COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

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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 Nearby Population of M-dwarfs with WISE: A Search for Warm Circumstellar Dust

Henning Avenhaus[1], Hans Martin Schmid[1] and Michael R. Meyer[1]

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Circumstellar debris disks are important because of their connection to planetary systems. An efficient way to identify these systems is through their infrared excess. Most studies so far concentrated on early-type or solar-type stars, but less effort has gone into investigating M dwarfs.

We characterize the mid-infrared photometric behavior of M dwarfs and search for infrared excess in nearby M dwarfs taken from the volume-limited RECONS sample using data from the WISE satellite and the 2MASS catalog. Our sample consists of 85 sources encompassing 103 M dwarfs. We derive empirical infrared colors from these data and discuss their errors. Based on this, we check the stars for infrared excess and discuss the minimum excess we would be able to detect.

Other than the M8.5 dwarf SCR 1845-6357 A, where the excess is produced by a known T6 companion, we detect no excesses in any of our sample stars. The limits we derive for the 22um excess are slightly higher than the usual detection limit of ∼10-15% for Spitzer studies, but including the 12μm band and the $[12] - [22]$ color in our analysis allows us to derive tight constraints on the fractional dust luminosity $L_{dust}/L_\star$. We show that this result is consistent with M dwarf excesses in the mid-inrared being as frequent as excesses around earlier-type stars. The low detection rate of $0^{+1.3}_{-0.0}$% we derive for our sample could be an age effect. We also present a tentative excess detection at 22μm around the known cold debris disk M dwarf AU Mic, which is not part of our statistical sample.

There is still no clear detection of a mid-infrared excess around any old (≥30 Myr) main-sequence M dwarf. It is unclear whether this is due to a different dust evolution around M dwarfs or whether this is an age effect combined

with the diffculties involved in searching M dwarfs for infrared excesses. A significantly larger sample of well-studied M dwarfs is required to solve this question.

Accepted by A&A

For preprints contact: havenhaus@phys.eth.ch

For preprints via ftp or WWW: http://arxiv.org/abs/1209.0678

Constraints on the Ubiquity of Coronal X-ray Cycles

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Stellar activity cycles are known to be a widespread phenomenon amongst moderately active solar– and late–type stars from long-term periodic variations in chromospheric Ca II H and K emission lines, yet to date only a handful of coronal X-ray cycles are known. We have surveyed serendipitously observed stellar sources in fields observed multiple times in the last decade by *XMM-Newton* and present our analysis of 9 stars from 6 fields. Since our sample is flux–limited, it is strongly biased towards higher levels of X-ray activity. We fit a single temperature APEC spectrum to each source and search for significant periodicities using a Lomb–Scargle Periodogram (LSP). We use a Monte Carlo (MC) algorithm to yield robust analysis of the statistical significance of cycle detections and non–detections. None of the 9 stellar lightcurves show any convincing indications of periodicity. From MC simulations we simulate the detection capabilities of our methodology and, assuming a uniform distribution of cycle periods and strengths over the domain searched, we conclude with 95% confidence that less than 72% of the stars represented by our sample of active stars have 5-13 year coronal X-ray cycles.

Accepted by ApJ

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For preprints via ftp or WWW: http://arxiv.org/abs/1209.5101

Scenarios to Explain Extreme Be Depletion in Solar-like Stars: Accretion or Rotation Effects?

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Studies of beryllium abundance in large samples of solar-type stars show a small fraction of extremely beryllium-deficient stars, which challenges our current understanding of light element depletion in these stars. We suggest two possible scenarios that may explain this high level of Be depletion: early accretion and rotational mixing. We show that in both cases, the conditions required to reach the observed level of Be depletion are quite extreme, which explains the very small fraction of detected Be outliers. We suggest that substantial Be depletion can be obtained in stars if they were fast rotators in the past, with high initial rotational velocities and short disc lifetimes. Our analysis suggests that rotational mixing may not be efficient enough to deplete Be in less than 10 Myr. Consequently, the detection of strongly Be-deficient stars in clusters younger than ~ 10 Myr may provide a genuine signature of accretion process and the proof that some protostars may undergo many extreme bursts of accretion during their embedded phases of evolution.

Accepted by A&A

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For preprints via WWW: http://arxiv.org/abs/1209.1812

New Evidence of Magnetic Interactions between Stars from 3D Doppler Tomography of Algol Binaries: β Per and RS Vul

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Time-resolved Hα spectra of magnetically-active interacting binaries have been used to create 3D Doppler tomograms by means of the Radioastronomical Approach. This is the first 3D reconstruction of β Per, with RS Vul for comparison. These 3D tomograms have revealed evidence of the mass transfer process (gas stream, circumprimary emission, localized region, absorption zone), as well as loop prominences and coronal mass ejections (CMEs) in β Per and RS Vul that could not be discovered from 2D tomograms alone. The gas stream in both binaries may have been deflected beyond the central plane by the mass losers magnetic field. The stream was more elongated along the predicted trajectory in RS Vul than in β Per, but not as pronounced as in U CrB (stream-state). The loop prominence reached maximum V_z velocities of ±155 km s^{-1} in RS Vul compared to ±120 km s^{-1} in β Per, while the CME reached a maximum V_z velocity of $+150$ km s^{-1} in RS Vul and $+100$ km s^{-1} in β Per. The 3D tomograms show that the gas flows are not symmetric relative to the central plane and are not confined to that plane; a result confirmed by recent 15GHz VLBI radio images of β Per. Both the 3D Hα tomography and the VLBI radio images support an earlier prediction of the superhump phenomenon in β Per: that the gas between the stars is threaded with a magnetic field even though the hot B8V mass gaining star is not known to have a magnetic field.

Accepted by ApJ

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For preprints via WWW: http://www.personal.psu.edu/mtr11/webpage/papers.html

Cross-Listed Abstracts (Pre-Main Sequence Stars)

Editor's Note: The abstracts below are being cross-listed with the *Star Formation Newsletter.*

Spectral Classification and HR Diagram of Pre-main Sequence Stars in NGC6530

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Mechanisms involved in the star formation process and in particular the duration of the different phases of the cloud contraction are not yet fully understood. Photometric data alone suggest that objects coexist in the young cluster NGC 6530 with ages from ~1 Myr up to 10 Myrs.We want to derive accurate stellar parameters and, in particular, stellar ages to be able to constrain a possible age spread in the star-forming region NGC6530. We used low-resolution spectra taken with VIMOS@VLT and literature spectra of standard stars to derive spectral types of a subsample of 94 candidate members of this cluster. We assign spectral types to 86 of the 88 confirmed cluster members and derive individual reddenings. Our data are better fitted by the anomalous reddening law with R_V=5. We confirm the presence of strong differential reddening in this region. We derive fundamental stellar parameters, such as effective temperatures, photospheric colors, luminosities, masses, and ages for 78 members, while for the remaining 8 YSOs we cannot determine the interstellar absorption, since they are likely accretors, and their V-I colors are bluer than their intrinsic colors. The cluster members studied in this work have masses between 0.4 and 4 $M_\odot$ and ages between 1-2 Myrs and 6-7 Myrs. We find that the SE region is the most recent site of star formation, while the older YSOs are loosely clustered in the N and W regions. The presence of two distint generations of YSOs with different spatial distribution allows us to conclude that in this region there is an age spread of 6-7 Myrs. This is consistent with the scenario of sequential star formation suggested in literature.

Accepted by A&A

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For preprints via WWW: http://dx.doi.org/10.1051/0004-6361/201219853

Upcoming Meeting

IAU Symposium 302

Magnetic Fields Throughout Stellar Evolution

26 - 30 August 2013

Biarritz, France

http://iaus302.sciencesconf.org

FIRST ANNOUNCEMENT

Dear Colleagues:

This is the first announcement for the Symposium 302 of the International Astronomical Union, entitled *Magnetic Fields Throughout Stellar Evolution*. The conference will be held in Biarritz (France), 26-30 August 2013. Preregistration is now open!

Topics include: * Stellar structure and evolution * Magnetized accretion and outflows inyoung stellar objects * Magnetic braking of PMS stars * Solar and stellaractivity in photospheres, chromospheres and coronae, and stellar cycles * Magnetism in very low-mass stars and brown dwarfs * Star-planet interaction * Stellar dynamos across the HR diagram * Magnetic field origin and stability inmassive stars * Magnetically-confined winds of massive stars * Small-scaledynamo and mass-loss in giant and supergiant stars * Final phases of stellarevolution : magnetism in compact objects Confirmed speakers:

Evelyne Alecian - Jonathan Braithwaite - Jean-Franois Donati - Rim Fares - Oleg Kochukhov - Franois Lignires - Stuart Littlefair - Nanda Rea - Andreas Reisenegger - Marina Romanova - Saku Tsuneta - Aline Vidotto

Important dates: * Early registration opens: 07 Jan 2013 * Deadline for IAU grant application: 15 Feb 2013 * Decision for IAU financial support: 08 Mar 2013 * Deadline for early registration: 01 Apr 2013 * Abstract deadline for contributed talks: 03 May 2013 * Abstract deadline for posters: 21 Jun 2013 * Deadline for proceedings submission: 30 Sep 2013

We invite you to express your interest by filling out the preregistration form on the conference webpage:

http://iaus302.sciencesconf.org

You can also join us on facebook:

http://www.facebook.com/events/100425383448793/

We hope to see as many of you as possible in Biarritz next year!

Best regards, Pascal Petit, on behalf of the SOC and LOC
ppetit *at* irap.omp.eu

Upcoming Meeting

Physics at the Magnetospheric Boundary

25 - 28 June 2013

Geneva, Switzerland

http://www.isdc.unige.ch/magbound/

Dear Colleagues:

The *Physics at the Magnetospheric Boundary* conference is aimed at bringing together specialists working theoretically, numerically and observationally on processes occurring at the limit of the magnetically dominated region around accreting objects such as neutron stars, white dwarfs, and T Tauri stars, where the surrounding hot plasma is finally captured.

Different manifestations of similar physical processes occur in this wide variety of celestial sources and have been investigated since the 1960s by different scientific communities. The conference represents a precious opportunity of exchange between research groups working on the topic of accretion, across different wavelengths and source types. It poses the basis for the next steps forward in our understanding of the physics at the magnetospheric boundary.

Planned sessions for this conference include:

Theory of accretion onto magnetized stars Numerical modelling of plasma-field interaction: accretion and jets production Observational clues to the physics at the magnetosphere Future perspectives in theory and observations

More details are available on the conference website:

http://www.isdc.unige.ch/magbound/

Subscribe to the conference mailing list to receive further news:

http://www.isdc.unige.ch/magbound/index.php/newsletter-subscription

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.***