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Stellar Abstracts

Three-Dimensional Interferometric, Spectrometric, and Planetary Views of Procyon

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We used a new realistic 3D radiative-hydrodynamical model atmosphere of Procyon generated with the Stagger Code and synthetic spectra computed with the radiative transfer code Optim3D to re-analyze interferometric and spectroscopic data from the optical to the infrared of Procyon. We compute intensity maps in two optical filters centered at 500 and 800 nm (MARK III) and one infrared filter centered at 2200 nm (VINCI). We constructed stellar disk images accounting for the center-to-limb variations and used them to derive visibility amplitudes and closure phases. We provide 3D limb-darkening coefficients in the optical as well as in the infrared. We show that visibility curves and closure phases show clear deviations from circular symmetry from the 3rd lobe on. These deviations are detectable with current interferometers using closure phases. We derive new angular diameters at different wavelengths with two independent methods based on 3D simulations. We find a diameter$_{Vinci}$ = 5.390 ± 0.03 mas that this is confirmed by an independent asteroseismic estimation. The resulting Teff is 6591 K, which is consistent with the infrared flux method determinations. We find also a value of the surface gravity log g = 4.01 ± 0.03 that is larger by 0.05 dex from literature values. Spectrophotometric comparisons with observations provide very good agreement with the spectral energy distribution and photometric colors, allowing us to conclude that the thermal gradient of the simulation matches fairly well Procyon. Finally, we show that the granulation pattern of a planet hosting Procyon-like star has a non-negligible impact on the detection of hot Jupiters in the infrared using interferometry closure phases. It is then crucial to have a comprehensive knowledge of the host star to directly detect and characterize hot Jupiters. In this respect, RHD simulations are very important to reach this aim.

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Starspots on the Fastest Rotators in the β Pic Moving Group

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Aims. We carried out high-resolution spectroscopy and $BV(I)_C$ photometric monitoring of the two fastest late-type rotators in the nearby β Pictoris moving group, HD 199143 (F7V) and CD−64°1208 (K7V). The motivation for this work is to investigate the rotation periods and photospheric spot patterns of these very young stars, with a longer term view to probing the evolution of rotation and magnetic activity during the early phases of main-sequence evolution. We also aim to derive information on key physical parameters, such as rotational velocity and rotation period.
Methods. We applied maximum entropy (ME) and Tikhonov regularizing (TR) criteria to derive the surface spot map distributions of the optical modulation observed in HD 199143 (F7 V) and CD−64°1208 (K7 V). We also used cross-correlation techniques to determine stellar parameters such as radial velocities and rotational velocities. Lomb-Scargle periodograms were used to obtain the rotational periods from differential magnitude time series.
Results. We find periods and inclinations of 0.356 days and 21.5 deg for HD 199143, and 0.355 days and 50.1 deg for CD−64°1208. The spot maps of HD 199143 obtained from the ME and TR methods are very similar, although the latter gives a smoother distribution of the filling factor. Maps obtained at two different epochs three weeks apart show a remarkable increase in spot coverage amounting to $\sim 7\%$ of the surface of the photosphere over a time period of only ~ 20 days. The spot maps of CD−64°1208 from the two methods show good longitudinal agreement, whereas the latitude range of the spots is extended to cover the whole visible hemisphere in the TR map. The distributions obtained from the first light curve of HD 199143 show the presence of an extended and asymmetric active longitude with the maximum filling factor at longitude $\sim 325°$. A secondary active longitude is present at $\sim 100°$. The spotted area distributions on CD−64°1208 show two active longitudes separated by about 180°, which is not unusual on such very active stars.

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On the Sodium Overabundance of Giants in Open Clusters: The Case of the Hyades

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Sodium abundances have been determined in a large number of giants of open clusters but conflicting results, ranging from solar values to overabundances of up to five orders of magnitude, have been found. The reasons for this disagreement are not well-understood. As these Na overabundances can be the result of deep mixing, their proper understanding has consequences for models of stellar evolution. As discussed in the literature, part of this disagreement comes from the adoption of different corrections for non-LTE effects and from the use of different atomic data for the same set of lines. However, a clear picture of the Na behaviour in giants is still missing. To contribute in this direction, this work presents a careful redetermination of the Na abundances of the Hyades giants, motivated by the recent measurement of their angular diameters. An average of [Na/Fe] = +0.30, in NLTE, has been found. This overabundance can be explained by hydrodynamical models with high initial rotation velocities. This result, and a trend of increasing Na with increasing stellar mass found in a previous work, suggests that there is no strong evidence of Na overabundances in red giants beyond those values expected by evolutionary models of stars with more than $\sim$ 2 $M_\odot$.

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Observation and Modelling of Main Sequence Stellar Chromospheres; XVII Rotation of dM4 Stars

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Using two different spectrographs, HARPS (ESO) and SOPHIE (OHP), we have measured vsini for a sample of 23 dM4 stars. These are the first measurements of vsini for most of the stars studied here.

We measured vsini to a precision of 0.3 $km\ s^{-1}$ and a detection limit of about 0.5-1 $km\ s^{-1}$. All our targets have similar (R-I)c colour. This is an advantage and facilitates the determination of the narrowest cross-correlation profiles for vsini$\sim$0. In our sample, we detected rotation for 21 stars (12 dM4e stars and 9 dM4 stars) and we did not detect rotation in a further 2 stars. This result shows that there are many dM4 fast rotators (of the order of 5 days), and many more than in the case of dM1 stars.

We determined radii and effective temperatures for all our target stars. The effective temperatures were derived using the (R-I)c colour and empirical far-red colour-effective temperature correlations. We derived the radii from the standard formulae relating M_{bol}, BC and T_{eff}.

We find that the distribution of P/sini (the projected rotation period) is bimodal with a maximum for slow rotators around 14 days and another around 6 days for fast rotators, similarly to dM1 stars. The rotation period appears to decrease with decreasing radius, both among dM4 and dM4e stars. The same finding was obtained in our previous study of dM1 stars.

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Observation and Modelling of Main Sequence Stellar Chromospheres; XVIII. Observations of the Ca II Resonance Lines and H_α Line for dM4 stars and dK5 Stars

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We use 665 high resolution spectra for 60 different dM4 stars and 1088 high resolution spectra for 97 different dK5 stars from the European Southern Observatory (ESO) and Observatoire de Haute Provence (OHP) databases. We present 179 new measurements of the Ca II resonance lines and 615 new measurements of the H_α line for dM4 stars. We also present 701 new measurements of the Ca II resonance lines and 1088 new measurements of the H_α line for dK5 stars. We also compiled other measurements available in the literature.

We cross-correlate the activity diagnostics, namely, the Ca II resonance lines characteristics, the H_α line characteristics and L_X. We set new constraints on some empirical relationships between these parameters that are important for constraining the chromospheric modelling of these stars.

We study the Ca II line mean equivalent width (EW) as a function of absolute magnitude (M_v) for three spectral types: dK5, dM1 and dM4. We show that the magnetic activity level is rather constant with M_v for both dM4 and dK5 stars on the contrary to dM1 stars for which the magnetic activity level increases with diminishing M_v. In other words, only dM1 stars show this particular dependence of the level of magnetic activity with M_v.

From the correlations of the magnetic activity indices with P/sini, we find that the Ca II EW and L_X grows increasingly faster as the spectral type increases from dK5, dM1 to dM4. The exponents in the Ca II-P/sini correlations are -0.80, -1.53 and -3.72 for dK5 stars, dM1 stars and dM4 stars respectively.

We also find that the X-ray luminosity grows faster than the chromospheric Ca II emission when the rotation rate increases. Moreover, we found that the exponent on P/sini for both the Ca II and L_X correlations is about twice smaller for dK5 stars than for dM1 stars. Therefore, the level of magnetic activity in dK5 and dM4 stars is more dependent on rotation than on the stellar radius, the opposite result to that found for dM1 stars.

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The *ChaMPlane* Bright X-ray Sources — Galactic Longitudes $l = 2° - 358°$

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The *Chandra* Multiwavelength Plane (ChaMPlane) Survey aims to constrain the Galactic population of mainly accretion-powered, but also coronal, low-luminosity X-ray sources ($L_X \lesssim 10^{33}$ erg s^{-1}). To investigate the X-ray source content in the plane at fluxes $F_X \gtrsim 3 \times 10^{-14}$ erg s^{-1} cm^{-2}, we study 21 of the brightest ChaMPlane sources, viz. those with >250 net counts (0.3–8 keV). By excluding the heavily obscured central part of the plane, our optical/near-infrared follow-up puts useful constraints on their nature. We have discovered two likely accreting white-dwarf binaries. CXOPS J154305.5−522709 (CBS 7) is a cataclysmic variable showing periodic X-ray flux modulations on 1.2 hr and 2.4 hr; given its hard spectrum the system is likely magnetic. We identify CXOPS J175900.8−334548 (CBS 17) with a late-type giant; if the X-rays are indeed accretion-powered, it belongs to the small but growing class of symbiotic binaries lacking strong optical nebular emission lines. CXOPS J171340.5−395213 (CBS 14) is an X-ray transient that brightened $\gtrsim$ 100 times. We tentatively classify it as a very late-type (>M7) dwarf, of which few have been detected in X-rays. The remaining sources are (candidate) active galaxies, normal stars and active binaries, and a plausible young T Tauri star. The derived cumulative number density versus flux (log N − log S) relation for the Galactic sources appears flatter than expected for an isotropic distribution, indicating that we are seeing a non-local sample of mostly coronal sources. Our findings define source templates that we can use, in part, to classify the $>10^4$ fainter sources in ChaMPlane.

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Planet-Induced Emission Enhancements in HD 179949: Results from McDonald Observations

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We monitored the Ca II H and K lines of HD 179949, a notable star in the southern hemisphere, to observe and confirm previously identified planet induced emission (PIE) as an effect of star-planet interaction. We obtained high resolution spectra ($R \sim 53,000$) with a signal-to-noise ratio S/N $\gtrsim 50$ in the Ca II H and K cores during 10 nights of observation at the McDonald Observatory. Wide band echelle spectra were taken using the 2.7 m telescope. Detailed statistical analysis of Ca II K revealed fluctuations in the Ca II K core attributable to planet induced chromospheric emission. This result is consistent with previous studies by Shkolnik et al. (2003). Additionally, we were able to confirm the reality and temporal evolution of the phase shift of the maximum of star-planet interaction previously found. However, no identifiable fluctuations were detected in the Ca II H core. The Al I λ3944 Å line was also monitored to gauge if the expected activity enhancements are confined to the chromospheric layer. Our observations revealed some variability, which is apparently unassociated with planet induced activity.

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M-dwarf Metallicities – A High-Resolution Spectroscopic Study in the Near Infrared

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Context. The relatively wide spread in the derived metallicities ([Fe/H]) of M dwarfs shows that various approaches have not yet converged to consistency. The presence of strong molecular features and incomplete line lists for the corresponding molecules have made determining the metallicity of M dwarfs difficult. Furthermore, the faint M dwarfs require long exposure times for the signal-to-noise ratio needed for a detailed spectroscopic abundance analysis.
Aims. We present a high-resolution (R∼50,000) spectroscopic study of a sample of eight single M dwarfs and three wide-binary systems observed in the infrared J band.
Methods. The absence of large molecular contributions allows for a precise continuum placement. We derived metallicities based on the best fit of synthetic spectra to the observed spectra. To verify the accuracy of the applied atmospheric models and test our synthetic spectrum approach, three binary systems with a K-dwarf primary and an M-dwarf companion were observed and analysed along with the single M dwarfs.
Results. We obtain good agreement between the metallicities derived for the primaries and secondaries of our test binaries, thereby confirming the reliability of our method of analysing M dwarfs. Our metallicities agree well with some earlier determinations, and deviate from others.
Conclusions. We conclude that spectroscopic abundance analysis in the J band is a reliable method for establishing the metallicity scale for M dwarfs. We recommend its application to a larger sample covering lower, as well as higher, metallicities. Further prospects for the method include abundance determinations for individual elements.

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Decorrelation Times of Photospheric Fields and Flows

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We use autocorrelation to investigate evolution in flow fields inferred by applying Fourier Local Correlation Tracking (FLCT) to a sequence of high-resolution (0.3″), high-cadence (≈2 min) line-of-sight magnetograms of NOAA active region (AR) 10930 recorded by the Narrowband Filter Imager (NFI) of the Solar Optical Telescope (SOT) aboard the Hinode satellite over 12–13 December 2006. To baseline the timescales of flow evolution, we also autocorrelated the magnetograms, at several spatial binnings, to characterize the lifetimes of active region magnetic structures versus spatial scale. Autocorrelation of flow maps can be used to optimize tracking parameters, to understand tracking algorithms' susceptibility to noise, and to estimate flow lifetimes. Tracking parameters varied include: time interval Δt between magnetogram pairs tracked, spatial binning applied to the magnetograms, and windowing parameter σ used in FLCT. Flow structures vary over a range of spatial and temporal scales (including unresolved scales), so tracked flows represent a local average of the flow over a particular range of space and time. We define flow lifetime to be the flow decorrelation time, τ. For $\Delta t > \tau$, tracking results represent the average velocity over one or more flow lifetimes. We analyze lifetimes of flow components, divergences, and curls as functions of magnetic field strength and spatial scale. We find a significant trend of increasing lifetimes of flow components, divergences, and curls with field strength, consistent with Lorentz forces partially governing flows in the active photosphere, as well as strong trends of increasing flow lifetime and decreasing magnitudes with increases in both spatial scale and Δt.

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Rights and Wrongs of the Temporal Solar Radius Variability

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From time immemorial men have strived to measure the size of celestial bodies. Among them, the diameter of the Sun was a source of curiosity and study. Tackled by Greek astronomers from a geometric point of view, an estimate, although incorrect, has been first determined, not truly called into question for several centuries. One must wait up to the XVIIth century to get the first precise determinations made by the French school of astronomy. Gradually, as the techniques were more and more sophisticated, many other solar diameter measurements were carried out, notably in England, Germany, Italy and US. However, even with instruments at the cutting edge of progress, no absolute value of the solar diameter has been provided yet, even if the community has adopted a canonical radius of 959".63, given in all ephemeris since the end of the XIXth century. One of the major difficulty is to define a correct solar diameter. Another issue is the possible temporal variability of the size of the Sun, as first advocated at the end of the XIXth century by the Italian school. Today, this question is just on the way to be solved in spite of considerable efforts developed on ground-based facilities or on board space experiments. We will here give a review of some of the most remarkable techniques used in the past, emphasizing how incorrect measurements have driven new ideas, leading to develop new statements for the underlying physics. On such new grounds, it can be speculated that the roundness of the Sun is not perfect, but developing a thin cantaloupe skin in period of higher activity, departures to sphericity being inevitably bounded by a few kilometers (around 80 km or 10 to 15 mas). (continued →)

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Basal Chromospheric Flux and Maunder Minimum-type Stars: The Quiet-Sun Chromosphere as a Universal Phenomenon

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Aims: We demonstrate the universal character of the quiet-Sun chromosphere among inactive stars (solar-type and giants). By assessing the main physical processes, we shed new light on some common observational phenomena. Methods: We discuss measurements of the solar Mt. Wilson S-index, obtained by the Hamburg Robotic Telescope around the extreme minimum year 2009, and compare the established chromospheric basal Ca II K line flux to the Mt. Wilson S-index data of inactive ("flat activity") stars, including giants. Results: During the unusually deep and extended activity minimum of 2009, the Sun reached S-index values considerably lower than in any of its previously observed minima. In several brief periods, the Sun coincided exactly with the S-indices of inactive ("flat", presumed Maunder Minimum-type) solar analogues of the Mt. Wilson sample; at the same time, the solar visible surface was also free of any plages or remaining weak activity regions. The corresponding minimum Ca II K flux of the quiet Sun and of the presumed Maunder Minimum-type stars in the Mt. Wilson sample are found to be identical to the corresponding Ca II K chromospheric basal flux limit. Conclusions: We conclude that the quiet-Sun chromosphere is a universal phenomenon among inactive stars. Its mixed-polarity magnetic field, generated by a local, "fast" turbulent dynamo finally provides a natural explanation for the minimal soft X-ray emission observed for inactive stars. Given such a local dynamo also works for giant chromospheres, albeit on larger length scales, i.e., $l \propto R/g$, with R and g as stellar radius and surface gravity, respectively, the existence of giant spicular phenomena and the guidance of mechanical energy toward the acceleration zone of cool stellar winds along flux-tubes have now become traceable.

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Low-Mass and Substellar Abstracts

The Stability of the Suggested Planet in the ν Octantis System: A Numerical and Statistical Study

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We provide a detailed theoretical study aimed at the observational finding about the ν Octantis binary system that indicates the possible existence of a Jupiter-type planet in this system. If a prograde planetary orbit is assumed, it has earlier been argued that the planet, if existing, should be located outside the zone of orbital stability. However, a previous study by Eberle & Cuntz (2010) [ApJ 721, L168] concludes that the planet is most likely stable if assumed to be in a retrograde orbit with respect to the secondary system component. In the present work, we significantly augment this study by taking into account the observationally deduced uncertainty ranges of the orbital parameters for the stellar components and the suggested planet. Furthermore, our study employs additional mathematical methods, which include monitoring the Jacobi constant, the zero velocity function, and the maximum Lyapunov exponent. We again find that the suggested planet is indeed possible if assumed to be in a retrograde orbit, but it is virtually impossible if assumed in a prograde orbit. Its existence is found to be consistent with the deduced system parameters of the binary components and of the suggested planet, including the associated uncertainty bars given by observations.

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Habitability of Earth-mass Planets and Moons in the Kepler-16 System

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We demonstrate that habitable Earth-mass planets and moons can exist in the Kepler-16 system, known to host a Saturn-mass planet around a stellar binary, by investigating their orbital stability in the standard and extended habitable zone (HZ). We find that Earth-mass planets in satellite-like (S-type) orbits are possible within the standard HZ in direct vicinity of Kepler-16b, thus constituting habitable exomoons. However, Earth-mass planets cannot exist in planetary-like (P-type) orbits around the two stellar components within the standard HZ. Yet, P-type Earth-mass planets can exist superior to the Saturnian planet in the extended HZ pertaining to considerably enhanced back-warming in the planetary atmosphere if facilitated. We briefly discuss the potential detectability of such habitable Earth-mass moons and planets positioned in satellite and planetary orbits, respectively. The range of inferior and superior P-type orbits in the HZ is between 0.657 to 0.71 AU and 0.95 to 1.02 AU, respectively.

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First Sub-millimeter Detection of the TWA Brown Dwarf Disc 2MASSW J1207334-393254

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We present Herschel/SPIRE observations for the 2MASS1207334-393254 (2M1207) system. Based on radiative transfer modeling of near-infrared to sub-millimeter data, we estimate a disc mass of $3{\pm}2\ M_{Jup}$ and an outer disc radius of 50–100 AU for the 2M1207A disc. The *relative* disc mass for 2M1207A is similar to the T Tauri star TW Hya, which indicates that massive discs are not underabundant around sub-stellar objects. In probing the various formation mechanisms for this system, we find that core accretion is highly uncertain mainly due to the large separation between the primary and the companion. Disk fragmentation could be a likely scenario based on analytical models, and if the disc initially was more massive than its current estimate. Considering that the TWA is sparsely populated, this system could have formed via one of the known binary formation mechanisms (e.g. turbulent fragmentation of a core) and survived disruption at an early stage.

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Limb Darkening Laws for Two Exoplanet Host Stars Derived from 3D Stellar Model Atmospheres

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We compare limb darkening laws derived from 3D hydrodynamical model atmospheres and 1D hydrostatic `MARCS` models for the host stars of two well-studied transiting exoplanet systems, the late-type dwarfs HD 209458 and HD 189733. The surface brightness distribution of the stellar disks is calculated for a wide spectral range using 3D LTE spectrum formation and opacity sampling. We test our theoretical predictions using least-squares fits of model light curves to wavelength-integrated primary eclipses that were observed with the Hubble Space Telescope (HST).

The limb darkening law derived from the 3D model of HD 209458 in the spectral region between 2900 Å and 5700 Å produces significantly better fits to the HST data, removing systematic residuals that were previously observed for

model light curves based on 1D limb darkening predictions. This difference arises mainly from the shallower mean temperature structure of the 3D model, which is a consequence of the explicit simulation of stellar surface granulation where 1D models need to rely on simplified recipes. In the case of HD 189733, the model atmospheres produce practically equivalent limb darkening curves between 2900 Å and 5700 Å, partly due to obstruction by spectral lines, and the data are not sufficient to distinguish between the light curves. We also analyze HST observations between 5350 Å and 10500 Å for this star; the 3D model leads to a better fit compared to 1D limb darkening predictions.

The significant improvement of fit quality for the HD 209458 system demonstrates the higher degree of realism of 3D hydrodynamical models and the importance of surface granulation for the formation of the atmospheric radiation field of late-type stars. This result agrees well with recent investigations of limb darkening in the solar continuum and other observational tests of the 3D models. The case of HD 189733 is no contradiction as the model light curves are less sensitive to the temperature stratification of the stellar atmosphere and the observed data in the 2900 Å - 5700 Å region are not sufficient to distinguish more clearly between the 3D and 1D limb darkening predictions.

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Upcoming Meeting

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21 - 24 October 2012

Ringberg Castle (Germany)

International Conference on Brown Dwarfs at Ringberg Castle

This workshop will take place exactly 50 years after the theoretical prediction of the existence of brown dwarfs, i.e. of degenerate objects just not massive enough to sustain stable hydrogen fusion. The exploration of brown dwarfs has seen tremendous progress over the last years since the first discoveries in the 90ies. How brown dwarfs form, however, is still one of the main open questions in the theory of star formation. A key role to answer this question play brown dwarfs as members of binary and multiple systems. Steadily improving instrumental performance led to the discovery of companions around brown dwarfs down to planetary masses, to size (radii) and dynamical mass determinations, and to statistically significant samples of very low-mass binaries. These detailed empirical characterizations of brown dwarfs enable us to test and calibrate increasingly sophisticated models of internal structure, atmosphere, and formation of substellar objects.

The Ringberg workshop will open with a celebration of the 50th anniversary of Shiv Kumars's theoretical prediction of brown dwarfs and proceed to explore the origin of brown dwarfs with a focus on brown dwarf binaries. The aim is to foster a close link between observational binary studies (RV and direct imaging, incl. individual benchmark systems) and theories in the field of brown dwarf formation. The program will include invited review talks on the main topics as well as contributed talks. We cordially invite the community for abstract submissions.

Location: The conference will take place at the nice venue of Ringberg castle, which is located south of Munich, Germany, in the Bavarian Alps.

Conference web page: http://www.mpia.de/homes/joergens/ ringberg2012.html

Registration deadline: April 15, 2012. The number of participants is limited to 70.

SOC: Viki Joergens, Isabelle Baraffe, Gibor Basri, Wolfgang Brandner, Adam Burgasser, Cathie Clarke, Thomas Henning, Ralf Klessen, Keivan Stassun

Upcoming Meeting

22nd UCL Astrophysics Colloquium: Opacities in Cool Stars and Exoplanets

2 - 5 July 2012

Cumberland Lodge (near London, UK)

In July 2012, immediately following the Barcelona Cool Stars 17 meeting, we will be holding a conference 'Opacities in Cool Stars and Exoplanets' (22nd UCL Astrophysics Colloquium) at Cumberland Lodge near to London. The conference will begin at lunchtime on Monday 2 July with departure after breakfast on Thursday 5 July.

Cumberland Lodge is a 17th Century house located in Great Windsor Park. It offers easy access to Heathrow and is close to Windsor Castle, which is the oldest and largest occupied castle in the world and the official residence of Her Majesty the Queen. We would aim to visit the castle during the course of the conference. You may like to look at the Cumberland Lodge website:

http://www.cumberlandlodge.ac.uk/

The provisional program includes sessions on: Existing sources of opacity data, New opacity data, Advances in understanding brown dwarf atmospheres, characterising exoplanet atmospheres, Modelling the transitions between cool stars to brown dwarfs to planetary mass objects, and Observational issues.

Invited speakers:

- France Allard: Centre de Recherche Astrophysique de Lyon
- Adam Burgasser: Associate Professor, Univesity of California, San Diego Center for Astrophysics and Space Science
- Michel Herman: Co-director of the Laboratoire de Chimie Quantique et Photophysique at Universite libre de Bruxelles
- Bob Kurucz: Harvard-Smithsonian Center for Astrophysics, Cambridge MA
- Tim Lee: Acting Divisional Director, Space Science and Astrobiology Division at NASA Ames
- Mark Marley: Planetary Systems Branch, NASA Ames
- Sara Seager: Massachusetts Institute of Technology, Cambridge MA.
- Jonathan Tennyson: University College London

We have gaps for 20 minute talks and posters if you want to present work.

You will find further details including: a registration form, details of payments and abstract submissions on the Conference website. If you plan to participate in the conference you must register by means of our www fill-out-form. As an accommodation at Cumberland Lodge is limited the registration will be at the first come basis. The payment is not yet due, but the prices are alrea dy displayed on the website. We will email you at the appropriate time to advise how to proceed to make the payment.

We very much hope that you will be able to attend the conference.

Sincerely yours,

Organizing Committee:
Jonathan Tennyson (UCL), France Allard (CRAL-ENS, Lyon), Bob Barber (UCL), Sergei Yurchenko (UCL), Christian Hill (UCL)

Website with additional information:
http://www.exomol.com/conference/2012/ Contact: Bob Barber: bob@theory.phys.ucl.ac.uk

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.***