COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

No. 147 — June 2008 Editor: Steve Skinner (coolnews@jila.colorado.edu)

TABLE OF CONTENTS

Stellar Abstracts

Infrared Spectroscopy of Symbiotic Stars. VI. Combined Orbits for Two S-Type Systems: V455 Scorpii and SS 73-90

Francis C. Fekel[1], Kenneth H. Hinkle[2], Richard R. Joyce[2], Peter R. Wood[3] and Ian D. Howarth[4]

[1] Tennessee State University, Center of Excellence in Information Systems, 3500 John A. Merritt Blvd., Box 9501, Nashville, TN 37209 USA
[2] National Optical Astronomy Observatory, P.O. Box 26732, Tucson, AZ USA
[3] Research School of Astronomy and Astrophysics, Mt. Stromlo Observatory, Australian National University, Private Bag, Weston Creek, ACT 2611, Australia
[4] Department of Physics and Astronomy, University College London, London, United Kingdom

We have combined new infrared radial velocities and previously obtained spectropolarimetric observations to compute orbits of the M6 giants in two southern S-type symbiotic systems. The spectropolarimetric data enable the orbital inclinations of the systems to be determined, placing greater constraints on the properties of the components. V455 Sco has a circular orbit with a period of 1398 $\pm$ 6 days and an inclination of 94 deg $\pm$ 1 deg. The orbit of SS 73-90 has a period of 898 $\pm$ 5 days, a modest eccentricity of 0.16, and an inclination of 97 deg $\pm$ 7 deg. The center of mass velocity of each system is large, -77.9 km s^{-1} for V455 Sco and 89.5 km s^{-1} for SS 73-90, making them members of the old disk population. The M giant component of each system is likely on the asymptotic giant branch. From estimates of the M giants' radii we predict that both systems are eclipsing and provide ephemerides to search for the eclipses. For V455 Sco the predicted eclipses are found in data from the Harvard College Observatory plate archives. The He II emission feature near 1.0123 μm is associated with the hot component in both systems. However, the orbits produced from the emission line radial velocities do not lead to masses that are consistent with other results.

Accepted by AJ

For preprints contact: fekel@evans.tsuniv.edu

A Grid of MARCS Model Atmospheres for Late-type Stars I. Methods and General Properties

Bengt Gustafsson[1], Bengt Edvardsson[1], Kjell Eriksson[1], Uffe Graae Jørgensen[2], Åke Nordlund[2], and Bertrand Plez[3]

[1] Dept. of Physics and Astronomy, Uppsala University, Box 515, S-751 20 Uppsala, Sweden
[2] Niels Bohr Institute, Copenhagen University, Blegdamsvej 17, Copenhagen Ø, DK-2100, Denmark
[3] GRAAL, Universite de Montpellier II, F-34095 Montpellier Cedex 05, France

We have constructed a grid of about 10,000 spherically symmetric and plane-parallel models with the MARCS program, and make it available for public use. Parameter ranges are: $T_{\rm eff}$ = 2500 to 8000 K, $\log g = \log(GM/R^2) = -1$ to 5 (cgs) with various masses and radii, [Me/H]=-5 to $+1$, with [α/Fe] = 0.0 and 0.4 and different choices of C and N abundances to also represent stars of types R, S and N, and with microturbulence parameters from 1 to 5 km/s. We also list fluxes in approximately 108,000 wavelength points. Underlying assumptions in addition to 1D stratification include hydrostatic equilibrium, MLT convection and LTE. A number of general properties of the models are discussed, in relation to the effects of changing blanketing and sphericity. Models are compared with other available grids and excellent agreement is found with plane-parallel models of Castelli and Kurucz within the overlapping parameter range. Although there are departures from the spherically symmetric NextGen models, the agreement with more recent PHOENIX models is gratifying. The models of the grid show regularities, but some interesting departures from general patterns occur for the coolest models due to the molecular opacities. We have tested rules of thumb concerning effects of blanketing and sphericity and found them to often be astonishingly accurate. Some interesting new phenomena have been discovered, such as the intricate coupling between blanketing and sphericity, and the strong effects of carbon enhancement on metal-poor models. We give further details of models and comparisons with observations in subsequent papers.

Accepted by A&A

For preprints via WWW: http://arxiv.org/abs/0805.0554

The Fainting of α Cen A, Resolved

Thomas R. Ayres[1], Philip G. Judge[2], Steven H. Saar[3], and Jürgen H. M. M. Schmitt[4]

[1]Center for Astrophysics and Space Astronomy, 389 UCB, University of Colorado, Boulder, CO 80309
[2]High Altitude Observatory, National Center for Atmospheric Research, Boulder, CO 80307
[3]Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138
[4]Universität Hamburg, Hamburger Sternwarte, Gojenbergsweg 112, 21029 Hamburg, Germany

Beginning in 2003, *XMM*–Newton snapshot monitoring of α Centauri (HD 128620,21: G2 V, K1 V) documented a steady fading of the primary's X-ray corona, which had all but disappeared by early 2005. The steep decline in $L_{\rm X}$ was at odds with the previous two decades of high energy measurements, which showed only modest variability of the Sun-like star. A *Chandra* LETGS spectrum in 2007 June, however, fully resolved the source of the curious X-ray darkening: a depletion of plasma above ∼2 MK had substantially depressed the line spectrum where the *XMM*–Newton response peaks ($\lambda < 30$ Å), even though the overall coronal luminosity, dominated by longer wavelength emissions, had declined only slightly. This is reminiscent of Sun's magnetic activity cycle, where the 2–3 MK active regions of sunspot maximum give way to the spatially pervasive, but cycle independent, 1 MK "quiet corona" at minimum. It emphasizes that any discussion of cyclic coronal variability in low activity stars will depend crucially on the energy coverage of the measurements.

Accepted by ApJ Letters

For preprints contact: Thomas.Ayres@Colorado.edu

For preprints via anonymous ftp: casa.colorado.edu/pub/ayres/Fainting_AlpCenA.pdf

The ChaMP Extended Stellar Survey (ChESS): Photometric and Spectroscopic Properties of Serendipitously Detected Stellar X-ray Sources

K. R. Covey[1], M. A. Agüeros[2] , P. J. Green[1], D. Haggard[3], W. A. Barkhouse[4], J. Drake[1], N. Evans[1], V. Kashyap[1], D.-W. Kim[1], A. Mossman[1], D. O. Pease[5], J. D. Silverman[6]

[1] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138

[2] NSF Astronomy and Astrophysics Postdoctoral Fellow; Columbia University, Department of Astronomy, 550 West 120th Street, New York, NY 10027

[3] NASA Harriett G. Jenkins Predoctoral Fellow, University of Washington, Department of Astronomy, Box 351580, Seattle, WA 98195

[4] Physics Department, University of North Dakota, Grand Forks, ND 58202

[5] Space Sciences Lab, 7 Gauss Way, Berkeley, CA 94720-7450

[6] Max-Planck-Institut für extraterrestrische Physik, D-84571 Garching, Germany

We present 348 X-ray emitting stars identified from correlating the Extended *Chandra* Multiwavelength Project (ChaMP), a wide-area serendipitous survey based on archival X-ray images, with the Sloan Digital Sky Survey (SDSS). We use morphological star/galaxy separation, matching to an SDSS quasar catalog, an optical color-magnitude cut, and X-ray data quality tests to create our catalog, the ChaMP Extended Stellar Survey (ChESS), from a sample of 2121 matched ChaMP/SDSS sources. Our cuts retain 92% of the spectroscopically confirmed stars in the original sample while excluding 99.6% of the 684 spectroscopically confirmed extragalactic sources. Fewer than 3% of the sources in our final catalog are previously identified stellar X-ray emitters. For 42 catalog members, spectroscopic classifications are available in the literature. We present new spectral classifications and Hα measurements for an additional 79 stars. The catalog is dominated by main sequence stars; we estimate the fraction of giants in ChESS is $\sim 10\%$. We identify seven giant stars (including a possible Cepheid and an RR Lyrae star) as ChAMP sources, as well as three cataclysmic variables. We derive distances from $\sim 10-2000$ pc for the stars in our catalog using photometric parallax relations appropriate for dwarfs on the main sequence and calculate their X-ray and bolometric luminosities. These stars lie in a unique space in the L_X–distance plane, filling the gap between the nearby stars identified as counterparts to sources in the *ROSAT* All-Sky Survey and the more distant stars detected in deep *Chandra* and *XMM-Newton* surveys. For 36 newly identified X-ray emitting M stars we calculate $L_{H\alpha}/L_{bol}$. $L_{H\alpha}/L_{bol}$ and L_X/L_{bol} are linearly related below $L_X/L_{bol} \sim 3 \times 10^{-4}$, while $L_{H\alpha}/L_{bol}$ appears to turn over at larger L_X/L_{bol} values. Stars with reliable SDSS photometry have an ~ 0.1 mag blue excess in $u-g$, likely due to increased chromospheric continuum emission. Photometric metallicity estimates suggest that the sample is evenly split between the young and old disk populations of the Galaxy; the lowest activity sources belong to the old disk population, a clear signature of the decay of magnetic activity with age. Future papers will present analyses of source variability and comparisons of this catalog to models of stellar activity in the Galactic disk.

Accepted by ApJS

For preprints contact: kcovey@cfa.harvard.edu

For preprints via ftp or WWW: http://www.cfa.harvard.edu/ kcovey/ChESS.fullres.ps or http://xxx.lanl.gov/abs/0805.2615

A Study of X-ray Flares - I. Active Late-type Dwarfs

J. C. Pandey[1] and K. P. Singh[1]

[1] Tata Institute of Fundamental Research, Mumbai, 400 005 India
Casilla 19001, Santiago 19, Chile

We present temporal and spectral characteristics of X-ray flares observed from six late-type G-K active dwarfs (V368 Cep, XI Boo, IM Vir, V471 Tau, CC Eri and EP Eri) using data from observations with the XMM-Newton observatory. All the stars were found to be flaring frequently and altogether a total of seventeen flares were detected above the "quiescent" state X-ray emission which varied from 0.5 to 8.3 $\times 10^{29}$ erg s-1. The largest flare was observed in a low activity dwarf XI Boo with a decay time of 10 ks and ratio of peak flare luminosity to "quiescent" state luminosity of 2. We have studied the spectral changes during the flares by using colour-colour diagram and by detailed spectral analysis during the temporal evolution of the flares. The exponential decay of the X-ray light curves, and time evolution of the plasma temperature and emission measure are similar to those observed in compact solar flares. We have derived the semiloop lengths of flares based on the hydrodynamic flare model. The size of the flaring loops is found to be less

than the stellar radius. The hydrodynamic flare decay analysis indicates the presence of sustained heating during the decay of most flares.

Accepted by MNRAS

For preprints contact: jeewan@aries.ernet.in

Chandra's Darkest Bright Star: Not So Dark After All?

Thomas R. Ayres[1]

[1]Center for Astrophysics and Space Astronomy, 389 UCB, University of Colorado, Boulder, CO 80309

Chandra High Resolution Camera (HRC) has obtained numerous short exposures of the UV-bright star Vega (α Lyrae; HD 172167: A0 V), to calibrate the response of the detector to out-of-band (non–X-ray) radiation. A new analysis uncovered a stronger "blue leak" in the imaging section (HRC-I) than reported in an earlier study of Vega based on a subset of the pointings. The higher count rate—a factor of nearly two above pre-launch estimates—raised the possibility that genuine coronal X-rays might be lurking among the out-of-band events. Exploiting the broader point spread function of the UV leak compared with soft X-rays identified an excess of counts centered on the target, technically at $3\,\sigma$ significance. A number of uncertainties, however, prevent a clear declaration of a Vegan corona. A more secure result would be within reach of a deep uninterrupted HRC-I pointing.

Submitted to AJ

For preprints contact: Thomas.Ayres@Colorado.edu

For preprints via anonymous ftp: casa.colorado.edu/pub/ayres/Darkest.pdf

Solar Abstracts

The Flaring and Quiescent Components of the Solar Corona

C. Argiroffi[1,2], G. Peres[1,2], S. Orlando[2] and F. Reale[1,2]

[1] Dipartimento di Scienze Fisiche ed Astronomiche, Sezione di Astronomia, Università di Palermo, Piazza del Parlamento 1, 90134 Palermo, Italy

[2] INAF - Osservatorio Astronomico di Palermo, Piazza del Parlamento 1, 90134 Palermo, Italy

The solar corona is a template to understand stellar activity. The Sun is a moderately active star, and its corona differs from that of active stars: for instance, active stellar coronae have a double-peaked emission measure distribution $EM(T)$ with the hot peak at $8-20\,$MK, while the non flaring solar corona has one peak at $1-2\,$MK and, typically, much cooler plasma. We study the average contribution of flares to the solar emission measure distribution to investigate indirectly the hypothesis that the hot peak of the $EM(T)$ of active stellar coronae is due to a large number of unresolved solar-like flares, and to infer properties on the flare distribution from nano- to macro-flares. We measure the disk-integrated time-averaged emission measure, $EM_F(T)$, of an unbiased sample of solar flares analyzing uninterrupted GOES/XRS light curves over time intervals of one month. We obtain the $EM_Q(T)$ of quiescent corona for the same time intervals from the Yohkoh/SXT data. To investigate how $EM_F(T)$ and $EM_Q(T)$ vary with the solar cycle, we evaluate them at different phases of the cycle between December 1991 and April 1998. Irrespective of the solar cycle phase, $EM_F(T)$ appears like a peak of the distribution significantly larger than the values of $EM_Q(T)$ for $T \sim 5-10\,$MK. As a result the time-averaged $EM(T)$ of the whole solar corona is double-peaked, with the hot peak, due to time-averaged flares, located at temperature similar of that of active stars, but less enhanced. The $EM_F(T)$ shape supports the hypothesis that the hot $EM(T)$ peak of active coronae is due to unresolved solar-like flares. If this is the case, quiescent and flare components should follow different scaling laws for increasing stellar activity. In the assumption that the heating of the corona is entirely due to flares, from nano- to macro-flares, then either the flare distribution or the confined plasma response to flares, or both, are bimodal.

Accepted by A&A

For preprints contact: argi@astropa.unipa.it

For preprints via ftp or WWW: http://adsabs.harvard.edu/abs/2008arXiv0805.2685A

The Photospheric Solar Oxygen Project: I. Abundance Analysis of Atomic Lines and Influence of Atmospheric Models

E. Caffau[1], H.-G. Ludwig[2,1], M. Steffen[3], T.R. Ayres[4], P. Bonifacio[2,1,5], R. Cayrel[6], B. Freytag[7,8], B. Plez[8,9]

[1]GEPI, Observatoire de Paris, CNRS, Université Paris Diderot; 92195 Meudon Cedex, France
[2]CIFIST Marie Curie Excellence Team
[3]Astrophysikalisches Institut Potsdam, An der Sternwarte 16, D-14482 Potsdam, Germany
[4]Center for Astrophysics and Space Astronomy, University of Colorado, Boulder, CO, USA 80309-0389
[5]Istituto Nazionale di Astrofisica, Osservatorio Astronomico di Trieste, Via Tiepolo 11, I-34143 Trieste, Italy
[6]GEPI, Observatoire de Paris, CNRS, Université Paris Diderot; 61 av. de l'Observatoire, F-75014 Paris, France
[7]CNRS, Université de Lyon, École Normale Supérieure de Lyon, 46 allée d'Italie, F-69364 Lyon Cedex 7, France
[8]Department of Physics and Astronomy, Uppsala University, Box 515, S-751 20 Uppsala, Sweden
[9]GRAAL, CNRS UMR 5024, Université Montpellier II, 34095 Montpellier Cedex 5, France

The solar oxygen abundance has undergone a major downward revision in the last decade, the most noticeable one being the update including 3D hydrodynamical simulations to model the solar photosphere. Up to now, such an analysis has been carried out only by one group using one radiation-hydrodynamics code. We investigate the photospheric oxygen abundance considering lines from atomic transitions. We also consider the relationship between the solar model used and the resulting solar oxygen abundance, to understand whether the downward abundance revision is specifically related to 3D hydrodynamical effects. We perform a new determination of the solar photospheric oxygen abundance by analysing different high-resolution high signal-to-noise ratio atlases of the solar flux and disc-centre intensity making use of the latest generation of CO5BOLD 3D solar model atmospheres. We find $8.73 \leq \log(N_{\rm O}/N_{\rm H}) + 12 \leq 8.79$. The lower and upper values represent extreme assumptions on the role of collisional excitation and ionisation by neutral hydrogen for the NLTE level populations of neutral oxygen. The error of our analysis is $\pm\,(0.04 \pm 0.03)$ dex, the last being related to NLTE corrections, the first error to any other effect. 3D "granulation effects" do not play a decisive role in lowering the oxygen abundance. Our recommended value, considering our present ignorance of the role of collisions with hydrogen atoms on the NLTE level populations of oxygen, is $\log(N_{\rm O}/N_{\rm H}) = 8.76 \pm 0.07$. The reasons which have led to lower O abundances in the past are identified as (1) the lower equivalent widths adopted, and (2) the choice of neglecting collisions with hydrogen atoms in the statistical equilibrium calculations for oxygen.

Accepted by A&A

For preprints contact: Elisabetta.Caffau@obspm.fr

For preprints via arXiv: 2008arXiv0805.4398

Solar Grand Minima and Random Fluctuations in Dynamo Parameters

D. Moss[1], D. Sokoloff[2], I. Usoskin[3] and V. Tutubalin[4]

[1] School of Mathematics, University of Manchester, Manchester M13 9PL, UK.
[2] Department of Physics, Moscow State University, Moscow, 119992, Russia.
[3] Sodankylä Geophysical Observatory (Oulu Unit), 90014 University of Oulu, Finland
[4] Department of Mechanics and Mathematics, Moscow State University, Moscow, 119992, Russia

We consider to what extent the long-term dynamics of cyclic solar activity in the form of Grand Minima can be associated with random fluctuations of the parameters governing the solar dynamo. We consider fluctuations of the alpha-coefficient in the conventional Parker migratory dynamo, and also in slightly more sophisticated dynamo models, and demonstrate that they can mimic the gross features of the phenomenon of the occurrence of Grand Minima over a suitable parameter range. The temporal distribution of these Grand Minima appears chaotic, with a more or less exponential waiting time distribution, typical of Poisson processes. In contrast however, the available reconstruction of Grand Minima statistics based on cosmogenic isotope data demonstrates substantial deviations from this exponential law. We were unable to reproduce the non-Poissonic tail of the waiting time distribution either in the framework of a simple alpha-quenched Parker model, or in its straightforward generalization, nor in simple models with feedback on the differential rotation. We suggest that the disagreement may only be apparent and is plausibly related to the limited observational data, and that the observations and results of numerical modeling can be consistent and represent

physically similar dynamo regimes.

Accepted by Solar Phys.

For preprints contact: ilya.usoskin@oulu.fi

Non-equilibrium of Ionization and the Detection of Hot Plasma in Nanoflare-heated Coronal Loops

Fabio Reale[1,2], and Salvatore Orlando[2]

[1] Dipartimento di Scienze Fisiche & Astronomiche, Università di Palermo, Sezione di Astronomia, Piazza del Parlamento 1, 90134 Palermo, Italy
[2] INAF - Osservatorio Astronomico di Palermo "G.S. Vaiana", Piazza del Parlamento 1, 90134 Palermo, Italy

Impulsive nanoflares are expected to transiently heat the plasma confined in coronal loops to temperatures of the order of 10 MK. Such hot plasma is hardly detected in quiet and active regions, outside flares. During rapid and short heat pulses in rarified loops the plasma can be highly out of equilibrium of ionization. Here we investigate the effects of the non-equilibrium of ionization (NEI) on the detection of hot plasma in coronal loops. Time-dependent loop hydrodynamic simulations are specifically devoted to this task, including saturated thermal conduction, and coupled to the detailed solution of the equations of ionization rate for several abundant elements. In our simulations, initially cool and rarified magnetic flux tubes are heated to 10 MK by nanoflares deposited either at the footpoints or at the loop apex. We test for different pulse durations, and find that, due to NEI effects, the loop plasma may never be detected at temperatures above ~ 5 MK for heat pulses shorter than about 1 min. We discuss some implications in the framework of multi-stranded nanoflare-heated coronal loops.

Accepted by ApJ

For preprints contact: reale@astropa.unipa.it

Solar Forbidden Oxygen, Revisited

Thomas R. Ayres[1]

[1]Center for Astrophysics and Space Astronomy, 389 UCB, University of Colorado, Boulder, CO 80309

Recent large reductions in the solar oxygen abundance, based on synthesis of photospheric O I, OH, and CO absorptions with 3D convection models, have provoked consternation in the helioseismology community: previous excellent agreement between measured p–mode oscillation frequencies and predictions based on the recommended $\epsilon_{\rm O}$ of a decade ago (680 parts per million [ppm] relative to hydrogen) unravels at the new low value (460 ppm). In an attempt to reconcile these conflicting results, the formation of pivotal [O I] λ6300, which is blended with a weak Ni I line, has been reconsidered, exploiting an alternative 3D model (albeit only a single temporal snapshot). And while there are several areas of agreement with the earlier [O I] studies of Allende Prieto, Asplund, and others, there is one crucial point of disagreement: the $\epsilon_{\rm O}$ derived here is significantly larger, 650$\pm$65 ppm (although at the expense of a $\sim 30\%$ weaker Ni I line than expected from the recommended nickel abundance). One innovation is a more robust treatment of the solar wavelengths: the balance between the components of the [O I] + Ni I blend is sensitive to velocity errors of only a few hundred m s^{-1}. A second improvement is enforcement of a "continuum calibration" to ensure a self-consistent 3D temperature scale. Owing to the renewed agreement between the linchpin tracer [O I] and seismic oxygen, the proposed downward slump of the solar metallicity—and the perceived "Oxygen Crisis"—now can be said to rest upon less secure footings.

Submitted to Astrophysical Journal

For preprints contact: Thomas.Ayres@Colorado.edu

For preprints via anonymous ftp: **casa.colorado.edu/pub/ayres/Oxygen_Crisis.pdf**

Chromospheric Activity, Rotation, and Rotational Braking in M and L Dwarfs

Ansgar Reiners[1] and Gibor Basri[2]

[1] Institut für Astrophysik, Georg-August-Universität, 37077 Göttingen, Germany
[2] Astronomy Department, University of California, Berkeley, CA 94720

We present results from a high-resolution spectroscopic survey of 45 L dwarfs, which includes both very low-mass stars and brown dwarfs. Our spectra allow us to derive a significant number of new rotational velocities, and discover a slowly rotating (in projected velocity) L dwarf that allows more accurate measurement of spectroscopic rotations for these objects. We measure chromospheric activity (and often its variability) through the Hα emission line. Our primary new result is good evidence that magnetic braking dominates the angular momentum evolution of even brown dwarfs, although spindown times appear to increase as mass decreases. We confirm that activity decreases as effective temperature decreases, though a larger fraction of L dwarfs are active than has previously been reported. Essentially all active objects are also variable. We confirm the lack of a rotation-activity connection for L dwarfs. We find a minimum limit for rotational velocities that increases with later spectral types, rising from near zero in older mid-M stars to more than 20 km s^{-1} for mid-L objects. There is strong evidence that all L dwarfs are rapid rotators. We derive a braking law that can depend on either temperature or mass which can explain all the rotational results and provides an age dependence for the angular momentum evolution. It is clear that angular momentum loss mechanisms in smaller and cooler objects become more inefficient, starting at the fully convective boundary.

Accepted by ApJ

For preprints contact: Ansgar.Reiners@phys.uni-goettingen.de
For preprints via ftp or WWW: http://arxiv.org/abs/0805.1059

Confirmation of the Electron Cyclotron Maser Instability as the Dominant Source of Radio Emission from Very Low Mass Stars and Brown Dwarfs

G. Hallinan[1], A. Antonova[2], J.G. Doyle[2], S. Bourke[1,3], C. Lane[1] and A. Golden[1]

[1] Centre for Astronomy, National University of Ireland, Galway, Ireland
[2] Armagh Observatory, College Hill, Armagh BT61 9DG, N. Ireland
[3] Joint Institute for VLBI in Europe, Postbus 2, 7990 AA Dwingeloo, the Netherlands

We report on radio observations of the M8.5 dwarf LSR J1835+3259 and the L3.5 dwarf 2MASS J00361617+1821104, which provide the strongest evidence to date that the electron cyclotron maser instability is the dominant mechanism producing radio emission in the magnetospheres of ultracool dwarfs. As has previously been reported for the M9 dwarf TVLM 513-46546, periodic pulses of 100% circularly polarized, coherent radio emission are detected from both dwarfs with periods of 2.84 ± 0.01 and 3.08 ± 0.05 hours respectively for LSR J1835+3259 and 2MASS J00361617+1821104. Importantly, periodic *unpolarized* radio emission is also detected from 2MASS J00361617+1821104, and brightness temperature limitations rule out gyrosynchrotron radiation as a source of this radio emission. The unpolarized emission from this and other ultracool dwarfs is also attributed to electron cyclotron maser emission, which has become depolarized on traversing the ultracool dwarf magnetosphere, possibly due to propagations effects such as scattering. Based on available $v \sin i$ data in the literature and rotation periods derived from the periodic radio data for the three confirmed sources of electron cyclotron maser emission, TVLM 513-46546, LSR J1835+3259 and 2MASS J00361617+1821104, we determine that the rotation axes of all three dwarfs are close to perpendicular to our line of sight. This suggests a possible geometrical selection effect due to the inherent directivity of electron cyclotron maser emission, that may account for the previously reported relationship between radio activity and $v \sin i$ observed for ultracool dwarfs. We also determine the radius of the dwarf LSR J1835+3259 to be $\geq 0.117 \pm 0.012$ R$_\odot$. The implied size of the radius, together with the bolometric luminosity of the dwarf, suggests that either LSR J1835 is a young or intermediate age brown dwarf or that current theoretical models underestimate the radii of ultracool dwarfs.

Accepted by ApJ

For preprints contact: gregg@it.nuigalway.ie

Hot Jupiters and Stellar Magnetic Activity

A. F. Lanza[1]

[1] INAF-Osservatorio Astrofisico di Catania, Via S. Sofia, 78, 95123 Catania, Italy

Recent observations suggest that stellar magnetic activity may be influenced by the presence of a close-by giant planet. Specifically, chromospheric hot spots rotating in phase with the planet orbital motion have been observed during some seasons in a few stars harbouring hot Jupiters. The spot leads the subplanetary point by a typical amount of $\sim 60° - 70°$, with the extreme case of υ And where the angle is $\sim 170°$. The interaction between the star and the planet is described considering the reconnection between the stellar coronal field and the magnetic field of the planet. Reconnection events produce energetic particles that moving along magnetic field lines impact onto the stellar chromosphere giving rise to a localized hot spot. A simple magnetohydrostatic model is introduced to describe the coronal magnetic field of the star connecting its surface to the orbiting planet. The field is assumed to be axisymmetric around the rotation axis of the star and its configuration is more general than a linear force-free field. With a suitable choice of the free parameters, the model can explain the phase differences between the hot spots and the planets observed in HD 179949, υ And, HD 189733, and τ Boo, as well as their visibility modulation on the orbital period and seasonal time scales. The possible presence of cool spots associated with the planets in τ Boo and HD 192263 cannot be explained by the present model. However, we speculate about the possibility that reconnection events in the corona may influence subphotospheric dynamo action in those stars producing localized photospheric (and chromospheric) activity migrating in phase with their planets.

Accepted by A&A

For preprints contact: nuccio.lanza@oact.inaf.it

For preprints via ftp or WWW: http://arxiv.org/abs/0805.3010

Instrumentation Abstracts

The Deep Lamp Project: An Investigation of the Precision and Accuracy of the Echelle Wavelength Scales of Space Telescope Imaging Spectrograph

Thomas R. Ayres[1]

[1]Center for Astrophysics and Space Astronomy, 389 UCB, University of Colorado, Boulder, CO 80309

The precision and absolute accuracy of the echelle mode wavelength scales of Space Telescope Imaging Spectrograph (STIS) are investigated. The method is to measure deep exposures of the onboard Pt/Cr–Ne hollow cathode calibration lamp. Standard deviations of emission spots from their laboratory wavelengths in a single image are a measure of the internal precision of the pipeline assigned scales. The average shift of the image as a whole is a measure of the absolute accuracy. While systematic patterns can be identified in all four echelle modes (E140M, E140M, E230M, and E230H), the overall precision (even without compensating for long range trends with λ) is excellent: of order one tenth of the resolution element ($\sigma \sim 600$ m s^{-1}, 300 m s^{-1}, for medium [M] and high [H] resolution modes respectively). Furthermore, the absolute accuracy and its repeatability (assessed in time series of WAVECAL images) is of order a remarkable 100 m s^{-1}, aside from one of the E230M modes (secondary tilt λ2269) that shows a systematic offset ten times larger. The excellent precision of the STIS echelle wavelengths could be improved by adding higher order terms to the bi-quadratic polynomial currently implemented in the "calstis" pipeline. On the other hand, the existing small distortions might be resolved more naturally by a "physical instrument model," currently under development by the Space Telescope European Coordinating Facility's STIS Calibration Enhancement Project.

Accepted by ApJ Supp.

For preprints contact: Thomas.Ayres@Colorado.edu

For preprints via anonymous ftp: casa.colorado.edu/pub/ayres/DeepLamp.pdf

Upcoming Meeting

Classification and Discovery with Large Astronomical Surveys

14 - 17 October 2008

Ringberg Castle, Germany

Numerous current or upcoming astronomical surveys produce large amounts of photometric, spectroscopic and astrometric data. Object classification, parameter determination, novelty detection and the discovery of structure are important yet challenging tasks. This workshop will bring together scientists to discuss the issues, present algorithms and results, and identify common problems and solutions for future work.

We invite scientists from all areas of astronomy working on the analysis and interpretation of large astronomical datasets to submit an abstract. This will be an informal meeting with a maximum of 60 participants. Print and online proceedings will be published by the American Institute of Physics.

The workshop will take place at Ringberg Castle in the foothills of the Bavarian Alps. There will be plenty of time for discussions, both during the plenary sessions as well as in the dining room, bar and lounges in the castle. Up to 34 participants can be hosted at the castle itself (first-come, first-served) with the rest staying at a hotel in a nearby town.

For more details on the workshop goals, list of invited speakers, plus registration and other practical information, see

http://www.mpia.de/class2008/

We look forward to welcoming you to Ringberg!

Yours sincerely,

Coryn Bailer-Jones, for the SOC and LOC

The Scientific Organizing Committee: Coryn Bailer-Jones (MPIA Heidelberg, Chair) Matthias Bartelmann (ITA Heidelberg) Tim Beers (MSU Michigan) Bob Nichol (ICG Portsmouth) Hans-Walter Rix (MPIA Heidelberg)

The Local Organizing Committee: Coryn Bailer-Jones, Christian Elting, Susanne Koltes-Al-Zoubi, Kester Smith, Carola Tiede, Paraskevi Tsalmantza

Job Opening

Fellowships for Ph.D. Students

Solar System Physics

Intl. Max Planck Research School (Germany)

The *International Max Planck Research School on Physical Processes in the Solar System and Beyond* at the Max Planck Institute for Solar System Research in Katlenburg-Lindau, and the Universities of Braunschweig and Goettingen, Germany, offers excellent research possibilities for students to obtain a PhD degree in a 3-years graduate program.

The program covers the full range of physics inherent in the field of solar system science from geophysics and planetary physics to solar physics as well as the underlying fundamental physics. The science program is complemented by training in computational physics, space technology and project management.

High-profile space missions, outstanding projects for ground- based instruments and data analysis, as well as theoretical and extensive numerical modeling provide a wide range of research possibilities for PhD students.

Applications for the program are open to highly-qualified and well-motivated students from all countries. A prerequisite is a diploma or master of science degree in physics or a related field, including a corresponding thesis. Proficiency in English is required.

The next PhD program will start in January 2009, review of application begins on 15 July 2008. Successful applicants will receive adequate financial support.

The application documents should include a CV, the filled application form (see web page), copies of university certificates and two letters of recommendation. The application can be send either by mail or by email (preferentially one attachment in pdf format).

For details on the IMPRS program and the application procedure, please visit http://www.solar-system-school.de or email to info@solar-system-school.de

Address applications to

Dr. Dieter Schmitt Coordinator IMPRS Solar System School Max Planck Institute for Solar System Research Max-Planck-Str. 2 37191 Katlenburg-Lindau Germany

Tel: +49 5556 979 431 Fax: +49 5556 979 190 Email: info@solar-system-school.de

Job Opening

Operations Staff Astronomer

Advanced Spectroscopy

ESO Science Operations (VLT)

ESO is opening an astronomer position for its Science Operations Department at the VLT (specialization in "Advanced spectroscopy").

The ideal candidate will be an active researcher and have excellent observation-oriented research records, will be familiar with instrumental, data analysis, archiving and/or observational techniques, and must be conversant with at least one major data reduction package such as MIDAS, IRAF or IDL. Of special value for this position would be a record of expertise with any of the various advanced spectroscopy techniques, such as 3D, massive multiobject, high accuracy radial velocity, etc, either at the observation preparation and optimization, and/or data analysis level.

The successful candidate will support observing operations in both visitor and service mode at the La Silla Paranal Observatory, with duty station on Paranal, including short-term scheduling of observations, calibration of instruments, and the assessment of the scientific quality of the astronomical data.

Depending on skills and experience, s/he will be responsible for some of the systems, for the definition, implementation, optimization and characterization of new observing modes, the set-up of optimized calibration plans and integration of these systems with the automatic data reduction pipelines.

Please visit http://www.eso.org for further details. Applicants are invited to apply online at https://jobs.eso.org/. Closing date for applications is 31 July 2008.

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.***