COOLNEWS

A RESEARCH NEWSLETTER DEDICATED TO COOL STARS AND THE SUN

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We present high-precision photometry, high- and medium-resolution spectroscopy for a sample of 32 stars likely to be the optical counterparts of X-ray sources serendipitously detected by the EXOSAT satellite. Using also recent results from the Hipparcos satellite, we infer spectral types, compute X-ray luminosities and Li abundance and investigate the single or binary nature of the sample stars. We found 11 new variable stars, whose photometric periods fall in the 1.2-27.5 day range, for most of which the optical variability is consistent with the presence of photospheric cool spots. For our sample of X-ray selected stars we confirm the existence of a strong correlation between the stellar rotation rate and the level of activity, and also between the X-ray and bolometric luminosities. Two stars in our sample are likely to be PMS object, one is likely to be a previously unknown M-type star within 25 pc.

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The *XMM-Newton* View of Stellar Coronae: High-resolution X-ray Spectroscopy of Capella

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We present the high-resolution RGS X-ray spectrum of the stellar binary Capella observed by the *XMM-Newton* satellite. A multi-thermal approach has first been applied to fit the data and derive elemental abundances. Using the latter, the emission measure distribution has been reconstructed using a Chebychev polynomial fit. Its shape is found to display a sharp peak around 7 MK, consistent with previous *EUVE* and *ASCA* results. A smaller but significant amount of emission measure is required around 1.8 MK in order to explain the O VII He-like triplet and the C VI Lyα line. We have applied the temperature diagnostics of dielectronic recombination satellite lines to the He-like O VII triplet to constrain the cool plasma temperature, and have obtained a lower limit consistent with the global reconstruction of the emission measure distribution. We have used line ratios from the forbidden, intercombination, and resonance lines of the O VII triplet to derive an average density for the cool coronal plasma ($n_e < 1 \times 10^{10}$ cm^{-3}). Implications for the coronal structure of Capella are discussed.

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The *XMM-Newton* View of Stellar Coronae: X-ray Spectroscopy of the Corona of AB Doradus

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We report results of deep X-ray observations of AB Doradus obtained with the *XMM-Newton* observatory during its Performance Verification phase. The main objective of the analysis is a study of the spectral variability of coronal plasma in a very active star, including investigations of the variable thermal structure, abundance variations, and possible density changes during flares. AB Dor revealed both quiescent and flaring emission. The RGS spectra show flux changes in lines of highly ionized Fe during the flares, and an increase of the continuum. Elemental abundances increase in the early flare phases, by a factor of three. The quiescent abundances are lower than corresponding solar photospheric values, and tend to *increase* with increasing first ionization potential, contrary to the behavior in the solar corona. High-resolution spectra show an average density of the cool plasma of $\approx 3 \times 10^{10}$ cm^{-3}; this value does not change during the flares. We analyse and model the temporal behavior of heating and cooling, and present model results for one of the flares. We find that magnetic loops with a semilength of the order of 2.5×10^{10} cm $\approx$0.3 $R_\star$ are involved.

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XMM-Newton Survey of the Low-metallicity Open Cluster NGC 2516

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We present the first results of an *XMM-Newton EPIC* survey of NGC 2516, a southern low-metallicity open cluster with an age close to the Pleiades. The attained limiting sensitivity is of $\sim 2.4 \times 10^{-15}$ erg sec^{-1} cm^{-2} in the 0.1–4.0 keV bandpass. This has been achieved by summing the data of the MOS and PN cameras of two distinct observations for a total exposure time of $\sim$ 33 ks and by analyzing the summed data set with the wavelet detection algorithm developed at Osservatorio Astronomico di Palermo (OAPA) that has yielded over 200 X-ray detections. Using data just from a single exposure or from a single camera would have reduced by a factor 2–4 our limiting sensitivity and would have resulted in 25–40% less X-ray detections. To date, 129 detections have as counterparts one or more of the 540 photometrically selected cluster members in the surveyed region, for a total of 147 likely detected members, with unique identification in 112 cases. We derive the X-ray luminosity functions (XLF) of NGC 2516 members of different spectral types and compare them with those of the more metal rich, approximately coeval Pleiades cluster, finding the NGC 2516 photometrically selected dG and dK stars less luminous than the Pleiades. The XLFs of the NGC 2516 and of the Pleiades dM stars are indistinguishable. We compare the *XMM-Newton* results with those recently obtained with *Chandra*.

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A Temperature Calibration for MK-class III Giants from High-resolution Spectral Line-depth Ratios

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A high-resolution spectroscopic survey in the 6380–6460 Å region of 224 slowly-rotating M-K class III giants is presented. Spectral line-depth ratios are calibrated against effective temperature obtained from $B-V$ and $V-I$ color indices in the range 3200–7500 K (M6–A9). A table of polynomial coefficients for 12 line-ratio–$T_{\rm eff}$ relations can be used to derive $T_{\rm eff}$ of F–M stars to within 33 K (rms), and of early-F and mid-to-late M stars to within 77–106 K (rms).

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A Spectroscopic Study of the Eclipsing Binaries: SV Camelopardalis and XY Ursae Majoris

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High-resolution spectroscopic observations of the eclipsing RS CVn-type active close binaries SV Camelopardalis and XY Ursae Majoris reveal excess emission components in the Hα and Hβ lines. We have used the spectral subtraction technique to separate the excess emission from the photospheric background and find that in both stars the excess emission is associated with the secondary, cooler component. Analysis of the $\mathrm{EW_{H\alpha}/EW_{H\beta}}$ ratio indicates that in both cases the emission is probably associated with surface plage regions or prominences viewed against the stellar disks. We find no evidence of excess absorption features associated with extended prominence-like material in these systems.

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Circumstellar Dust Shells Around Long-period Variables IX. Molecular Layers Resulting from Shocked Carbon-rich Atmospheres

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The existence of warm zones of an enhanced molecular content surrounding the photospheres of AGB stars has been postulated to explain observed molecular absorption/emission components which are in excess of the results obtained from classical hydrostatic model atmospheres. We have analyzed the chemical equilibrium molecular composition of time-dependent models of carbon-rich circumstellar envelopes for various combinations of the stellar parameters and found that groups of molecules appear to be present in different zones with temporally varying temperature and density. The regions of enhanced molecular abundances are situated between the stellar photosphere and the circumstellar dust shell. In the models, these zones are produced by the levitation of the atmospheric gas due to the dissipation of shock waves and/or due to radiation pressure on molecules and dust.

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X-ray and EUV Emission from the Coronae of Capella

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The primary objective of this work is the analysis and interpretation of coronal observations of Capella obtained in September 1999 with the High Energy Transmission Grating Spectrometer on the *Chandra* X-ray Observatory and the *Extreme Ultraviolet Explorer* (*EUVE*). He-like lines of O (O VII) are used to derive a density of 1.7×10^{10} cm^{-3} for the corona of the binary, consistent with upper limits derived from Fe XXI, Ne IX and Mg XI line ratios. Previous estimates of the electron density based on Fe XXI should be considered as upper limits. We construct emission measure distributions and compare theoretical and observed spectra to conclude that the coronal material has a temperature distribution that peaks around $4-6$ MK implying that the corona of Capella was significantly cooler than in previous years. In addition, we present an extended line list with over 100 features in the 5–24Å wavelength range, and find that the X-ray spectrum is very similar to that of a solar flare observed with SMM. The observed to theoretical Fe XVII 15.012Å line intensity reveals that opacity has no significant effect on the line flux. We derive a lower limit to the optical depth, which we combine with the electron density to derive an upper limit of $3,000$ km for the size of the Fe XVII emitting region. In the same context, we use the Si IV transition region lines of Capella from HST/GHRS observations to show that opacity can be significant at $T = 10^5$ K, and derive a path length of ≈ 75 km for the transition region. Both the coronal and transition region observations are consistent with very small emitting regions, which could be explained by small loops over the stellar surfaces. However in addition we speculate on the possibility of an emitting region between the stars caused by the interaction of their magnetic fields.

Submitted to MNRAS

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The "Rotation-Activity Connection": Its Extension to Photospheric Activity Diagnostics

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In this paper we present the results of a different approach in the study of the so-called *rotation-activity connection*, which is a well established correlation between rotation and magnetic activity at chromospheric and outer atmospheric levels. The present study concerns the photospheric level and was carried out by using V-band photometric light curve amplitudes as indicators of starspot coverage and of magnetic activity.
A high degree of correlation between the envelope of maximum V-band light curve amplitudes and the rotation period is found for the active star members of young open clusters (IC 2602, IC 2391, Alpha Persei, Pleiades and Hyades), as well as for active field stars. This correlation shows a different behaviour in two different rotation period ranges. Moreover, some evidence of a possible activity "saturation" is found among the most rapidly rotating stars of the sample. Additional correlations between photospheric and other magnetic activity indicators in the chromosphere, transition region and corona are also investigated.
The results presented here can be considered as an extension of the well established *rotation-activity connection* valid from the corona, transition region and chromosphere, down to the photosphere.

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Database of Geneva Stellar Evolution Tracks and Isochrones for $\mathbf{(UBV)_J(RI)_C}$ JHKLL′M, HST-WFPC2, Geneva and Washington Photometric Systems

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We have used an updated version of the empirically and semi-empirically calibrated *BaSeL* library of synthetic stellar spectra of Lejeune et al. (1997, 1998) and Westera et al. (1999) to calculate synthetic photometry in the $(UBV)_J(RI)_C$ JHKLL′M, HST-WFPC2, Geneva, and Washington systems for the entire set of non-rotating Geneva stellar evolution models covering masses from 0.4–0.8 to 120–150 $M_\odot$ and metallicities Z=0.0004 (1/50 $Z_\odot$) to 0.1 (5 $Z_\odot$). The results are provided in a database which includes all individual stellar tracks and the corresponding isochrones covering ages from 10^3 yr to 16–20 Gyr in time steps of $\Delta \log t = 0.05$ dex. The database also includes a new grid of stellar tracks of very metal-poor stars (Z=0.0004) from 0.8 – 150 $M_\odot$ calculated with the Geneva stellar evolution code.

The full database will be available in electronic form at the CDS
`http://cdsweb.u-strasbg.fr/cgi-bin/qcat?J/A+A/(vol)/(page)` and at
`http://webast.ast.obs-mip.fr/stellar/`.

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Identification of Fe II Emission Lines in FUSE Stellar Spectra

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We identify two complexes of Fe II emission lines in far ultraviolet spectra of the stars α TrA and HD 104237. Using spectra from both the *Far Ultraviolet Spectroscopic Explorer (FUSE)* and the Space Telescope Imaging Spectrograph (STIS) on-board the *Hubble Space Telescope (HST)*, we show that these emission lines, which represent the majority

of previously unidentified emission features in cool stars spectra between 912 and 1180 Å, are fluorescent decays in Fe II following excitation by H Lyα. Specifically, following photo-excitation from the third term ($4s\ a\ ^4D$) of Fe II, subsequent decays are observed to the two lowest terms ($4s\ a\ ^6D$ and $3d^7\ a\ ^4F$) which are observed near 1100 Å and 1135 Å, respectively. Decays to higher terms, and hence longer wavelengths, also are clearly seen in the STIS spectra. Differences in the fluorescent Fe II spectra of α TrA and HD 104237 are tentatively identified as resulting from differences in the intrinsic width of the density weighted H Lyα radiation fields. The additional Fe II lines observed in α TrA result from a broadener H Lyα profile. Two features near 1060 Å appear to be fluorescent lines of Cr II, also excited by H Lyα.

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The Boron Absorption Line at 2089.6 Å in HD 140283 ?

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We have observed the B I line at 2089.6 Å in the metal poor star HD 140283 with HST/STIS. The observation was an attempt to confirm the B abundances derived from the 2497 Å B I line in earlier works in general, and for for this star in particular (Edvardsson et al. 1994, A&A 290, 176; Kiselman & Carlsson 1996, A&A 311, 680). The resulting spectrum gained from 8 orbits of observations is hardly consistent with the boron abundance derived in the earlier works. A pure ^{10}B line could produce the feature observed but no reasonable process can produce such a ratio between ^{10}B and ^{11}B. More likely the analysed feature is affected by a statistical fluctuation. A conservative upper limit estimate of the NLTE corrected boron abundance gives a value marginally consistent with that derived from the 2497 Å line. We are proposing further observations to derive a more definite abundance from the line.

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High Resolution Spectroscopy of Symbiotic Stars: VI. Orbital and Stellar Parameters for AR Pav

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We present new dynamical parameters of the AR Pav binary system. Our observations consist of a series of high resolution optical/NIR spectra from which we derive the radial velocity curve of the red giant as well as its rotation velocity. Assuming co-rotation, we determine the stellar radius (130 $R_\odot$) of the red giant. Based on this we derive the red giant's luminosity and mass (2.0 $M_\odot$) as well as the distance of the system (4.9 kpc). The binary mass function finally yields the companion's mass (0.75 $M_\odot$) and the binary separation (1.95 AU). We find that the red giant does not fill its Roche lobe. We review the radial velocity data of Thackeray and Hutchings (1974), and compare it with our red giant's orbit. We find that their RV curves of the blue absorption system and the permitted emission lines are in anti-phase with the red giant, and that the forbidden emission lines are shifted by a quarter of a period. The blue absorptions and the permitted emission lines are associated with the hot companion but not in a straightforward way. The blue absorption system only tracks the hot component's orbital motion whilst it is in front of the red giant, whereas at other phases line blanketing by interbinary material leads to perturbations. We finally present UV light curves based on IUE archive spectra. We clearly detect eclipses in the continuum at all wavelengths. The eclipse light curves are unusual in that they show a slow and gradual decline prior to eclipse which is followed by a sharp increase after eclipse.

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Precise Masses for Wolf 1062 AB from Hubble Space Telescope Interferometric Astrometry and McDonald Observatory Radial Velocities

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We present an analysis of astrometric data from FGS 3, a white-light interferometer on *HST*, and of radial velocity data from two ground-based campaigns. We model the astrometric and radial velocity measurements simultaneously to obtain parallax, proper motion and component masses for Wolf 1062 = Gl 748 AB (M3.5V). To derive the mass fraction, we relate FGS 3 fringe scanning observations of the science target to a reference frame provided by fringe tracking observations of a surrounding star field. We obtain an absolute parallax $\pi_{abs} = 98.0 \pm 0.4$ milliseconds of arc, yielding $\mathcal{M}_A = 0.379 \pm 0.005\mathcal{M}_\odot$ and $\mathcal{M}_B = 0.192 \pm 0.003\mathcal{M}_\odot$, high quality component masses with errors of only 1.5%.

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Solar Abstracts

Search for Microflaring Activity in the Magnetic Network

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We analyze the temporal behavior of Network Bright Points (NBPs) searching for low-atmosphere signatures of flares occuring on the magnetic network. We make use of a set of data acquired during coordinated observations between ground based observatories (NSO/Sacramento Peak) and the MDI instrument onboard SOHO. Light curves in chromospheric spectral lines show only small amplitude temporal variations, without any sudden intensity enhancement that could suggest the presence of a transient phenomenon such as a (micro) flare. Only one NBP shows spikes of downward velocity, of the order of 2 – 4 Km/s, considered as signals of compression associated to a (micro) flare occurrence. For this same NBP, we also find a peculiar relationship between the magnetic and velocity fields fluctuations, as measured by MDI. Only for this point the B - V fluctuations are well correlated, suggesting the presence of magneto-acoustic waves propagating along the magnetic structure. This correlation is lost during the compression episodes and resumes afterward. An A6 GOES soft X-ray burst is temporally associated with the downward velocity episodes, suggesting that this NBP is the footpoint of the flaring loop. This event has a total thermal energy content of about 10^{28} erg, and hence belongs to the microflare class.

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High-sensitivity Observations of Solar Flare Decimeter Radiation

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A new acousto-optic radio spectrometer has observed the 1 – 2 GHz radio emission of solar flares with unprecedented sensitivity. The number of detected decimeter type III bursts is greatly enhanced compared to observations by conventional spectrometers observing only one frequency at the time. The observations indicate a large number of electron beams propagating in dense plasmas. For the first time, we report weak, reversed drifting type III bursts at *frequencies above* simultaneous narrowband decimeter spikes. The type III bursts are reliable signatures of electron beams propagating downward in the corona, apparently away from the source of the spikes. The observations contradict the most popular spike model that places the spike sources at the footpoints of loops. Conspicuous also was an apparent bidirectional type U burst forming a fish-like pattern. It occurs simultaneously with an intense U-burst at 600-370 MHz observed in Tremsdorf. We suggest that it intermodulated with strong *terrestrial interference* (cellular phones) causing a spurious symmetric pattern in the spectrogram at 1.4 GHz. Symmetric features in the 1 – 2 GHz range, some already reported in the literature, therefore must be considered with utmost caution.

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The Analysis of Hard X–ray Radiation of Flares with Occulted Footpoints

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14 behind-the-limb flares with occulted footpoints, well-observed by *Yohkoh*, have been carefully selected. Such a flare location on the Sun offers a unique possibility to investigate loop-top hard X–ray emission sources separately, without the presence of strong footpoint sources which can disturb the observational characteristics of the loop-top sources during any process of image reconstruction. Hard X–ray radiation in all investigated flares has similar features: (1) smooth light curves with several impulsive spikes, (2) low-energy spectra (mainly below 33 keV) which can expressed in terms of temperatures within the interval of about 20–100 MK. The HXR images show two types of loop-top emission sources: type A, co-spatial with the bright loop-top kernels seen in soft X–rays, and type B, having no distinct counterpart in soft X–rays. Arguments are presented that this classification is more physical than the classification considering impulsive and gradual sources proposed by Masuda (1994), who actually separated two phases of evolution of the same loop-top source. The model of the turbulent flare kernel (Jakimiec [1998]; Jakimiec et al. [1998]) has been adapted to explain the obtained characteristics of loop-top HXR emission sources of type A.

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The Best Brown Dwarf Yet?: A Companion to the Hyades Eclipsing Binary V471 Tau

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We have carried out an analysis of about 160 eclipse timings spanning over 30 years of the Hyades eclipsing binary V471 Tauri that shows a long-term quasi-sinusoidal modulation of its observed eclipse arrival times. The O–Cs have been analyzed for the "light-time" effect that arises from the gravitational influence of a tertiary companion. The presence of a third body causes the relative distance of the eclipsing pair to the Earth to change as it orbits the barycenter of the triple system. The result of the analysis of the eclipse times yields a light-time semi-amplitude of 137.2 ± 12.0 s, an orbital period of $P_3 = 30.5 \pm 1.6$ yr and an eccentricity of $e_3 = 0.31 \pm 0.04$. The mass of the tertiary component is $M_3 \sin i_3 \simeq 0.0393 \pm 0.0038\,\mathrm{M}_\odot$ when a total mass of $1.61 \pm 0.06\,\mathrm{M}_\odot$ for V471 Tau is adopted. For orbital inclinations $i_3 > 35°$, the mass of the third body would be below the stable hydrogen burning limit of $M \approx 0.07\ \mathrm{M}_\odot$ and it thus would be a brown dwarf. In the next several years (near maximum elongation), it should be feasible to obtain IR images and spectra of V471 Tau C that, when combined with the known mass, age, distance, and $[Fe/H]$, will serve as a benchmark for understanding the physical properties and evolution of brown dwarfs.

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Limits on Line Bisector Variability for Stars with Extrasolar Planets

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We present an analysis of high-resolution synoptic spectra of ten F- and G-type stars, seven of which exhibit periodic radial velocity variations due to the presence of one or more substellar companions. We searched for subtle periodic variations in photospheric line asymmetry, as characterized by line bisectors. In principle, periodic variations in line asymmetry observed at lower spectral resolution could mimic the radial velocity signature of a companion, but we find no significant evidence of such behavior in our data. Observations were obtained from 1998 March to 1999 February using the National Solar Observatory (NSO) 1.52-m McMath-Pierce Solar Telescope Facility on Kitt Peak in conjunction with the solar-stellar spectrograph, achieving a resolving power of 1.2×10^5. To characterize line asymmetry, we first measured line bisectors for the unblended Fe I photospheric line at 625.26 nm. To improve sensitivity to small fluctuations, we then combined points in each bisector to form a velocity displacement with respect to the line core. We searched for periodic variations in this displacement, finding no substantial difference between stars with substellar companions and those without reported companions. We find no correlation between bisector velocity displacement and the known orbital phase of substellar companions around our target stars. Simulations of a periodic signal with noise levels that mimic our measurement errors suggest that we can exclude bisector variations with amplitudes greater than about 20 m s^{-1}. These results support the conclusion that extrasolar planets best explain the observed periodic variations in radial velocity.

Accepted by AJ

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For preprints via ftp or WWW: ftp gemini.tuc.noao.edu; cd pub; cd giampapa; binary; mget bisectors.tar.gz

Dynamical Mass Determination for the Very Low Mass Stars LHS 1070 B and C

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[5] Astrophysikalisches Institut Potsdam, An der Sternwarte 16, 14482 Potsdam, Germany We followed the relative orbit of the close pair of very late-type stars in the nearby triple system LHS 1070 during the past seven years. These observations are used to derive the astrometric elements of the orbit. Using the period of 16.1 ± 1.4 years and assuming the distance of 7.39 pc given by van Altena ([?]) to be exactly correct, the combined mass of components B and C is 0.138 ± 0.003 $M_{\odot}$. Otherwise, this mass scales with the third power of the distance, which presently is not known to better than 9 %. The dynamical mass would equal the combined mass of 0.161 ± 0.002 $M_{\odot}$ derived from the theoretical mass-luminosity relation of Baraffe et al. ([?]) and Chabrier et al. ([?]) for a 5 % larger distance of 7.78 pc. A critical comparison with the theoretical relations therefore has to await more precise parallax determinations for this comparatively faint system with visual magnitude V = 15.3. by a factor of about three smaller than its present projected separation from the primary, which is a borderline case for dynamical stability according to common understanding. The wide orbit of component A around the center of mass of components B and C cannot yet be determined from our measurements. However, we can show that it is probably co-planar with the close pair orbit and should have a period in the range 60–1000 years.

Accepted by A&A

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UPCOMING MEETING

Stellar Coronae in the Chandra and XMM-Newton Era

First Announcement, 35th ESLAB Symposium

25 - 29 June 2001

ESTEC, Noordwijk, The Netherlands

This is a first announcement for the 35th ESLAB Symposium on "Stellar Coronae in the Chandra and XMM-Newton Era", to be held at ESTEC (Noordwijk, The Netherlands) on June 25-29 2001. This announcement contains the preliminary program and some important deadlines. An "expression of interest" form, which you should fill if you want to receive future mailings about the symposium, is available at
http://astro.estec.esa.nl/Symposia/Coronae2001/prel_reg.html.

Rationale

Results from earlier generations of X-ray and EUV observatories (Einstein, EXOSAT, ROSAT, ASCA, EUVE) over the past two decades have opened up the field of stellar coronae, while solar observations have greatly advanced our view of the only stellar corona that we can study with spatial resolution. However, the observational advances and discoveries have left many open questions regarding the nature of stellar outer atmospheres. Fundamental issues such as coronal heating, the spatial distribution of stellar coronal plasma, and the nature and presence of elemental fractionation and abundance anomalies, remain outstanding problems. Much also remains to be explored concerning the existence and role of hot stellar coronae in the broader context of the H-R diagram, in star formation and in other areas of astronomy.

Thanks to their high sensitivity and spectral resolution, the data obtained by the Chandra and XMM-Newton missions are providing a new look at the coronae of stars. At the same time, the spectacular successes of the SOHO and TRACE missions are providing the most detailed spatial and spectral views ever obtained of the solar corona. The aim of this conference is to provide a timely forum for a detailed discussion of the impact of the new generation of data on coronal astronomy at large, bringing together observers and theoreticians, as well as experts in other disciplines of relevance, such as stellar structure and star formation.

Scientific Organizing Committee

F. Favata (ESA/ESTEC – chair), J. Drake (Harvard-Smithsonian Center for Astrophysics – co-chair), M. Guedel (Paul Scherrer Institute), J. Klimchuk (US Naval Research Laboratory), J.M. Laming (US Naval Research Laboratory), G. Micela (Osservatorio Astronomico di Palermo), R. Rosner (University of Chicago) J. Schmitt (Universitaet Hamburg), S.M. White (University of Maryland)

Financial help

A limited amount of financial support (in the form of partial travel or accommodation grants) will be available, with priority given to young researchers and to researchers from less developed regions. Prospective attendees who may require partial financial support are invited to contact the LOC at the address coronae2001@astro.estec.esa.nl well in advance of the March 15 deadline to obtain an application form.

Important deadlines

20 December 2000 - pre-registration
15 March 2001 - Abstract submission
15 March 2001 - Financial help request submission
11 May 2001 - Meeting Registration with reduced rate
11 May 2001 - Hotel Registration with preferential rates
September 2001 - Proceedings submission

Further Information

Further information can be found at http://astro.esa.int/Symposia/Coronae2001/ or by contacting the LOC at coronae2001@astro.estec.esa.nl.

Preliminary program

Ample space will be given to contributed talks, specially for the presentation of new results from Chandra and XMM-Newton. Speakers whose participation is not confirmed yet are marked with a "*".

Introduction
- Historical Perspective, J. Linsky

Coronal Structure
- Solar Coronal Structure, K. Schrijver
- Stellar Coronal Structure pre-chandra/XMM, J. Schmitt

Observational Data: problems and new opportunities
- Spectral synthesis for high resolution spectra, N. Brickhouse
- How reliable are atomic data?, J.M. Laming
- Solar and Stellar Observational and Interpretational challenges (inc. density diagnostics), P. Judge

Flares
- Solar flares, G. Doschek
- Origin of flare activity, G. Emslie *
- Flare modeling, F. Reale
- Large stellar flares, F. Favata
- High energy coronal phenomena and interpretation, J. Brown

Multi-wavelength Coronae
- Radio observations of the solar corona, S. White
- Relationships between radio, EUV, X-ray coronae (both solar and stellar), M. Guedel

Coronal Abundances, Winds, Mass Loss and CME's
- Solar Coronal Abundances, U. Feldman
- Stellar Coronal Abundances, J. Drake
- Fractionation mechanisms, I. Axford
- The solar wind, E. Marsch *
- Stellar winds, mass loss, and angular momentum evolution, L. Hartmann
- The role of accretion disks in the coronal activity of young stars, T. Montmerle

- Observation of Solar CMEs, R. Schwenn *
- Theory of CMEs, S. Antiochos
- Observation of Stellar CMEs (do they exist?), A. Collier Cameron

Dynamos and Coronal Heating
- Stellar and Solar Dynamos, S. Tobias *
- Coronal Heating, R. Rosner
- Scaling laws: solar, J. Klimchuk
- Scaling laws: stellar, S. Saar

Coronae over the range of spectral types and evolutionary phase
- The Sun as seen by Yohkoh, S. Tsuneta *
- Origin of X-ray Emission from Hot Stars, J. Cassinelli *
- Low mass stars, M. Giampapa *
- Protostars, Y. Koyama
- Close binaries, A. Dupree
- Effects of age and metallicity, G. Micela

- Concluding remarks, C. Jordan

JOB OPENING

Predoctoral or Postdoctoral Fellowship in X-ray and Optical Observations of Stellar Coronae

Osservatorio Astronomico di Brera (Italy)

We invite applications for a pre- or postdoctoral fellowship in the study of stellar coronae at the Osservatorio Astronomico di Brera (OAB), starting early 2001. The fellowship is funded by the Italian Ministry of Research and by OAB as part of a national project on "Spectroscopy and study of physical processes on the Sun and the solar-like stars", in collaboration with other Italian institutions. The duration of the fellowship is of 1.5-2 years (depending on the expertise and on the monthly salary allocated). The successful candidate will be based in Merate, near Milan. Applicants should have research interests and experience in one or more of the following areas: X-ray observations of stellar coronae, spectroscopic and variability study of active stars, stellar activity evolution, coronal and chromospheric activity connection, stellar activity and Lithium abundances, Lithium abundances determination. The successful applicant will join the stellar group at OAB and will collaborate with the local staff on on-going and new projects. Our group has access to proprietary data on the BeppoSAX, Chandra and Newton-XMM satellites and on optical instruments. The successful applicant will participate to the analysis and interpretation of these data and will be involved in new proposals. Moreover, our group has a large expertise in exploiting the available X-ray archival databases from BeppoSAX, ROSAT and ASCA satellites. Our group will also strictly interact with researchers from the other groups in the consortium on the above topics. Independent research will also be encouraged. The gross annual salary will be commensurate to experience, within the approximate range from 16,000 to 25,000 Euro, together with an appropriate travel budget and computing support.

The OAB houses one of the most active high energy groups in Italy, with research interests spanning from stars, to collapsed objects, to GRB, to galaxies and cluster of galaxies, AGNs, large scale structure and cosmology. In addition, it hosts leading technological activities in the field of X-ray mirrors and optical instrumentation. It is directly involved in high energy missions such as Swift, a NASA MIDEX satellite dedicated to gamma-ray bursts, JET-X and Constellation-X. It participates to the construction of instrumentation for the TNG, VLT and Columbus optical telescopes. OAB also hosts a very active group working on innovative detection algorithms for X-ray astronomy, based on the wavelet transform, which made possible the creation of the BMW ROSAT-HRI source catalog. Further details on the OAB activities may be obtained from the www page (http://www.merate.mi.astro.it), and related links.

Interested individuals should send a Curriculum Vitae, list of publications and a statement of research interests to the address given below (E-mail submission are welcome). They should also arrange to have up to three letters of reference sent directly by the referee to the same address (or E-mail). Applications sent before 15 January 2001 will be given full consideration. Please quote reference "Cofin2000 - Stellar Activity Fellowship" on all correspondence.

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or http://www.merate.mi.astro.it

NEW BOOK

Transport and Energy Conversion in the Heliosphere
Springer Lecture Notes in Physics #553 (214 pp.)

by **Jean-Pierre Rozelot** [1], **Ludwig Klein** [2] **and Jean-Claude Vial**[3]

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The book contains courses taught to a public group of Ph.D. students, post-docs and confirmed researchers in all fields of heliospheric plasma physics. It aims at identifying physical issues which are common to two different fields of astronomy: solar and magnetosheric physics. Emphasis is given to basic processes of transport and conversion of energy: magnetic reconnection is discussed in detail from the viewpoints of MHD and kinetic physics. Processes of charged particle acceleration are reviewed and confronted with recent observations. The subject is introduced by a summary of MHD and the basic structures and parameters of the solar atmosphere, terrestrial ionosphere and magnetosphere are reviewed. The book combines a pedagogic and rather comprehensive presentation of physical issues and raises fully open questions, with the complementary and sometimes conflicting views of geophysicists ans solar physicits. The book's focus, while basic, opens new avenues.

For information contact: rozelote@obs-azur.fr

For information via WWW:

`http://www.springer.de/cgi-bin/search_book.pl?isbn=3-540-67595-7`

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), brown dwarfs, 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` .