COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

No. 202 — March - May 2016 Editor: Steve Skinner (coolnews@jila.colorado.edu)

TABLE OF CONTENTS

Coolnews on the Web

The current and previous issues of *Coolnews* are available on the following web page in pdf, postscript, and Latex format: **http://casa.colorado.edu/∼skinners/coolnews.html**

Stellar Abstracts

The Rotation-Activity Correlations in K and M dwarfs. I. Stellar Parameters, Compilations of $v \sin i$ and $P/\sin i$ for a Large Sample of Late-K and M dwarfs

E.R. Houdebine[1], 2, D.J. Mullan[3], F. Paletou[2], and M. Gebran[4]

[1] Armagh Observatory, College Hill, BT61 9DG Armagh, Northern Ireland
[2] Université de Toulouse, UPS-Observatoire Midi-Pyrénées, IRAP, Toulouse, France
[3] Department of Physics and Astronomy, University of Delaware, Newark, DE 19716, USA
[4]Department of Physics & Astronomy, Notre Dame University-Louaize, PO Box 72, Zouk Mikaël, Lebanon

Reliable determination of Rotation-Activity Correlation (RAC's) depends on precise measurements of the following stellar parameters: T_{eff}, parallax, radius, metallicity, and rotational speed $v \sin i$. In this paper, our goal is to focus on the determination of these parameters for a sample of K and M dwarfs. In a future paper (Paper II), we will combine our rotational data with activity data in order to construct RAC's.

Here, we report on a determination of effective temperatures based on the (R-I)$_C$ color from the calibrations of Mann et al. (2015) and Kenyon & Hartmann (1995) for four samples of late-K, dM2, dM3 and dM4 stars. We also determine stellar parameters (T_{eff}, $log(g)$ and [M/H]) using the PCA-based inversion technique for a sample of 105 late-K dwarfs. We compile all effective temperatures from the literature for this sample. We determine empirical radius-[M/H] correlations in our stellar samples. This allows us to propose new effective temperatures, stellar radii, and metallicities for a large sample of 612 late-K and M dwarfs. Our mean radii agree well with those of Boyajian et al. (2012).

We analyze HARPS and SOPHIE spectra of 105 late-K dwarfs, and have detected $v \sin i$ in 92 stars. In combination with our previous $v \sin i$ measurements in M and K dwarfs, we now derive $P/sini$ measures for a sample of 418 K and

M dwarfs. We investigate the distributions of $P/sini$ and we show that they are different from one spectral sub-type to another at a 99.9% confidence level.

Accepted by ApJ

For preprints contact: eric_houdebine@yahoo.fr

For preprints via WWW: http://arxiv.org/abs/1604.07920

The Gaia-ESO Survey: Inhibited Extra Mixing in Two Giants of the Open Cluster Trumpler 20?

R. Smiljanic[1], et al.

[1]Nicolaus Copernicus Astronomical Center, Polish Academy of Sciences, ul. Bartycka 18, 00-716 Warsaw , Poland

We report the discovery of two Li-rich giants, with A(Li) $\sim$ 1.50, in an analysis of a sample of 40 giants of the open cluster Trumpler 20 (with turnoff mass $\sim$ 1.8 Msun). The cluster was observed in the context of the Gaia-ESO Survey. The atmospheric parameters and Li abundances were derived using high-resolution UVES spectra. The Li abundances were corrected for nonlocal thermodynamical equilibrium (non-LTE) effects. Only upper limits of the Li abundance could be determined for the majority of the sample. Two giants with detected Li turned out to be Li rich: star MG 340 has A(Li) non-LTE = 1.54 $\pm$ 0.21 dex and star MG 591 has A(Li) non-LTE = 1.60 $\pm$ 0.21 dex. Star MG 340 is on average $\sim$ 0.30 dex more rich in Li than stars of similar temperature, while for star MG 591 this difference is on average $\sim$ 0.80 dex. Carbon and nitrogen abundances indicate that all stars in the sample have completed the first dredge-up. The Li abundances in this unique sample of 40 giants in one open cluster clearly show that extra mixing is the norm in this mass range. Giants with Li abundances in agreement with the predictions of standard models are the exception. To explain the two Li-rich giants, we suggest that all events of extra mixing have been inhibited. This includes rotation-induced mixing during the main sequence and the extra mixing at the red giant branch luminosity bump. Such inhibition has been suggested in the literature to occur because of fossil magnetic fields in red giants that are descendants of main-sequence Ap-type stars.

Accepted by A&A

For preprints contact: rsmiljanic@camk.edu.pl

For preprints via WWW: http://arxiv.org/abs/1605.01945

Rotation in the Pleiades with K2: I. Data and First Results

L. M. Rebull[1,2], J. R. Stauffer[2], J. Bouvier[3], A. M. Cody[4], L. A. Hillenbrand[5], D. R. Soderblom[6], J. Valenti[6], D. Barrado[7], H. Bouy[7], D. Ciardi[8], M. Pinsonneault[9], K. Stassun[10], G. Micela[11], S. Aigrain[12], F. Vrba[13], G. Somers[9], J. Christiansen[8], E. Gillen[12,14], A. Collier Cameron[15]

[1]Infrared Science Archive (IRSA), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 91125, USA; rebull@ipac.caltech.edu
[2]Spitzer Science Center (SSC), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 9112, USA5
[3]Université de Grenoble, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), F-38000 Grenoble, France; CNRS, IPAG, F-38000 Grenoble, France
[4]NASA Ames Research Center, Kepler Science Office, Mountain View, CA 94035, USA
[5]Astronomy Department, California Institute of Technology, Pasadena, CA 91125, USA
[6]Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, USA; Center for Astrophysical Sciences, Johns Hopkins University, 3400 North Charles St., Baltimore, MD 21218, USA
[7]Centro de Astrobiología, Dpto. de Astrofísica, INTA-CSIC, E-28692, ESAC Campus, Villanueva de la Cañada, Madrid, Spain
[8]NASA Exoplanet Science Institute (NExScI), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 91125, USA
[9]Department of Astronomy, The Ohio State University, Columbus, OH 43210, USA; Center for Cosmology and Astroparticle Physics, The Ohio State University, Columbus, OH 43210, USA
[10]Department of Physics and Astronomy, Vanderbilt University, Nashville, TN 37235, USA; Department of Physics, Fisk University, Nashville, TN 37208, USA

[11]INAF - Osservatorio Astronomico di Palermo, Piazza del Parlamento 1, 90134, Palermo, Italy
[12]Department of Physics, University of Oxford, Keble Road, Oxford OX3 9UU, UK
[13]US Naval Observatory, Flagstaff Station, P.O. Box 1149, Flagstaff, AZ 86002, USA
[14]Astrophysics Group, Cavendish Laboratory, J.J. Thomson Avenue, Cambridge CB3 0HE, UK
[15]School of Physics and Astronomy, University of St Andrews, North Haugh, St Andrews, Fife KY16 9SS, UK

Young (125 Myr), populous (>1000 members), and relatively nearby, the Pleiades has provided an anchor for stellar angular momentum models for both younger and older stars. We used K2 to explore the distribution of rotation periods in the Pleiades. With more than 500 new periods for Pleiades members, we are vastly expanding the number of Pleiads with periods, particularly at the low mass end. About 92% of the members in our sample have at least one measured spot-modulated rotation period. For the ∼8% of the members without periods, non-astrophysical effects often dominate (saturation, etc.), such that periodic signals might have been detectable, all other things being equal. We now have an unusually complete view of the rotation distribution in the Pleiades. The relationship between P and $(V-K_{\rm s})_0$ follows the overall trends found in other Pleiades studies. There is a slowly rotating sequence for $1.1 \lesssim (V-K_{\rm s})_0 \lesssim 3.7$, and a primarily rapidly rotating population for $(V-K_{\rm s})_0 \gtrsim 5.0$. There is a region in which there seems to be a disorganized relationship between P and $(V-K_{\rm s})_0$ for $3.7 \lesssim (V-K_{\rm s})_0 \lesssim 5.0$. Paper II continues the discussion, focusing on multi-period structures, and Paper III speculates about the origin and evolution of the period distribution in the Pleiades.

Accepted by AJ

For preprints contact: rebull@ipac.caltech.edu

For preprints via WWW: https://arxiv.org/abs/1606.00052

Rotation in the Pleiades with K2: II. Multi-Period Stars

L. M. Rebull[1,2], J. R. Stauffer[2], J. Bouvier[3], A. M. Cody[4], L. A. Hillenbrand[5], D. R. Soderblom[6], J. Valenti[6], D. Barrado[7], H. Bouy[7], D. Ciardi[8], M. Pinsonneault[9], K. Stassun[10], G. Micela[11], S. Aigrain[12], F. Vrba[13], G. Somers[9], E. Gillen[12,14], A. Collier Cameron[15]

[1]Infrared Science Archive (IRSA), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 91125, USA; rebull@ipac.caltech.edu
[2]Spitzer Science Center (SSC), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 9112, USA5
[3]Université de Grenoble, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), F-38000 Grenoble, France; CNRS, IPAG, F-38000 Grenoble, France
[4]NASA Ames Research Center, Kepler Science Office, Mountain View, CA 94035, USA
[5]Astronomy Department, California Institute of Technology, Pasadena, CA 91125, USA
[6]Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, USA; Center for Astrophysical Sciences, Johns Hopkins University, 3400 North Charles St., Baltimore, MD 21218, USA
[7]Centro de Astrobiología, Dpto. de Astrofísica, INTA-CSIC, E-28692, ESAC Campus, Villanueva de la Cañada, Madrid, Spain
[8]NASA Exoplanet Science Institute (NExScI), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 91125, USA
[9]Department of Astronomy, The Ohio State University, Columbus, OH 43210, USA; Center for Cosmology and Astroparticle Physics, The Ohio State University, Columbus, OH 43210, USA
[10]Department of Physics and Astronomy, Vanderbilt University, Nashville, TN 37235, USA; Department of Physics, Fisk University, Nashville, TN 37208, USA
[11]INAF - Osservatorio Astronomico di Palermo, Piazza del Parlamento 1, 90134, Palermo, Italy
[12]Department of Physics, University of Oxford, Keble Road, Oxford OX3 9UU, UK
[13]US Naval Observatory, Flagstaff Station, P.O. Box 1149, Flagstaff, AZ 86002, USA
[14]Astrophysics Group, Cavendish Laboratory, J.J. Thomson Avenue, Cambridge CB3 0HE, UK
[15]School of Physics and Astronomy, University of St Andrews, North Haugh, St Andrews, Fife KY16 9SS, UK

We use K2 to continue the exploration of the distribution of rotation periods in Pleiades that we began in Paper I. We have discovered complicated multi-period behavior in Pleiades stars using these K2 data, and we have grouped them into categories, which are the focal part of this paper. About 24% of the sample has multiple, real frequencies in the periodogram, sometimes manifesting as obvious beating in the light curves. Those having complex and/or structured

periodogram peaks, unresolved multiple periods, and resolved close multiple periods are likely due to spot/spot group evolution and/or latitudinal differential rotation; these largely compose the slowly rotating sequence in P vs. $(V-K_{\rm s})_0$ identified in Paper I. The fast sequence in P vs. $(V-K_{\rm s})_0$ is dominated by single-period stars; these are likely to be rotating as solid bodies. Paper III continues the discussion, speculating about the origin and evolution of the period distribution in the Pleiades.

Accepted by AJ

For preprints contact: rebull@ipac.caltech.edu

For preprints via WWW: https://arxiv.org/abs/1606.00055

Rotation in the Pleiades With K2: III. Speculations on Origins and Evolution

J. R. Stauffer[1], L. M. Rebull[1,2], J. Bouvier[3], L. A. Hillenbrand[4], A. Collier Cameron[5], M. Pinsonneault[6], S. Aigrain[7], D. Barrado[8], H. Bouy[8], D. Ciardi[9], A. M. Cody[10], T. David[4] G. Micela[11], D. R. Soderblom[12], G. Somers[6], K. Stassun[13], J. Valenti[12], F. Vrba[14]

[1]Spitzer Science Center (SSC), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 9112, USA5
[2]Infrared Science Archive (IRSA), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 91125, USA
[3]Université de Grenoble, Institut de Planétologie et d'Astrophysique de Grenoble (IPAG), F-38000 Grenoble, France; CNRS, IPAG, F-38000 Grenoble, France
[4]Astronomy Department, California Institute of Technology, Pasadena, CA 91125, USA
[5]School of Physics and Astronomy, University of St Andrews, North Haugh, St Andrews, Fife KY16 9SS, UK
[6]Department of Astronomy, The Ohio State University, Columbus, OH 43210, USA; Center for Cosmology and Astroparticle Physics, The Ohio State University, Columbus, OH 43210, USA
[7]Department of Physics, University of Oxford, Keble Road, Oxford OX3 9UU, UK
[8]Centro de Astrobiología, Dpto. de Astrofísica, INTA-CSIC, E-28692, ESAC Campus, Villanueva de la Cañada, Madrid, Spain
[9]NASA Exoplanet Science Institute (NExScI), Infrared Processing and Analysis Center (IPAC), 1200 E. California Blvd., California Institute of Technology, Pasadena, CA 91125, USA
[10]NASA Ames Research Center, Kepler Science Office, Mountain View, CA 94035, USA
[11]INAF - Osservatorio Astronomico di Palermo, Piazza del Parlamento 1, 90134, Palermo, Italy
[12]Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, USA; Center for Astrophysical Sciences, Johns Hopkins University, 3400 North Charles St., Baltimore, MD 21218, USA
[13]Department of Physics and Astronomy, Vanderbilt University, Nashville, TN 37235, USA; Department of Physics, Fisk University, Nashville, TN 37208, USA
[14]US Naval Observatory, Flagstaff Station, P.O. Box 1149, Flagstaff, AZ 86002, USA

We use high quality K2 light curves for hundreds of stars in the Pleiades to understand better the angular momentum evolution and magnetic dynamos of young, low mass stars. The K2 light curves provide not only rotational periods but also detailed information from the shape of the phased light curve not available in previous studies. A slowly rotating sequence begins at $(V-K_{\rm s})_0{\sim}1.1$ (spectral type F5) and ends at $(V-K_{\rm s})_0 \sim 3.7$ (spectral type K8), with periods rising from $\sim$2 to $\sim$11 days in that interval. Fifty-two percent of the Pleiades members in that color interval have periods within 30% of a curve defining the slow sequence; the slowly rotating fraction decreases significantly redward of $(V-K_{\rm s})_0$=2.6. Nearly all of the slow-sequence stars show light curves that evolve significantly on timescales less than the K2 campaign duration. The majority of the FGK Pleiades members identified as photometric binaries are relatively rapidly rotating, perhaps because binarity inhibits star-disk angular momentum loss mechanisms during pre-main sequence evolution. The fully convective, late M dwarf Pleiades members $(5.0 < (V-K_{\rm s})_0 < 6.0)$ nearly always show stable light curves, with little spot evolution or evidence of differential rotation. During PMS evolution from $\sim$3 Myr (NGC 2264 age) to $\sim$125 Myr (Pleiades age), stars of 0.3 $M_\odot$ shed about half their angular momentum, with the fractional change in period between 3 and 125 Myr being nearly independent of mass for fully convective stars. Our data also suggest that very low mass binaries form with rotation periods more similar to each other and faster than would be true if drawn at random from the parent population of single stars.

For preprints contact: rebull@ipac.caltech.edu
For preprints via WWW: https://arxiv.org/abs/1606.00057

Spectroscopic Orbits for 15 Late-Type Stars

Daryl W. Willmarth[1], Francis C. Fekel[2] Helmut A. Abt[1] and Dimitri Pourbaix[3]

[1] Kitt Peak National Observatory, Box 26732, Tucson, AZ 85726 USA

[2] Center of Excellence in Info. Systems, Tennessee State University, Nashville, TN 37209 USA

[3] FNRS Institut d'Astronomie et d'Astrophysique, Université Libre de Bruxelles, CP 226, B-1050 Bruxelles, Belgium

Spectroscopic orbital elements are determined for 15 stars with periods from 8 to 6528 days with 6 orbits computed for the first time. Improved astrometric orbits are computed for 2 stars and one new orbit is derived. Visual orbits have been determined previously for 4 stars, 4 stars are members of multiple systems, and 5 stars have *Hipparcos* "G" designations or have been resolved by speckle interferometry. For the 9 binaries with previous spectroscopic orbits, we determine improved or comparable elements. For HD 28271 and HD 200790 our spectroscopic results support the conclusions of previous authors that the large values of their mass functions and lack of detectable secondary spectrum argue for the secondary in each case being a pair of low mass dwarfs. The orbits given here may be useful in combination with future interferometric and Gaia satellite observations.

Accepted by AJ

For preprints contact: fekel@evans.tsuniv.edu

Solar Abstracts

The Magnetic Field Vector of the Sun-as-a-Star

A. A. Vidotto[1]

[1]School of Physics, Trinity College Dublin, the University of Dublin, Dublin-2, Ireland

Direct comparison between stellar and solar magnetic maps are hampered by their dramatic differences in resolution. Here, we present a method to filter out the small-scale component of vector fields, in such a way that comparison between solar and stellar (large-scale) magnetic field vector maps can be directly made. Our approach extends the technique widely used to decompose the radial component of the solar magnetic field to the azimuthal and meridional components as well. For that, we self-consistently decompose the three-components of the vector field using spherical harmonics of different l degrees. By retaining the low l degrees in the decomposition, we are able to calculate the large-scale magnetic field vector. Using a synoptic map of the solar vector field at Carrington Rotation CR2109, we derive the solar magnetic field vector at a similar resolution level as that from stellar magnetic images. We demonstrate that the large-scale field of the Sun is not purely radial, as often assumed – at CR2109, 83% of the magnetic energy is in the radial component, while 10% is in the azimuthal and 7% is in the meridional components. By separating the vector field into poloidal and toroidal components, we show that the solar magnetic energy at CR2109 is mainly ($> 90\%$) poloidal. Our description is entirely consistent with the description adopted in several stellar studies. Our formalism can also be used to confront synoptic maps synthesised in numerical simulations of dynamo and magnetic flux transport studies to those derived from stellar observations.

Accepted by MNRAS

For preprints contact: Aline.Vidotto@tcd.ie

For preprints via WWW: http://arxiv.org/abs/1603.09226

Photospheric and Coronal Magnetic Fields in Six Magnetographs: I. Consistent Evolution of the Bashful Ballerina

I.I. Virtanen[1] and K Mursula[1]

[1]ReSoLVE Centre of Excellence, Space Climate Research Unit, University of Oulu, POB 3000, FIN-90014, Oulu, Finland

We study the long-term evolution of solar photospheric and coronal magnetic fields and the heliospheric current sheet (HCS), especially its north-south asymmetry. Special attention is paid to the reliability of the six data sets used in this study, and to the consistency of the results based on them. We use synoptic maps constructed from Wilcox Solar Observatory (WSO), Mount Wilson Observatory (MWO), Kitt Peak (KP), SOLIS, SOHO/MDI and SDO/HMI measurements of the photospheric field and the potential field source surface (PFSS) model. The six data sets depict a fairly similar long-term evolution of magnetic fields and the heliospheric current sheet, including polarity reversals and hemispheric asymmetry. However, there are time intervals of several years long, when first Kitt Peak measurements (in the 1970s and 1980s) and later WSO measurements (in the 1990s and early 2000s) significantly deviate from the other simultaneous data sets, reflecting likely errors at these times. All the six magnetographs agree on the southward shift of the heliospheric current sheet (the so called bashful ballerina phenomenon) in the declining to minimum phase of the solar cycle during a few years of all five included cycles. We show that during solar cycles 20 – 22, the the southward shift of the HCS is mainly due to the axial quadrupole term, reflecting the stronger magnetic field intensity at the southern pole during these times. During cycle 23 the asymmetry is less persistent and mainly due to higher harmonics than the quadrupole term.

Currently, in the early declining phase of cycle 24, the HCS is also shifted southward and is mainly due to the axial quadrupole, as for most earlier cycles. This further emphasizes the special character of the global solar field during cycle 23.

Accepted by A&A

For preprints contact: ilpo.virtanen@oulu.fi

For preprints via WWW: http://dx.doi.org/10.1051/0004-6361/201628096

New Databases

The ExoMol Database: Molecular Line lists for Exoplanet and Other Hot Atmospheres

Jonathan Tennyson[1], Sergei N. Yurchenko, Ahmed F. Al-Refaie, Emma J. Barton, Katy L. Chubb, Phillip A. Coles, S. Diamantopoulou, Maire N. Gorman, Christian Hill, Aden Z. Lam, Lorenzo Lodi, Laura K. McKemmish, Yueqi Na, Alec Owens, Oleg L. Polyansky, Clara Sousa-Silva, Daniel S. Underwood, Andrey Yachmenev and Emil Zak

[1]Department of Physics and Astronomy, University College London, London, WC1E 6BT, UK

The ExoMol database (www.exomol.com) provides extensive line lists of molecular transitions which are valid over extended temperatures ranges. The status of the current release of the database is reviewed and a new data structure is specified. This structure augments the provision of energy levels (and hence transition frequencies) and Einstein A coefficients with other key properties, including lifetimes of individual states, temperature-dependent cooling functions, Landé g-factors, partition functions, cross sections, k-coefficients and transition dipoles with phase relations. Particular attention is paid to the treatment of pressure broadening parameters. The new data structure includes a definition file which provides the necessary information for utilities accessing ExoMol through its application programming interface (API). Prospects for the inclusion of new species into the database are discussed.

Accepted by J. Mol. Spectrosc.

For preprints contact: j.tennyson@ucl.ac.uk

For preprints via WWW: http://arxiv.org/abs/1603.05890

Magnetic Influences on the Solar Wind

Lauren Woolsey

Thesis work conducted at: Harvard University, Cambridge, MA USA

Current address: Harvard University, 60 Garden St, M.S. 10, Cambridge, MA 02138, USA

E-mail: lwoolsey@cfa.harvard.edu

Ph.D dissertation directed by: Steven H. Cranmer

Ph.D degree awarded: May 2016

The steady, supersonic outflow from the Sun we call the solar wind was first posited in the 1950s and initial theories rightly linked the acceleration of the wind to the existence of the million-degree solar corona. Still today, the wind acceleration mechanisms and the coronal heating processes remain unsolved challenges in solar physics. In this work, I seek to answer a portion of the mystery by focusing on a particular acceleration process: Alfvén waves launched by the motion of magnetic field footpoints in the photosphere. The entire corona is threaded with magnetic loops and flux tubes that open up into the heliosphere. I have sought a better understanding of the role these magnetic fields play in determining solar wind properties in open flux tubes. After an introduction of relevant material, I discuss my parameter study of magnetic field profiles and the statistical understanding we can draw from the resulting steady-state wind. In the chapter following, I describe how I extended this work to consider time dependence in the turbulent heating by Alfvén waves in three dimensional simulations. The bursty nature of this heating led to a natural next step that expands my work to include not only the theoretical, but also a project to analyze observations of small network jets in the chromosphere and transition region, and the underlying photospheric magnetic field that forms thresholds in jet production. In summary, this work takes a broad look at the extent to which Alfvén-wave-driven turbulent heating can explain measured solar wind properties and other observed phenomena.

Accepted by Harvard University for Ph.D. Dissertation

For preprints contact: lwoolsey@cfa.harvard.edu

Thesis Download: http://arxiv.org/abs/1605.04318

Upcoming Meeting

Living Around Active Stars (IAU Symp. 328

17 - 21 October 2016

Maresias, SP, Brazil

FIRST ANNOUNCEMENT

Conference website: http://www.sab-astro.org.br/IAUS328

Rationale: The variable activity of stars such as the Sun is mediated via stellar magnetic fields, radiative and energetic particle fluxes, stellar winds and magnetic storms. This activity influences planetary atmospheres, climate and habitability. Studies of this intimate relationship between the parent star, its astrosphere (i.e., the equivalent of the heliosphere) and the planets that it hosts have reached a certain level of maturity within our own Solar System fuelled both by advances in theoretical modelling and a host of satellites that observe the Sun-Earth system. In conjunction, the first attempts are being made to characterize the interactions between stars and planets and their coupled evolution, which have relevance for habitability and the search for habitable planets. This Symposium will bring together scientists from diverse, interdisciplinary scientific areas such as solar, stellar and planetary physics, atmospheric and climate physics and astrobiology to review the current state of our understanding of solar and stellar environments. The Symposium is expected to fertilize exchange of ideas and identify outstanding issues tackling which necessitates coordinated scientific efforts across disciplines.

Invited Speakers: Anil Bhardwaj (India), Cesar Bertucci (Argentina), Paul Charbonneau (Canada), Manuel Guedel (Austria), Gaitee Hussain (Germany), Moira Jardine (UK), Colin Johnstone (Austria), Laurne Jouve (France), Eiichiro Kokubo (Japan), Hiroyuki Maehara (Japan), Jose Dias do Nascimento Jr. (Brazil), Rachel Olsten (USA), Katja Poppenhaeger (UK), Steve Saar (USA), Alexander Shapiro (Germany)

Specifics: The symposium will be held in the sea side town of Maresias, Brazil from 17-21 October, 2016. Further details, including registration, abstract submission, financial support and accommodation information are available at the conference website:

http://www.sab-astro.org.br/IAUS328

Financial support application deadline: **30 April 2016**

Abstract submission deadline: **16 June 2016**

Early Registration deadline: **16 July 2016**

On behalf of the Organizing Committees we welcome you to the IAUS 328 and look forward to hosting you in Maresias, Brazil.

Scientific Organizing Committee: Dibyendu Nandi (Chair), Sarah Gibson (Co-Chair), Pascal Petit (Co-Chair), Margit Haberreiter, Emre Isik, Heidi Korhonen, Kanya Kusano, Duncan Mackay, Cristina Mandrini, Allan Sacha-Brun, Adriana Valio, Aline Vidotto, David Webb

Local Organizing Committee: Adriana Valio (Chair), Gustavo Guerrero (Co-Chair), Alisson Dal Lago, Jorge Melendez, Emilia Correia, Caius L. Selhorst

Contact: iaustars328@gmail.com

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 bimonthly call for abstracts will be issued. 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.***