of LHS 2065

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LHS 2065 is an M9 very low-mass star at a distance of 8.5 pc. It was known to have H_α emission, but no other emission lines had been seen before. We observed it on December 12, 1998, and found a rich emission spectrum (HeI, NaD, Balmer series). Additional spectra were obtained after 1 hour, 2 hours and 1 day. They showed progressively weaker emission lines. Using our data and a compilation of the literature, we find that, while strong flares in LHS 2065 are

rare (their recurrence rate is $\leq$0.03 per hour), weak flares may be common (about 0.5 per hour). Our observations add to the growing evidence that many, if not all, of the coolest M dwarfs have flare activity.

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Prominence Support in Potential Field Configurations Around Rotating Stars

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We present a general method for determining the locations of stable gravitational-centrifugal potential minima within arbitrary potential magnetic field configurations surrounding rotating single stars. We show that stable locations exist both inside and outside the co-rotation radius of a single star, for even the simplest field configurations. We show that for prominence formation to occur at significant distances above the equatorial plane, as observed in stars such as AB Dor and PZ Tel, the field must show significant departures from a simple dipole to distances as great as four or more stellar radii from the star. We demonstrate that the radial-field distribution derived from a Zeeman-Doppler image of AB Dor yields sufficient field complexity at large distances for prominence sheets to form outside the co-rotation radius at latitudes that transit the stellar disc, assuming an axial inclination of 60° to the line of sight.

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Detection of Magnetic Dipole Lines of Fe XII in the Ultraviolet Spectrum of the Dwarf Star ϵ Eri

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We report observations of the dwarf star ϵ Eri (K2 V) made with the Space Telescope Imaging Spectrograph (STIS) on the Hubble Space Telescope (*HST*). The high sensitivity of the STIS instrument has allowed us to detect the magnetic dipole transitions of Fe XII at 1242.00 Å and 1349.38 Å for the first time in a star other than the Sun. The width of the stronger line at 1242.00 Å has also been measured; such measurements are not possible for the permitted lines of Fe XII in the extreme ultraviolet. To within the accuracy of the measurements, the N V and the Fe XII lines occur at their rest wavelengths. Electron densities and line widths have been measured from other transition region lines. Together, these can be used to investigate the non-thermal energy flux in the lower and upper transition region, which is useful in constraining possible heating processes. The Fe XII lines are also present in archival STIS spectra of other G/K-type dwarfs.

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A Search for Ca II Emission Enhancement in Stars Due to Nearby Giant Planets

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We present a search for periodicities ($P_{\rm chr}$) in the=20 chromospheric Ca II infrared triplet emission of several stars (τ Boo, 51 Peg, υ And, ρ^1 Cnc, ρ CrB, 70 Vir, and GL 876), which may be directly attributable to interaction with close-in giant planets. Activity enhancements could arise from increased non-radiative heating and dynamo action in planet-induced tidal bulges (with $P_{\rm chr} \approx P_{\rm orb}/2$), or from interactions between the stellar and planetary magnetic fields (with $P_{\rm chr} \approx P_{\rm orb}$). We compare $P_{\rm chr}$ and activity phase's dependence with the planetary orbital period $P_{\rm orb}$, the

orbital phase, and models. No significant $P_{\rm chr}$ or phase dependence attributable to planets could be clearly identified. We place approximate upper limits on the amplitude of any planet-induced activity. Furthermore, we identify a possible stellar rotation period for GL 876, and support previous period determinations for four other stars. We argue that future searches for planet-related effects should target lower density regions (i.e., transition regions, coronae). Future searches in chromospheres would benefit from more densely sampled, lower noise data.

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Enhanced Noble Gases in Coronae of Active Stars

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We have analysed *Chandra* HETG spectra of the active RS CVn-type binary V711 Tau (HR 1099; HD 22468) in order to examine the chemical composition of its coronae. Observed fluxes and flux upper limits for spectral lines from a range of charge states of iron, covering species Fe XVI-Fe XXV, have been used to determine the emission measure distribution as a function of temperature, while the observed Fe line-to-continuum ratio has been used to examine the absolute iron abundance, Fe/H. Abundances of elements O, Ne, Mg, Si, S and Ar relative to both Fe and H have been estimated by comparison of observed line fluxes with predictions based on the emission measure distribution. We confirm results of earlier studies finding the coronae of V711 Tau to be metal poor, and derive an iron abundance of Fe/H$= 7.0 \pm 0.1$. We find the noble gas elements Ne and Ar to be enhanced relative to the local cosmic value and enhanced by an order of magnitude relative to Fe. Very mild enhancements of O and Mg relative to Fe are also discerned. By examination of coronal abundances of Ne relative to Fe culled from the literature, in addition to Ne lines seen in hitherto unpublished *Chandra* spectra, we conclude that large Ne abundance enhancements are a common feature of active stellar coronae.

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CHANDRA–LETGS X-ray observations of Capella: Temperature, Density & Abundance Diagnostics

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We report an analysis of the X-ray spectrum of Capella from 6 to 175 Å obtained with the Low Energy Transmission Grating Spectrometer (LETGS) on board of the X-ray space observatory CHANDRA. Many emission line features appear that can be resolved much better as compared to former instruments (EUVE and ASCA). Coronal electron densities ($n_{\rm e}$) and temperatures (T) of brightly emitting regions are constrained by an analysis of ratios of density- and temperature-sensitive lines of helium-like ions and highly ionized iron atoms. Lines emitted by e.g., O VII & VIII, Mg X–XII, Si XII–XIV, Fe IX, X & XV–XXIII are used to derive T. Line ratios in the helium-like triplets of C V, N VI, O VII, Mg XI, and Si XIII yield T in the range 0.5–10 MK, and $n_{\rm e}$ in the range 10^9–10^{13} cm^{-3}. The Fe IX/X ratio yields $T \simeq 0.9$ MK, while lines from Fe XVIII to XXII give $T \sim 6$–10 MK. Flux ratios of Fe XX–XXII lines indicate for the electron densities an upper limit in the range $n_{\rm e} \lesssim (2$–$5)\ 10^{12}$ cm^{-3}. From line ratios of Fe XVII and Fe XVIII we derive constraints on the optical depth τ of $\sim$ 1–1.5. An emission measure distribution is derived from Fe line intensities. Results for element abundances (relative to Fe) from a 4-T model are: O&Ne/Fe about solar, N,Mg&Si/Fe $\sim 2\times$ solar. The results for T and $n_{\rm e}$ are described in terms of quasi-static coronal loop models and it is shown that the X-ray emission originates from compact structures much smaller than the stellar radii.

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Disk-locking and the Presence of Slow Rotators Among Solar-type Stars in Young Star Clusters

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The simultaneous presence of both the so-called 'ultra-fast rotators' and slowly rotating stars among the solar-type stars ($\sim 0.6 - 1.2 M_{\odot}$) in the same young star clusters has been a puzzle in the field of stellar rotation. No model to date has been able to explain both by a single mechanism intrinsic to the star and questions about the appropriate initial conditions for models often complicate the problem.

In this paper, using the same starting conditions for the models that we used in examining the origin of the ultra-fast rotators in young star clusters, we show that the slowest rotators demand an extrinsic mechanism. Assuming that this mechanism is a disk-star interaction, we determine that a disk-locking timescale of a few Myr must operate for this type of star. If, instead of allowing (radial) differential rotation, we enforce solid-body rotation, the models require timescales about two to three times as long.

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Solar Abstracts

Modelling the Rate of Occurrence of Solar Flares

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Dimensional considerations are used to analyze the distribution of times between solar flares (the flare waiting-time distribution). An analytical estimate for the mean flaring rate λ_0 is obtained, based on the idea that the rate reflects a balance between the processes of energy input into the corona and energy dissipation by flaring. The estimate is shown to be in good agreement with observations of flares by *Geostationary Operational Environmental Satellite* detectors. The analytic result is confirmed using the master equation (probability balance equation) formalism. Analysis of time variation leads to a differential equation describing how the free energy in the corona changes when the rates of driving of the system and of flaring vary. This equation may be used to describe the global energy balance in the corona over the solar cycle.

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Electron Density Variations During Ultraviolet Transient Events

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High-resolution temporal observations performed with the SUMER spectrometer on SoHO provide an opportunity to investigate the electron density variations in the 'quiet Sun' solar transition region due to UV transient events. Two datasets obtained in the density sensitive lines belonging to the O IV 1400 Å multiplet were searched for such events, leading to the identification of two explosive events, on 1996 July 10 and 1997 May 31. In both cases, the

O IV 1401.16/1404.81 density sensitive line intensity ratio shows a clear variation, corresponding to enhancements in the electron density by factors of ~ 3. This is fully consistent with recent 2.5D MHD simulations. The 1996 July 10 dataset also provided us with the opportunity to monitor the behaviour of the electron density through an UV blinker. Despite an increase of a factor of two in the line intensities, no variation of the electron density was found. This suggests that the intensity enhancement is due to an increase in the filling factor.

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Long-term North-south Asymmetry in Solar Wind Speed Inferred from Geomagnetic Activity: A New Type of Century-scale Solar Oscillation?

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A significant and very similar annual variation in solar wind speed and in geomagnetic activity was recently found around all the four solar cycle minima covered by direct SW observations since mid-1960's. We have shown that the phase of this annual variation reverses with the Sun's polarity reversal, depicting a new form of 22-year periodicity. The annual variation results from a small north-south asymmetry in SW speed distribution where the minimum speed region is shifted toward the northern magnetic hemisphere. Here we study the very long-term evolution of the annual variation using early registrations of geomagnetic activity. We find a significant annual variation during the high-activity solar cycles in mid-19th century and since 1930's. Most interestingly, the SW speed asymmetry in mid-19th century was opposite to the present asymmetry, i.e., the minimum speed region was then shifted toward the southern magnetic hemisphere. This change of asymmetry suggests for a possible new form of century-scale oscillation in the north-south asymmetry of the Sun. We explain the asymmetry in terms of a relic magnetic field dislocated slightly in the north-south direction from the heliographic equator. The change in the asymmetry would result from the century-scale north-south oscillation of the location of the relic field across the ecliptic.

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Shock Formation of Slow Magnetosonic Waves in Coronal Plumes

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We investigate the height of shock formation in coronal plumes for slow magnetosonic waves. The models take into account plume geometric spreading, heat conduction and radiative damping. The wave parameters as well as the spreading functions of the plumes and the base magnetic field strength are given by empirical constraints mostly from SOHO/UVCS. Our models show that shock formation occurs at rather low coronal heights, i.e., within 1.3 $R_\odot$, depending on the model parameters. The shock formation height is lowest for large amplitude waves and waves with relatively short periods. The shock formation is calculated using the well-established wave breaking condition given by the intersection of C^+ characteristics in the space-time plane. The results found are consistent with analytic estimates. Our models show that shock heating by slow magnetosonic waves is expected to be relevant at most heights in solar coronal plumes, although slow magnetosonic waves are most likely not a solely operating energy supply mechanism.

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The Importance of Fe I as a Continuous Opacity Source in the Solar Atmosphere

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The inability of theoretical model fluxes to fit the observed solar flux in the UV, the "missing UV opacity problem", results in erroneous abundances derived from UV lines. For example, Balachandran & Bell (1998) argued that the solar beryllium abundance, derived from Be II lines at 3130 Å, was not depleted but rather equal to the meteoritic value with critical implications on mixing and angular momentum transport models. In this paper we have incorporated recent Iron Project calcuations of the Fe I bound-free opacity into our calculations of the continuous opacity. By combining this with observed line blocking, we compare the predicted fluxes to the observed solar flux in the 2000 - 4000 Å region. We find that a reasonable fit to the observed flux between 3000 and 4000 Å is obtained with twice the Fe I b-f value from Bautista (1997). The importance of this and other metal b-f opacities is discussed.

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Transition Region Oscillations Above Sunspots

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We present observations of three sunspots made in the EUV wavelength range with the Coronal Diagnostic Spectrometer (CDS) on SOHO. We examine time series of line intensities obtained with a 15-s cadence and calculate their Fourier power spectra and the wavelet transforms. We find oscillations in the chromosphere and transition region above sunspots in the temperature range $2 \times 10^4 - 4 \times 10^5$ K. Most of the spectral power is contained in the 5-8 mHz frequency range, and the dominant frequency is 5.9 mHz (170 s period). We find a relationship between the oscillations and sunspot plumes which are compact features located above sunspots and bright in the transition region lines emitted between 1.7×10^5 and 4×10^5 K. When the CDS slit crosses a sunspot plume, the bright O IV 554.5 Å and O V 629.7 Å lines show clear 3-minute oscillations. An extreme alternative interpretation that excludes the presence of oscillations in sunspot plumes carries the requirement that the adjacent low-intensity plasma oscillate with high relative amplitudes greater than 50 percent. We also observe oscillations in a fainter area above a sunspot, outside the sunspot plume. The oscillations seen at different temperatures are compared. Using the wavelet transform, we find variability of the oscillation period in the range $120 - 200$ s.

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Comparison of Empirical Models for Polar and Equatorial Coronal Holes

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We present a self-consistent empirical model for several plasma parameters of a large equatorial coronal hole observed on 1999 November 12 near solar maximum. The model was derived from observations with the Ultraviolet Coronagraph Spectrometer on the *Solar and Heliospheric Observatory*. In this Letter, we compare the observations of O VI $\lambda\lambda$1032, 1037 emission lines with previous observations of a polar coronal hole observed near solar minimum. At the time of the 1999 observations, there was no evidence of large polar coronal holes. The resulting empirical model for the equatorial coronal hole describes the outflow velocities and most probable speeds for O^{5+}, and we compared the derived ion properties to the empirical model for a solar minimum polar coronal hole. The comparison of the empirical models shows that the 1999 equatorial hole has lower O^{5+} outflow speeds and perpendicular temperatures than its polar counterpart from 1996–1997 at heights between 2 and 3 $R_\odot$. However, *in situ* asymptotic speeds of the wind streams coming from the 1996–1997 polar hole and from the 1999 equatorial hole are only $\sim$ 15% different. Thus, the bulk of the solar wind acceleration must occur above 3 $R_\odot$ for the equatorial coronal hole. The equatorial hole also has a higher density than the polar hole at similar heights. It is not yet known if the higher densities are responsible for the seeming inhibition of the fast ion outflow speeds and extremely large perpendicular temperatures that occur in polar

coronal holes at solar minimum. We discuss the constraints and implications on various theoretical models of coronal heating and acceleration.

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Brown Dwarf Abstracts

Probing the Substellar Regime with SIRTF

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One of the main scientific drivers of the Space InfraRed Telescope Facility (SIRTF) is the search for brown dwarfs and extrasolar superplanets. We present new calculations of the spectra of substellar objects and a prediction of their colors in the SIRTF passbands. We discuss observational strategies for identification of very low-mass objects as free-floaters in the solar vicinity, and provide estimates of their densities as a function of sensitivity and the mass function.

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UPCOMING MEETING

CHEMICAL COMPOSITION OF STARS

September 19 - 22, 2001
Univ. of Washington
Seattle, WA USA

In commemoration of the 50th anniversary of the paper by Chamberlain and Aller that showed that the subdwarfs are metal-poor, and the discovery of technetium in stars, the Astronomy department of the University of Washington is pleased to announce a conference on the CHEMICAL COMPOSITION OF STARS to be held in Seattle, WA on September 19, 20, 21, 22, 2001. Specific subtopics that we would like covered include: Li, Be, B, in stars, C, N, O, Na, Al, alphas, hot Stars (types O, B, A), supernova nucleosynthesis, extremely metal-poor stars, AGB and post-AGB stars, stars with planets, L and T stars, and atmospheric modeling and NLTE.

Specific social events will include a salmon bake and a Seattle Mariners baseball game.

To receive further information and to help us estimate the number of attendees please send an email to

WALL@ASTRO.WASHINGTON.EDU

if it is likely that you will attend.

A web site will be created within a month or so.

The Scientific Organizing Committee consists of

Lawrence Aller and Jesse Greenstein Honorary Chairmen, and

W.D. Arnett, A.M. Boesgaard, C. Charbonell, M. Carlsson, G. Gonzalez, W. Haxton, J. Lutz, C.A. Pilachowski, V.V. Smith, C. Sneden, K. Venn, G. Wallerstein (Chair)

JOB OPENING

Marie Curie Fellowship
Osservatorio Astronomico di Palermo Giuseppe S. Vaiana
Palermo, Italy

Closing date: 01 March 2001

Osservatorio Astronomico di Palermo Giuseppe S. Vaiana expects to appoint one fellow in the area of X-ray observations of stellar coronae under the European Commission's Marie Curie Development Host Fellowship Scheme.

Osservatorio Astronomico di Palermo has a long tradition in X-ray astronomy and in particular on stellar and solar coronal physics. Part of the recent activity has been centered on the study of stellar coronae considering coeval stellar samples. These studies, initiated with data of the Einstein Observatory and of ROSAT, continue through the access to a large number of X-ray observations of CHANDRA and XMM/NEWTON as part of both guaranteed and guest-observer programs.

The scientific aim of this work is to understand the relationship between the stellar interior structure and the stellar outer atmosphere. The X-ray emitting coronae of late-type stars play a crucial role in stellar evolution from the pre-main sequence phase onward, impacting on a diversity of other areas of astronomy. Coronal properties affect the angular momentum evolution of the stars and hence the dynamo efficiency producing a feedback process with a tight interplay between the properties of the stellar interiors and those of the outer atmospheric layers.

The successful candidate is expected to partecipate to the analysis of the new X-ray data mainly on open clusters and star forming regions with special emphasis on spectroscopic data.

Candidates should have a PhD in a relevant field or at least four years of full-time research experience at postgraduate level other than doctoral studies. The ability to work in team and possibly a strong and competitive research programme are important skills.

The applicant must be national of a Member State of the European Community (other than Italy) or an Associated State, or otherwise residing in the Community for at least the last five years. The fellow must be of age 35 years or less (allowance is made for time actually served in compulsory military or civil service and for childcare with a maximum of 2 years per child). In addition candidates should not have been resident in Italy for more than 12 months in the two years prior to selection. Gross salary, including all compulsory deductions under italian legislation, is fixed at 3813 Euro per month plus a mobility allowance for the duration of the contract, which is expected to last for 24 months. Female candidates are explicitly encouraged to apply.

Applications, including CV, publication list, description of applicant's research interests/program (all documents above should be signed by the candidate), documents certifying the doctoral degree or a four years of full time research experience and two letters of recommendations should arrive by 1st March 2001 at:

Osservatorio Astronomico di Palermo
Marie Curie Fellowship Selection
Piazza del Parlamento 1
I-90134 Palermo, Italy

For further information contact:
Giusi Micela - giusi@oapa.astropa.unipa.it or http://www.astropa.unipa.it

EXPECTED JOB OPENING

Postdoctoral Scientist (Stellar Coronae)

Smithsonian Astrophysical Observatory
Cambridge, MA USA

An opening in the field of stellar coronae is expected very shortly, for filling within the next several months. The successful candidate would work with Jeremy Drake and collaborators, predominantly with the analysis and interpretation of space-based UV-to-X-ray observations of stellar coronae, including data taken by Chandra, EUVE, ASCA and XMM-Newton. The initial appointment is expected to be for two years, with possible extension.

Applicants should have a recent Ph.D. or equivalent, and have some experience closely relevant to the field of stellar coronae.

Interested candidates should send vitae to:

Jeremy Drake,
Smithsonian Astrophysical Observatory, MS-3,
60 Garden Street,
Cambridge, MA 02138 USA
e-mail: `jdrake@cfa.harvard.edu`

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), brown dwarfs, 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` .