COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

No. 82 — November 2002 Editor: Steve Skinner (coolnews@jila.colorado.edu)

TABLE OF CONTENTS

Stellar Abstracts

Dynamics of Flares on Late Type dMe Stars IV. Constraints from Spectrophotometry in the Visible

E.R. Houdebine[1]

[1] Department of Physics (Theoretical Physics), Oxford University, 1 Keble Road, Oxford OX1 3NP, UK

We investigate the spectral signatures of stellar flares in the wavelength range 3600Å to 4500Å and in broad band photometry. We study the phenomenology of the spectral signatures and we found that flares are best described by two main phases; an impulsive phase and a gradual phase, for which the physical properties are different. Important spectral differences between flares lead us to distinguish four main classes: (i) solar-like chromospheric or two-ribbon flares, (ii) white-light flares, (iii) combined white-light flares with distinct impulsive and gradual phases, and (iv) non solar-like flares (usually occuring on RS CVn type stars). We show how this classification corresponds to substantial differences in the physical properties of the flare components.

We compiled all available spectroscopic data for stellar flares. We found several new empirical correlations between the time lags in the spectral lines (rise and decay times). We found for instance that during the gradual phase, the rise time in the H_γ line is well correlated to the rise time in the Ca II K line, and that the Ca II K line is 1.63 times slower to rise than the H_γ line. Similar correlations were found between the rise and decay times in these lines. These correlations are evidence that there is a dominant mechanism commanding the temporal flux evolutions during the gradual phase of flares. This mechanism applies on time scales ranging from one minute to more than a hundred minutes.

We found correlations between the time lags and the maximum fluxes in the Johnson U-band and the spectral lines. These correlations show that the larger the flare the longer it takes to evolve. We show that the maximum flux in the Johnson U-band correlates well, but not linearly with the maximum flux in the H_γ line during the impulsive phase, and over five orders of magnitude. We argue how this correlation can provide constraints on the currently available models. The spectral line maximum fluxes during the gradual phase also correlate with the Johnson U-band flux,

which demonstrates that somehow the impulsive and gradual phases are physically linked. The correlation between the H_γ and CaII K line fluxes during the gradual phase and the lack of dependence of the flux ratio of those lines on flare magnitude reveal that larger flares are not "hotter" than smaller flares during the gradual phase.

We examine the behaviour of the spectral line widths: While the CaII K line width shows essentially no detectable variation, the Balmer line widths show a complex dependency on the white light intensity. We distinguish three energy domains where the Balmer line widths exhibit a different behaviour: (i) for small flares, the widths remain rather constant as a function of white light intensity, which suggests that in this energy range the U-band is not a good diagnostic of the total energy release and that dense "kernels" do not dominate the Balmer emission, (ii) for medium size flares, the widths rapidly increase with the U-band flux up to about 15Å, which indicates that emission in the Balmer lines is then dominated by kernel emission, and (iii) for large flares the widths decrease with increasing U-band flux, which suggests that the Balmer line emission is then increasingly dominated by a radiative pumping process between the white light and the Balmer lines.

Finally, we remark that the Balmer line fluxes are well correlated to the white light flux during the impulsive phase of flares, and not only at flare maximum. We obtain a power law correlation between the Balmer line and U-band fluxes that is evidence for either a common source ("kernels") or strongly related flare components.

Accepted by A&A

For preprints contact: erh@thphys.ox.ac.uk

Starspots and Active Regions on the Emission Red Dwarf Star *LQ Hydrae*

I.Yu. Alekseev[1] and O.V. Kozlova[1]

[1]Crimean Astrophysical Observatory, P/O Nauchny, 98409 Crimea, Ukraine; and Isaac Newton Institute of Chile, Crimean Branch

The quasi-simultaneous electrophotometric, polarimetric and spectroscopic observations of the single active spotted star *LQ Hya* are presented. The photometric variability of the star can be described completely by a zonal starspots model. Spotted regions occupy up to 23 % of the total stellar surface. The temperature difference between the unspotted photosphere and starspots is about 800 K. Starspots are localized at the low and middle latitudes. We find for the first time broad-band linear polarization of the stellar light and its rotational modulation connected to the local magnetic region on the stellar surface. We suspect that there is a spacial connection between plages, magnetic regions and the mostly spotted stellar longitudes.

Accepted by A&A

For preprints contact: ilya@crao.crimea.ua

For preprints via ftp or WWW: http://www.crao.crimea.ua/ ilya/papers/ms2017.ps.gz

A Globular Cluster Metallicity Scale Based on the Abundance of Fe II

Robert P. Kraft[1] and Inese I. Ivans [2]

[1] UCO/Lick Obs. & UC-Santa Cruz
[2] UT-Austin & McDonald Obs. & California Institute of Technology

Assuming that in the atmospheres of low-mass, metal-poor red giant stars, 1-D models based on LTE accurately predict the abundance of iron from Fe II, we derive a globular cluster metallicity scale based on the equivalent widths of Fe II lines measured from high resolution spectra of giants in 16 key clusters lying in the abundance range -2.4 < [Fe/H]II < -0.7. We base the scale largely on the analysis of spectra of 149 giant stars in 11 clusters by the Lick-Texas group supplemented by high-resolution studies of giants in five other clusters. We also derive ab initio the true distance moduli for M5, M3, M13, M92, and M15 as a means of setting stellar surface gravities. We find that [Fe/H]II is correlated linearly with ¡W'¿, the reduced strength of the near infra-red Ca II triplet defined by Rutledge et al, although the actual correlation coefficients depend on the atmospheric model employed. We also discuss how to estimate [X/Fe]-ratios. We suggest that C, N, and O, as well as elements appearing in the spectrum in the singly ionized state, e.g., Ti, Sc, Ba, La and Eu, should be normalized to the abundance of Fe II. Other elements, which appear mostly in the neutral state, but for which the dominant species is nevertheless the ionized state, are probably best normalized to Fe I, but uncertainties remain.

Accepted by PASP

For preprints contact: kraft@ucolick.org or iii@astro.caltech.edu

For preprints via WWW: http://arXiv.org/abs/astro-ph/0210590

The Structure of Stellar Coronae in Active Binary Systems

J. Sanz-Forcada[1,2], N. S. Brickhouse[1] and A. K. Dupree[1]

[1] Harvard-Smithsonian Center for Astrophysics; 60 Garden St., Cambridge, MA 02138 (USA)
[2] INAF – Osservatorio Astronomico di Palermo; Piazza del Parlamento, 1; Palermo, I-90134 (Italy)

A survey of 28 stars (22 active binary systems, plus 6 single stars or wide binaries for comparison) using extreme ultraviolet spectra has been conducted to establish the structure of stellar coronae in active binary systems from the emission measure distribution (EMD), electron densities, and scale sizes. Observations obtained by the *Extreme Ultraviolet Explorer* satellite (EUVE) during 9 years of operation are included for the stars in the sample. EUVE data allow a continuous EMD to be constructed in the range log $\mathrm{T}_e(K)$ ∼5.6–7.4, using iron emission lines. These data are complemented with IUE observations to model the lower temperature range (log $\mathrm{T}_e[K]$ ∼4.0–5.6). Inspection of the EMD shows an outstanding narrow enhancement, or "bump" peaking around log $\mathrm{T}_e(K)$ ∼6.9 in 25 of the stars, defining a fundamental coronal structure. The emission measure per unit stellar area decreases with increasing orbital (or photometric) periods of the target stars; stars in binaries generally have more material at coronal temperatures than slowly rotating single stars. High electron densities ($N_e \geq 10^{12}\ cm^{-3}$) are derived at ∼log $\mathrm{T}_e(K)$ ∼7.0 for some targets, implying small emitting volumes.

The observations suggest the magnetic stellar coronae of these stars are consistent with two basic classes of magnetic loops: solar-like loops with maximum temperature around log $\mathrm{T}_e(K)$ ∼6.3 and lower electron densities ($N_e \geq 10^9 - 10^{10.5}\ cm^{-3}$), and hotter loops peaking around log $\mathrm{T}_e(K)$ ∼6.9 with higher electron densities ($N_e \geq 10^{12}\ cm^{-3}$). For the most active stars, material exists at much higher temperatures (log $\mathrm{T}_e[K]$ ≥6.9) as well. However, current *ab initio* stellar loop models cannot reproduce such a configuration. Analysis of the light curves of these systems reveals signatures of rotation of coronal material, as well as apparent seasonal (i.e. year-to-year) changes in the activity levels.

Accepted by ApJS

For preprints contact: jsanz@astropa.unipa.it

For preprints via ftp or WWW: http://www.astropa.unipa.it/∼jsanz/papers0002.html

Fast-rotating Nearby Solar-type Stars II. Li Abundances, v sin i and X-ray Luminosities Relationships

G. Cutispoto[1], G. Tagliaferri[2], J.R. de Medeiros[3], L. Pastori[2], L. Pasquini[4] and J. Andersen[5]

[1]INAF – Catania Astrophysical Observatory, v. S. Sofia 78, I-95125 Catania, Italy
[2]INAF – Brera Astronomical Observatory, Via Bianchi 46, I-22055 Merate (LC), Italy
[3]University Federal of Rio Grande do Norte, Department of Physics, BR - 59072-970 Natal, R.N., Brazil
[4]European Southern Observatory, Karl-Schwarzschild-Strasse 2, D-85748 Garching bei München, Germany
[5]Astronomical Observatory, NBIfAFG, Juliane Maries Vej 30, DK-2100 Copenhagen, Denmark

We present an analysis of our high-resolution spectroscopic and high-precision $\mathrm{UBV(RI)}_c$ photometric observations of a sample of 110 nearby late-F and G-type stars selected for their large rotational velocity. The relationships between Li abundance, X–ray luminosity, and v sin i are investigated. We find that, as expected, the stars in our sample show statistically higher Li abundance and activity level than field star samples with similar characteristics, but slower rotation. Surprisingly, however, we also find four rapidly-rotating single main-sequence stars with very low Li abundance. For both single and binary stars we find a large spread of Li abundance for stars with rotation lower than about $18\,\mathrm{km\,s^{-1}}$. The well-established correlation between X–ray luminosity and rotation rate is clearly observed. All single unevolved solar type stars with v sin i larger than $18\,\mathrm{km\,s^{-1}}$ are strong X–ray emitters and have high Li abundance. Finally, we find also five evolved stars with very low Li abundance that are still rather fast rotators. The results from our sample confirm the presence of young very active stars close to the Sun, in agreement

with recent findings from EUV and X–ray surveys, although our sample does not show such extreme characteristics as those selected from EUV and X–ray surveys at the current flux limits.

Accepted by A&A

For preprints contact: gcutispoto@ct.astro.it

Solar Abstracts

Lost Sunspot Cycle in the Beginning of Dalton Minimum: New Evidence and Consequences

I. G. Usoskin[1], K. Mursula[2] and G. A. Kovaltsov[3]

[1] Sodankylä Geophysical Observatory (Oulu unit), POB 3000, FIN-90014 University of Oulu, Finland
[2] Department of Physical Sciences, POB 3000, FIN-90014 University of Oulu, Finland
[3] Ioffe Physical-Technical Institute, RU-194021 St.Petersburg, Russia

We have recently suggested that one solar cycle was lost in the beginning of the Dalton minimum during 1790s [Usoskin et al., 2001]. Earlier, this cycle has been combined with the preceding activity to form the exceptionally long solar cycle 4 in 1784-1799 with an irregular phase evolution. Here we show that historical data of auroral occurrence provide independent evidence for the existence of the new cycle. Using a heliospheric model we demonstrate that ^{10}Be or any other cosmogenic isotope data do not exclude the possibility of a new cycle. We also discuss the other implications of the new cycle for solar activity, in particular the cycle length distribution and the Waldmeier relation between the cycle amplitude and the length of the ascending and descending phase. Including the new cycle also restores the Gnevyshev-Ohl rule of cycle pairing and removes the phase catastrophe in the beginning of the Dalton minimum.

Accepted by Geophys. Res. Lett.

For preprints contact: Ilya.Usoskin@oulu.fi

For preprints via ftp or WWW: http://spaceweb.oulu.fi/ usoskin/personal/List.html

Our Sun. IV. The Standard Model and Helioseismology: Consequences of Uncertainties in Input Physics and in Observed Solar Parameters

Arnold I. Boothroyd[1] and I.-Juliana Sackmann[2]

[1] CITA, U. of Toronto, 60 St. George Street, Toronto, Ontario, Canada M5S 3H8
[2] West Bridge Laboratory 103-33, California Institute of Technology, Pasadena, CA 91125

Helioseismology provides a powerful tool to explore the deep interior of the Sun: for example, the adiabatic sound speed can be inferred with an accuracy of a few parts in 10^4. This has become a serious challenge to theoretical models of the Sun. Therefore, we have undertaken a self-consistent, systematic study of sources of uncertainties in the standard solar model, which must be understood before the helioseismic observations can be used as constraints on theory. We find that the largest effect on the sound speed in the solar interior, as much as 3 parts in 10^3, arises from uncertainties in the observed photospheric abundances of the elements; uncertainties of 1 part in 10^3 arise from (1) the 4% uncertainty in the OPAL opacities, (2) the 5% uncertainty in the basic pp nuclear reaction rate, (3) the 15% uncertainty in the diffusion constants for the gravitational settling of helium, and (4) the 50% uncertainties in diffusion constants for the heavier elements. (Other investigators have shown that similar sound-speed effects arise from uncertainties in the interior equation of state and in rotation-induced turbulent mixing.) The predicted pre-main-sequence solar lithium depletion is a factor of order 20 (an order of magnitude larger than that predicted by earlier models that neglected gravitational settling and used older opacities), and is uncertain by a factor of 2. The predicted neutrino capture rate is uncertain by $\sim 30\%$ for the ^{37}Cl experiment and by $\sim 3\%$ for the ^{71}Ga experiments (not including uncertainties in the capture cross sections), while the ^{8}B neutrino flux is uncertain by $\sim 30\%$.

Accepted by ApJ

For preprints contact: boothroy@cita.utoronto.ca

For preprints via ftp or WWW: http://www.cita.utoronto.ca/~boothroy/sun4.html

Our Sun. V. A Bright Young Sun Consistent with Helioseismology and Warm Temperatures on Ancient Earth and Mars

I.-Juliana Sackmann[1] and Arnold I. Boothroyd[2]

[1] West Bridge Laboratory 103-33, California Institute of Technology, Pasadena, CA 91125
[2] CITA, U. of Toronto, 60 St. George Street, Toronto, Ontario, Canada M5S 3H8

The relatively warm temperatures required on early Earth and Mars have been difficult to account for via warming from greenhouse gases. We tested whether this problem can be resolved for both Earth and Mars by a young Sun that is brighter than predicted by the standard solar model. We computed high-precision solar evolutionary models with slightly increased initial masses of $M_i = 1.01$ to $1.07\ M_\odot$; for each mass, we considered three different mass loss scenarios. We then tested whether these models were consistent with the current high-precision helioseismic observations. The relatively modest mass loss rates in these models are consistent with observational limits from young stars and estimates of the past solar wind obtained from lunar rocks, and do not significantly affect the solar lithium depletion. For appropriate initial masses, all three mass loss scenarios are capable of yielding a solar flux 3.8 Gyr ago high enough to be consistent with water on ancient Mars. We find that all of our mass-losing solar models are consistent with the helioseismic observations. The early solar mass loss of a few percent does indeed leave a small fingerprint on the Sun's internal structure. However, for helioseismology to significantly constrain early solar mass loss would require higher accuracy in the observed solar parameters and input physics, namely, by a factor of ~ 3 for the observed solar surface composition, and a factor of ~ 2 for the solar interior opacities, the pp nuclear reaction rate, and the diffusion constants for gravitational settling.

Accepted by ApJ

For preprints contact: boothroy@cita.utoronto.ca

For preprints via ftp or WWW: http://www.cita.utoronto.ca/~boothroy/sun5.html

On the Time Variability of the Evershed Effect

L.H.M. Rouppe van der Voort[1]

[1]The Institute for Solar Physics of the Royal Swedish Academy of Sciences, AlbaNova University Center, SE-10691 Stockholm, Sweden

The time variability of the Evershed effect in the penumbra of a sunspot is studied from a time series of high-spatial resolution spectrograms covering the wings of the Ca II K line accompanied by Ca II K slit-jaw images obtained with the Swedish Vacuum Solar Telescope. Simultaneous G-band observations from the Dutch Open Telescope are used to study the penumbral scene around the spectrograph slit on the photospheric level. Four spectral lines are selected to probe the Evershed effect at different heights in the penumbral atmosphere. The Evershed flow is found to show variations on a time scale of 8–14 minutes which is a confirmation of earlier observations from tunable filter instruments. The largest amplitudes in the variation are found where the Evershed flow is strongest. No systematic height dependence is found for the propagation of the velocity variations. On several occasions, an increase in the Evershed signal is associated with an intensity increase. In the weak Evershed signal detected in bright filaments, no significant variability is found. As an alternative to the interpretation of temporal enhancements in the flow speed, it is speculated that temporal height variations of a flow channel hosting a steady Evershed flow can explain the observed variations in the Evershed effect.

Accepted by A&A

For preprints contact: rouppe@astro.su.se

For preprints via ftp or WWW: http://www.astro.su.se/˜rouppe

Limits on the Infrared Photometric Monitoring of Brown Dwarfs

C.A.L. Bailer-Jones[1], M. Lamm[1]

[1]Max-Planck-Institut für Astronomie, Heidelberg, Germany

Recent monitoring programs of ultra cool field M and L dwarfs (low mass stars or brown dwarfs) have uncovered low amplitude photometric I-band variations which may be associated with an inhomogeneous distribution of photospheric condensates. Further evidence hints that this distribution may evolve on very short timescales, specifically of order a rotation period or less. In an attempt to study this behaviour in more detail, we have carried out a pilot program to monitor three L dwarfs in the near infrared where these objects are significantly brighter than at shorter wavelengths. We present a robust data analysis method for improving the precision and reliability of infrared photometry. No significant variability was detected in either the J or K' bands in 2M1439 and SDSS1203 above a peak-to-peak amplitude of 0.04 mag (0.08 mag for 2M1112). The main limiting factor in achieving lower detection limits is suspected to be second order extinction effects in the Earth's atmosphere, on account of the very different colours of the target and reference stars. Suggestions are given for overcoming such effects which should improve the sensitivity and reliability of infrared variability searches.

Accepted by MNRAS

For preprints contact: calj@mpia-hd.mpg.de

For preprints via WWW: http://www.mpia-hd.mpg.de/homes/calj/bdvar4.html

Ph.D. Thesis Abstract

Surface Structures of FK Com

Heidi Korhonen

Thesis work conducted at: Astronomy Division, University of Oulu, Finland

Current address: Astrophysical Institute Potsdam, An der Sternwarte 16, D-14482 Potsdam, Germany

E-mail: hkorhonen@aip.de

Ph.D dissertation directed by: Prof. I. Tuominen and Dr. S.V. Berdyugina

Ph.D degree awarded: September 2002

With Doppler imaging stellar surface characteristics can be mapped. These characteristics can for example be the effective temperature, element abundance or magnetic field. In the mapping, spectral observations at different rotational phases are used to measure the rotationally modulated distortions in the line profiles. These distortions are produced by the inhomogeneous distribution of the observed characteristic.

In this work surface imaging techniques have been used for investigating the surface temperature distribution, i.e. starspots, on a single, late-type giant FK Com. The high resolution, high signal-to-noise spectroscopic observations have been obtained 1994–1998. This reasonably long time series of temperature maps has been used to investigate the spot evolution, surface differential rotation and the so-called "flip-flop" phenomenon in detail. In the "flip-flop" phenomenon the dominant part of the spot activity shifts the longitude by 180° and remains at the new active longitude for some years.

The results based on the Doppler imaging reveal that on FK Com there are stable high-latitude active regions that can exist for several years on the stellar surface. From Doppler images obtained right before and after a "flip-flop", it is clear that this phenomenon is caused by changing the relative strengths of the spot groups at the two active longitudes, with no actual spot movements across the stellar surface.

The observations needed for Doppler imaging have been available only since late 1980s. This seriously limits the time scales for detecting possible magnetic cycles. Photometric observations of FK Com have been carried out since 1966. They lack the latitudinal information available in the Doppler images, but they enable the study of the longitudinal spot configuration on the stellar surface over much longer time interval than the Doppler imaging alone permits, and so make it possible to look for possible activity cycles. The photometric observations reveal that two permanent active longitudes, 180° apart, exist on FK Com and that they are periodically active, i.e. the dominant part of the spot activity abruptly changes the longitude after about 3 years, indicating a "flip-flop" event. The full activity cycle is estimated to be 6.4 years.

The possibility of stellar surface differential rotation was investigated using Doppler imaging and photometric observations. The results give evidence for weak solar type differential rotation, i.e. the polar regions of FK Com rotate slower than the equatorial regions.

Thesis-related Publications: A&A 346, 101; A&A 360, 1067; A&A 374 1049; A&A 379, L30; A&A 390, 179

Ph.D. Thesis Abstract

Cool-Star Gravities (Schwerebeschleunigungen kühler Sterne)

Andreas J. Korn

Thesis work conducted at: Universitäts-Sternwarte München (USM), Germany

Current address: MPI für extraterrestrische Physik (MPE), PO box 1312, 85741 Garching, Germany

E-mail: akorn@mpe.mpg.de

Ph.D dissertation directed by: Thomas Gehren

Ph.D degree awarded: July 2002

A refined theory of line formation for neutral and singly-ionized iron in the atmospheres of cool stars in presented. It accounts for departures from local thermodynamic equilibrium – so-called non-LTE effects – and serves the derivation of spectroscopic stellar gravities "g" via the ionization equilibrium constraint. The respective influence of various model assumptions (atomic data sets including photo-ionization cross-sections and transition probabilities; the efficiency of collisions with neutral particles and so forth) is investigated by means of extensive profile analyses of iron lines in the optical spectrum of the Sun. Due to the large scatter among laboratory transition probabilities the main free parameter of the model – the strength of collisions with neutral hydrogen S_H which govern excitation and ionization – cannot be determined by inspecting the Sun alone. Depending on the choice of S_H non-LTE effects in neutral iron range from 0.01 dex to 0.10 dex in the logarithmic abundance, while singly-ionized iron follows LTE.

To calibrate S_H a set of local standard stars is employed whose surface gravities can be inferred from the astrometry of the HIPPARCOS satellite mission on a given temperature scale.

With the exception of the metal-rich standard star Procyon for which a mild temperature correction is needed to fulfil the ionization balance, excellent consistency is obtained for the metal-poor calibration stars in various evolutionary stages if the Balmer profile temperatures are combined with an S_H of 3. Departures from LTE are moderate and amount to 0.1 dex in $\log g$ at most. The correct choice of the van-der-Waals damping constants is generally more important for these stars than non-LTE. The long-standing discrepancy with respect to the independent spectroscopic gravity scale of Mg I b lines discussed in the literature can be fully resolved.

Recent modifications to the formation theory of Balmer lines (Barklem et al. 2002) are implemented, but do not yield consistent results: the temperature of the Sun is not recovered, the observed Balmer line profiles of metal-poor stars are not reproduced.

The devised model is applied to two extreme objects, the most metal-poor star known (HE 0107−5240 with 100 000 times less metals than the Sun) and a so-called r-process star, both recently identified in wide-angle sky survey. Here non-LTE effects are much more pronounced (0.3 dex in $\log g$). This result emphasizes the importance of considering departures from LTE for iron, especially when it comes to studying giant stars in the Galactic halo.

Thesis-related Publications: A&A 366, 981; A&A 380, 645; Nature 419, 904

UPCOMING MEETINGS

2nd Eddington Workshop
Stellar Structure and Habitable Planet Finding

9 - 11 April 2003
Hotel La Torre, Mondello (Palermo), Italy)

Organized by the European Space Agency and INAF – Palermo Astronomical Observatory

The *Eddington* mission was approved in May 2002 as part of the European Space Agency's new Science Program "Cosmic Vision" for launch in 2007/8. Its primary goals are extra-solar planet hunting by transits, and the determination of multi-mode oscillations of stars for asteroseismic investigations of stellar structure and evolution. There will also be ample and exciting opportunities for parallel and ancillary science.

In its current design the mission consists of 4×60 cm folded Schmidt telescopes, each with a 6 deg diameter field of view and its own CCD array camera; its primary data products will be calibrated relative photometric time series for all stars in the field of view down to the instrument's limiting magnitude.

The current observing plan is to spend 3 years continuously on a single target field monitoring upwards of 20 000 late type dwarfs with noise level of 6.3×10^{-5} in 1 hour, and upwards of 100 000 stars of all types with lower S/N, and 2 years primarily devoted to asteroseismology with 1 to 3 months on different target fields monitoring up to 50 000 stars per field with a noise level in Fourier space < 1.5 ppm in 30 days with the goal of determining oscillation frequencies with a precision of 0.1–0.3 μHz

Choosing the Planet Search Field

The observing program of *Eddington* foresees a long (3 yr) observation on a single field (the "planet field") with the primary aim of terrestrial planet detection. Given the advanced phase of definition of the mission the direction in which the *Eddington* planet field will be located must now be defined. This is essential both because of the impact that this will have on the mission's final design and because of the long lead time which will be required for the ground-based preparatory work on characterizing the stars which will fall in the *Eddington* planet field.

One session of the workshop will mainly be dedicated to the selection of the planet field. We solicit proposals both for specific directions in the sky as well as for required specific characteristics the target field. Presentations (both in oral and in poster form) will be discussed at the workshop.

The workshop

This workshop is an invitation to the wider scientific community to get involved in the *Eddington* mission – both the planet finding and asteroseismology phases.

The main topics covered at the workshop will be:

- the mission baseline's and possible options
- selection of the planet field
- possible scientific targets for the asteroseismology part
- possible/required data products for each scientific goal
- "support" science needed to be done by the community ahead of the mission
- parallel and auxiliary science

The program will include a presentation of the various aspects of the mission's present baseline and scientific performance, and an overview of the mission's science goals. Contributions are solicited on all aspects of the mission. A formal call for abstracts will be circulated later this year, together with a preliminary program with a list of invited speakers. An "expression of interest" form can be found at `http://www.astropa.unipa.it/Eddington/Eddi2003.html`, which should be returned to `eddi2003@astropa.unipa.it` by Nov. 8 2002. The same email address can also be contacted with any question regarding the workshop. Updated information about the Workshop will be made available at the same web address.

Please feel free to pass this message to any colleague who might be interested in the meeting and who may not be in the initial mailing list. Note that the invitation is equally open to scientists working both in ESA- and non-ESA-member states.

Scientific Organizing Committee:

F. Favata (ESA/ESTEC – chair), A. Baglin (Obs. Paris Meudon, FR), C. Catala (Obs. Paris Meudon, FR), J. Christensen-Dalsgaard (Aarhus Univ., DK), M. Di Mauro (INAF - Catania Obs., IT), G. Gilmore (IoA, UK), K. Horne (St. Andrews Univ., UK), M. Mas Hesse (LAEFF, ES), G. Micela (INAF - Palermo Obs., IT), P. Pallè (IAC, ES), A. Preite Martinez (IAS/CNR, IT), D. Queloz (Geneva Obs., CH), I. Roxburgh (QM, Univ. of London, UK), A. Weiss (MPG, DE)

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.***