ISSN 1783-3426

THE MASSIVE STAR NEWSLETTER

formerly known as the hot star newsletter

*

No. 135 2013 May-June

Editors: Philippe Eenens (University of Guanajuato) eenens@gmail.com

Raphael Hirschi (Keele University) http://www.astroscu.unam.mx/massive_stars

CONTENTS OF THIS NEWSLETTER:

Abstracts of 1 other types of papers

Eta Carinae Splinter session at 223rd AAS Meeting January 2014, Washington, DC, USA

Jobs

Post-doctoral or PhD position in stellar astrophysics
Postdoctoral Research Fellow
Numerical Modelling of Stellar Interiors

Meetings

Giants of Eclipse
IAUS 302 - Full program and registration deadline

News

Next Massive Star Meeting

Dear colleagues,

After the fantastic meeting in Rhodes (thanks to Alceste Bonanos and Danny Lennon as organizers) we have to start preparing the next Massive Stars Meeting. We foresee that this meeting will probably take place in 2017.

With this call the Organizing Committee of our Massive Stars Working Group invites any interested people to send an email before next October 15th communicating his/her interest in organizing the next meeting. The email shall be sent to me as chair of the OC (ahd-at-iac.es).

We do not want that anyone spends too much time and effort with the proposals. A short email indicating the willingness to organize the meeting with some comments about the adequacy of the proposed place will be enough.

The OC will consider all proposals and select one of the proposed places before end of the year, based on criteria like:
- the meeting location (traditionally, our group prefers locations near a beach where a relaxed atmosphere favours personal contacts)
- the availability of hotels with large conference rooms (at least 200 people) and meeting facilities at affordable prices
- the support of a local astronomical community
- the balance of locations hosting our meetings

Best regards,
Artemio Herrero
Chair of the Organizing Committee of the IAU Massive Stars Working Group

Back to contents

A Spectroscopic Campaign on WR 134, WR 135, and WR 137

We are announcing that the large "Pro-Am" campaign to spectroscopically study the variability in 3 WR stars will start on May 17, continuing through September 17 of this year. We have received several telescope allocations, including a 4-month span at the IAC 0.8m (with only a few nights devoted to other projects) and a few allocations of a few weeks. A team of amateur spectroscopists will be observing both at the IAC as well as their small telscopes to study the CIRs and clumps in these stars to create a long, intense time-series. We welcome additional contributors if you have the availability and telescope time.

Weblink: http://www.stsci.de/wr134/index.htm
Email: richardson@astro.umontreal.ca

Back to contents

European Ultraviolet Visible Observatory

In response to the recent ESA call for science themes for large missions, the UV astrophysics community has submitted a white paper (http://www.nuva.eu/whitepaper/files/euvo_wp_220513_fin.pdf) to promote a mission for a visible-UV observatory. Several areas of astrophysics are interested in UV observations, in particular massive stars. EUVO will provide access to key diagnostics of stellar properties, stellar winds, and star-ISM interactions. The EUVO team invites you to become a supporter of this project : http://www.nuva.eu/whitepaper/supporters.php

Weblink: http://www.nuva.eu/whitepaper/index.php
Email: Coralie.Neiner@obspm.fr

Back to contents

The Advanced Telescope for High Energy Astrophysics

In response to the recent ESA call for science themes to define its future large missions, the X-ray astrophysics community has submitted a white paper (http://arxiv.org/abs/1306.2307) to promote the Advanced Telescope for High Energy Astrophysics (Athena+) mission. Athena+ provides the necessary performance (e.g. angular resolution, spectral resolution, survey grasp) to address a number of fundamental questions in modern astrophysics and revolutionize our understanding of the Hot and Energetic Universe. These capabilities will provide a powerful observatory to be used in all areas of astrophysics as illustrated by a series of
supporting papers, including one on star formation and evolution (http://arxiv.org/abs/1306.2333). In the field of massive stars, Athena+ will not only allow us to study many more objects with an unprecedented spectral resolution, but will also pioneer the study of the dynamics of
their X-ray emission via time-resolved high-resolution spectroscopy. In this way, Athena+ will be a unique tool to study small and large-scale structures in the winds of single massive stars, wind interactions in
massive binary systems, and many other topics. The Athena+ Science Working Group invites you to become a supporter of this project. You can do so by signing up at
http://fs6.formsite.com/ATHENA2028/form2/index.html

Weblink: http://www.the-athena-x-ray-observatory.eu/
Email: rauw@astro.ulg.ac.be

Back to contents

PAPERS

Abstracts of 12 accepted papers

Evolution of blue supergiants and alpha Cygni variables; Puzzling CNO surface abundances

Hideyuki Saio^1, Cyril Georgy^2, and Georges Meynet^3

1 - Astronomical Institute, Tohoku University, 2 - Astrophysics, Lennard-Jones Laboratories, EPSAM, Keele, University, 3 - Geneva Observatory, University of Geneva

A massive star can enter the blue supergiant region either evolving directly from the main-sequence, or evolving from a previous red supergiant stage. The fractions of the blue supergiants having different histories depend on the internal mixing and mass-loss during the red supergiant stage. We study the possibility to use diagnostics based on stellar pulsation to discriminate blue supergiants having different evolution histories. For this purpose we have studied the pulsation property of massive star models calculated with the Geneva stellar evolution code for initial masses ranging from 8 to 50 M_odot with a solar metallicity of Z=0.014. We have found that radial pulsations are excited in the blue-supergiant region only in the models that had been red-supergiants before. This would provide us with a useful mean to diagnose the history of evolution of each blue-supergiant. At a given effective temperature, much more nonradial pulsations are excited in the model after the red-supergiant stage than in the model evolving towards the red-supergiant. The properties of radial and nonradial pulsations in blue supergiants are discussed. Predicted periods are compared with period ranges observed in some alpha-Cygni variables in the Galaxy and NGC 300. We have found that blue supergiant models after the red- supergiant stage roughly agree with observed period ranges in most cases. However, we are left with the puzzle that the predicted surface N/C and N/O ratios seem to be too high compared with those of Deneb and Rigel.

Reference: MNRAS in press
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1305.2474

Comments:

Email: saio@astr.tohoku.ac.jp

Back to contents

Single-Star HII Regions as a Probe of Massive Star Spectral Energy Distributions

J. Zastrow(1), M.S. Oey(1), E.W. Pellegrini(2)

(1) U. Michigan; (2) U. Toledo

The shape of the OB-star spectral energy distribution is a critical component in many diagnostics of the ISM and galaxy properties. We use single-star HII regions from the LMC to quantitatively examine the ionizing SEDs from widely available CoStar, TLUSTY, and WM-basic atmosphere grids. We evaluate the stellar atmosphere models by matching the emission-line spectra that they predict from CLOUDY photoionization simulations with those observed from the nebulae. The atmosphere models are able to reproduce the observed optical nebular line ratios, except at the highest energy transitions > 40 eV, assuming that the gas distribution is non-uniform. Overall we find that simulations using WM-basic produce the best agreement with the observed line ratios. The rate of ionizing photons produced by the model SEDs is consistent with the rate derived from the Halpha luminosity for standard, log(g) = 4.0 models adopted from the atmosphere grids. However, there is a systematic offset between the rate of ionizing photons from different atmosphere models that is correlated with the relative hardness of the SEDs. In general WM-basic and TLUSTY atmosphere models predict similar effective temperatures, while CoStar predicts effective temperatures that are cooler by a few thousand degrees. We compare our effective temperatures, which depend on the nebular ionization balance, to conventional photospheric-based calibrations from the literature. We suggest that in the future, spectral type to effective temperature calibrations can be constructed from nebular data.

Reference: ApJ, 769, 94
Status: Manuscript has been accepted

Weblink: http://iopscience.iop.org/0004-637X/769/2/94/

Email: jazast@umich.edu

Back to contents

Turbulent Entrainment at the Boundaries of the Convective Cores of Main-sequence Stars

E.I. Staritsin

K.A. Barkhatova Kourovka Astronomical Observatory, B.N. El’tsin Ural Federal University, Ekaterinburg, Russia

Extra mixing of matter in stellar interiors at the boundaries of the convective cores of main sequence stars is considered for the first time using the physical model of turbulent entrainment developed by Arnett and collaborators based on three-dimensional hydrodynamical simulations. The model takes into account the energy that goes into mixing the matter of the convective core and layers stable against convection located above the core. It is shown that the extent of the region of extra mixing expressed in units of the pressure scale height is not constant, and decreases as the star evolves along the main sequence. Adequate allowance for extra mixing at the boundaries of convective cores is necessary to clarify the relative importance of different mixing mechanisms in stellar interiors, as well as to determine stellar parameters using asteroseismology.

Reference: Astronomy Reports, Vol. 57
Status: Manuscript has been accepted

Weblink:

Comments:

Email: Eugenij.Staritsin@usu.ru

Back to contents

The distance to the young open cluster Westerlund 2

G. Carraro^1, D. Turner^2, D. Majaess^2, G. Baume^3

1 - ESO, Alonso de Cordova 3107, 19001, Santiago de Chile, Chile; 2 - Department of Astronomy and Physics, Saint Mary’s University, Halifax, NS B3H 3C3, Canada; 3 - Facultad de Ciencias Astron´omicas y Geofisicas (UNLP), Instituto de Astrofisica de La Plata (CONICETUNLP), Paseo del Bosque s/n, La Plata, Argentina

A new X-ray, {it UBVR}I_c, and {it JHKs} study of the young cluster Westerlund 2 was undertaken to resolve discrepancies tied to the cluster's distance. Existing spectroscopic observations for bright cluster members and new multi-band photometry imply a reddening relation towards Westerlund~2 described by $E_{U-B}/E_{B-V}=0.63 + 0.02;E_{B-V}$. Variable-extinction analyses for Westerlund~2 and nearby IC 2581 based upon spectroscopic distance moduli and ZAMS fitting yield values of $R_V=A_V/E_{B-V}=3.88pm0.18$ and $3.77pm0.19$, respectively, and confirm prior assertions that anomalous interstellar extinction is widespread throughout Carina (e.g., Turner 2012). The results were confirmed by applying the color difference method to {it UBVRI_cJHK_s} data for 19 spectroscopically-observed cluster members, yielding $R_V=3.85pm0.07$. The derived distance to Westerlund~2 of $d=2.85pm0.43$ kpc places the cluster on the far side of the Carina spiral arm. The cluster's age is no more than $tau sim2times10^6$ yr as inferred from the cluster's brightest stars and an X-ray (Chandra) cleaned analysis of its pre-main-sequence demographic. Four Wolf-Rayet stars in the cluster core and surrounding corona (WR20a, WR20b, WR20c, and WR20aa) are likely cluster members, and their inferred luminosities are consistent with those of other late-WN stars in open clusters. The color-magnitude diagram for Westerlund~2 also displays a gap at spectral type B0.5 V with associated color spread at higher and lower absolute magnitudes that might be linked to close binary mergers. Such features, in conjunction with the evidence for mass loss from the WR stars, may help to explain the high flux of $gamma$ rays, cosmic rays, and X-rays from the direction towards Westerlund~2.

Reference: A&A, in press
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1305.4309

Comments:

Email: gcarraro@eso.org

Back to contents

X-ray properties of the young open clusters HM1 and IC2944/2948

Yael Naze, Gregor Rauw, Hugues Sana, Michael F. Corcoran

ULg, ULg, Univ. Amsterdam, GSFC

Using XMM data, we study for the first time the X-ray emission of HM1 and IC2944/2948. Low-mass, pre-main-sequence objects with an age of a few Myr are detected, as well as a few background or foreground objects. Most massive stars in both clusters display the usual high-energy properties of that type of objects, though with log(Lx/Lbol) apparently lower in HM1 than in IC2944/2948. Compared with studies of other clusters, it seems that a low signal-to-noise ratio at soft energies, due to the high extinction, may be the main cause of this difference. In HM1, the two Wolf-Rayet stars show contrasting behaviors: WR89 is extremely bright, but much softer than WR87. It remains to be seen whether wind-wind collisions or magnetically confined winds can explain these emissions. In IC2944/2948, the X-ray sources concentrate around HD101205; a group of massive stars to the north of this object is isolated, suggesting that there exist two subclusters in the field-of-view.

Reference: accepted by A&A
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1305.5105

Email: naze@astro.ulg.ac.be

Back to contents

Luminous and Variable Stars in M31 and M33. I. The Warm Hypergiants and Post-Red Supergiant Evolution

Roberta M. Humphreys^1, Kris Davidson^1,
Skyler Grammer^1, Nathan Kneeland^1,
John C. Martin^2, Kerstin Weis^3 and Birgitta Burggraf^3

1. University of Minnesota
2. University of Illinois, Springfield
3. Astronomical Institute, Ruhr-Universitaet Bochum, Germany

The progenitors of Type IIP supernovae have an apparent upper limit to their initial masses of about 20 solar masses, suggesting that the most massive red supergiants evolve to warmer temperatures before their terminal explosion. But very few post-red supergiants are known. We have identified a small group of luminous stars in M31 and M33 that are candidates for post-red supergiant evolution. These stars have A -- F-type supergiant absorption line spectra and strong hydrogen emission. Their spectra are also distinguished by the Ca II triplet and [Ca II] doublet in emission formed in a low density circumstellar environment. They all have significant near- and mid-infrared excess radiation due to free-free emission and thermal emission from dust. We estimate the amount of mass they have shed and discuss their wind parameters and mass loss rates which range from a few times 10^-6 to 10^-4 solar masses/yr.. On an HR Diagram, these stars will overlap the region of the LBVs at maximum light, however the warm hypergiants are not LBVs. Their non-spherical winds are not optically thick and they have not exhibited any significant variability. We suggest, however, that the warm hypergiants may be the progenitors of the ``less luminous" LBVs such as R71 and even SN1987A.

Reference: Astrophysical Journal
Status: Manuscript has been accepted

Weblink:

Comments:

Email: roberta@umn.edu

Back to contents

Constraints on porosity and mass loss in O-star winds from modeling of X-ray emission line profile shapes

Maurice A. Leutenegger^{1,2}, David H. Cohen^3, Jon O. Sundqvist^{4,5}, Stanley P. Owocki^4

1 - CRESST and X-ray Astrophysics Laboratory
NASA/Goddard Space Flight Center;
2 - Department of Physics, University of Maryland, Baltimore County;
3 - Department of Physics and Astronomy, Swarthmore College;
4 - Bartol Research Institute, University of Delaware;
5 - Universitaetssternwarte Muenchen

We fit X-ray emission line profiles in high resolution XMM-Newton and Chandra grating spectra of the early O supergiant Zeta Pup with models that include the effects of porosity in the stellar wind. We explore the effects of porosity due to both spherical and flattened clumps. We find that porosity models with flattened clumps oriented parallel to the photosphere provide poor fits to observed line shapes. However, porosity models with isotropic clumps can provide acceptable fits to observed line shapes, but only if the porosity effect is moderate. We quantify the degeneracy between porosity effects from isotropic clumps and the mass-loss rate inferred from the X-ray line shapes, and we show that only modest increases in the mass-loss rate (<~ 40%) are allowed if moderate porosity effects (h_infty <~ R_*) are assumed to be important. Large porosity lengths, and thus strong porosity effects, are ruled out regardless of assumptions about clump shape. Thus, X-ray mass-loss rate estimates are relatively insensitive to both optically thin and optically thick clumping. This supports the use of X-ray spectroscopy as a mass-loss rate calibration for bright, nearby O stars.

Reference: 2013 ApJ, 770, 80
Status: Manuscript has been accepted

Weblink: http://iopscience.iop.org/0004-637X/770/1/80/

Comments: Preprint available at
http://arxiv.org/abs/1305.5595

Email: maurice.a.leutenegger@nasa.gov

Back to contents

On magnetic inhibition of photospheric macro turbulence generated in the iron-bump opacity zone of O-stars

J.O. Sundqvist(1,2), V. Petit(2), S.P. Owocki(2), G.A. Wade(3), J. Puls(1), the MiMeS Collaboration

1 - University of Munich
2 - University of Delaware
3 - RMC, Kingston

Massive, hot OB-stars show clear evidence of strong macroscopic broadening (in addition to rotation) in their photospheric spectral lines. This paper examines the occurrence of such ``macro-turbulence'' in slowly rotating O-stars with strong, organised surface magnetic fields. Focusing on the CIV 5811A line, we find evidence for significant macro-turbulent broadening in all stars except NGC1624-2, which also has (by far) the strongest magnetic field. Instead, the very sharp CIV lines in NGC1624-2 are dominated by magnetic Zeeman broadening, from which we estimate a dipolar field 20 kG. By contrast, magnetic broadening is negligible in the other stars (due to their weaker field strengths, on the order of 1 kG), and their CIV profiles are typically very broad and similar to corresponding lines observed in non-magnetic O-stars. Quantifying this by an isotropic, Gaussian macro-turbulence, we derive vmac 2.2 (+- 0.9/2.2) km/s for NGC-1624, and vmac = 20-65 km/s for the rest of the magnetic sample. We use these observational results to test the hypothesis that the field can stabilise the atmosphere and suppress the generation of macro-turbulence down to stellar layers where the magnetic pressure PB and the gas pressure Pg are comparable. Using a simple grey atmosphere to estimate the temperature T0 at which PB = Pg, we find that T0 > Teff for all investigated magnetic stars, but that T0 reaches the layers associated with the iron opacity-bump in hot stars only for NGC1624-2. This is consistent with the view that the responsible physical mechanism for photospheric O-star macro-turbulence may be stellar gravity-mode oscillations excited by sub-surface convection zones, and suggests that a sufficiently strong magnetic field can suppress such iron-bump generated convection and associated pulsational excitation.

Reference: Accepted for publication in MNRAS, pre-print on astro-ph
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1305.5549

Comments:

Email: mail@jonsundqvist.com

Back to contents

On the simultaneous evolution of massive protostars and their host cores

Rolf Kuiper & Harold W. Yorke

Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109, USA

Studies of the evolution of massive protostars and the evolution of their host molecular cloud cores are commonly treated as separate problems. However, interdependencies between the two can be significant. Here, we study the simultaneous evolution of massive protostars and their host molecular cores using a multi-dimensional radiation hydrodynamics code that incorporates the effects of the thermal pressure and

radiative acceleration feedback of the centrally forming protostar. The evolution of the massive protostar is computed simultaneously using the stellar evolution code STELLAR, modified to include the effects of variable accretion. The interdependencies are studied in three different collapse scenarios. For comparison, stellar evolutionary tracks at constant accretion rates and the evolution of the host cores using pre-computed stellar evolutionary tracks are computed.
The resulting interdependencies of the protostellar evolution and the evolution of the environment are extremely diverse and depend on the order of events, in particular the time of circumstellar accretion disk formation with respect to the onset of the bloating phase of the star. Feedback mechanisms affect the instantaneous accretion rate and the protostar's radius, temperature and luminosity on timescales equal or smaller than 5 kyr, corresponding to the accretion timescale and Kelvin-Helmholtz contraction timescale, respectively. Nevertheless, it is possible to approximate the overall protostellar evolution in many cases by pre-computed stellar evolutionary tracks assuming appropriate constant average accretion rates.

Reference: ApJ
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1305.6310

Comments:

Email: Rolf.Kuiper@jpl.nasa.gov

Back to contents

Unexpected Ionization Structure in Eta Carinae's ``Weigelt Knots''

Grant N. Remmen(1,2), Kris Davidson(1) and Andrea Mehner (3)

1. School of Physics and Astronomy, University of Minnesota, Minneapolis, MN 55455
2. California Institute of Technology, Pasadena, CA 91125
3. ESO, Alonso de Cordova 3107, Santiago de Chile

The Weigelt knots, dense slow-moving ejecta near eta Car, are mysterious in structure as well as in origin. Using spatially dithered spectrograms obtained with the HST/STIS, we have partially resolved the ionization zones of one knot. Contrary to simple models, higher ionization levels occur on the outer side of the knot, i.e., farther from the star. They cannot represent a bow shock, and no satisfying explanation is yet available -- though we sketch one qualitative possibility. STIS spectrograms provide far more reliable spatial measurements of the Weigelt Knots than HST images do, and this technique can also be applied to the knots' proper motion problem. Our spatial measurement accuracy is about 10 mas, corresponding to a projected linear scale of the order of 30 AU which is appreciably smaller than the size of each Weigelt knot.

Reference: Astrophysical Journal
Status: Manuscript has been accepted

Weblink:

Email: kd@astro.umn.edu

Back to contents

HD45314: a new gamma Cas analog among Oe stars

G. Rauw (1), Y. Naze (1), M. Spano (2), T. Morel (1), & A. ud-Doula (3)

1 - Institute of Astrophysics and Geophysics, Liege University, Belgium
2 - Geneva Observatory, University of Geneva, Switzerland
3 - Penn State Worthington Scranton, USA

Oe stars possibly form an extension to higher temperatures of the Be phenomenon, but it is still unclear whether these stars have disks. X-ray spectra could provide hints for interactions of the star with a putative surrounding disk. We obtained XMM-Newton observations of two Oe stars, HD45314 and HD60848. Spectra and light curves were extracted and analysed. Optical spectra were also obtained to support the X-ray observations. We find that both stars display very different X-ray properties. Whilst HD60848 has an X-ray spectrum and emission level typical for its spectral type, HD45314 displays a very hard X-ray emission, dominated by a thermal plasma with kT ~ 21 keV. Furthermore, HD45314 displays count rate variations by a factor 2 on timescales of ~ 1000s and a high log(L_X/L_bol) = -6.10 +/- 0.03. The X-ray properties of HD45314 indicate that this star is a new member of the class of gamma Cas analogs, the first one among the original category of Oe stars.

Reference: A&A Letter, in press
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1306.6520

Email: rauw@astro.ulg.ac.be

Back to contents

Advanced burning stages and fate of 8-10 Mo stars

Samuel Jones (1), Raphael Hirschi (1,2), Ken'ichi Nomoto (2), Tobias Fischer (3,4), Frank X. Timmes (5,6), Falk Herwig (7,6), Bill Paxton (8), Hiroshi Toki (9), Toshio Suzuki (10,11), Gabriel Martinez-Pinedo (4,3), Yi Hua Lam (4), Michael G. Bertolli (12)

(1) Keele University, (2) Kavli IPMU (WPI), (3) GSI, (4) TU Darmstadt, (5) ASU, (6) JINA, (7) UVic, (8) KITP UCSB, (9) Osaka University, (10) Nihon University, (11) NAO Japan, (12) LANL

The stellar mass range 8-12 Mo corresponds to the most massive AGB stars and the most numerous massive stars. It is host to a variety of supernova progenitors and is therefore very important for galactic chemical evolution and stellar population studies. In this paper, we study the transition from super-AGB star to massive star and find that a propagating neon-oxygen burning shell is common to both the most massive electron capture supernova (EC-SN) progenitors and the lowest mass iron-core collapse supernova (FeCCSN) progenitors. Of the models that ignite neon burning off-center, the 9.5Mo model would evolve to an FeCCSN after the neon-burning shell propagates to the center, as in previous studies. The neon-burning shell in the 8.8Mo model, however, fails to reach the center as the URCA process and an extended (0.6 Mo) region of low Ye (0.48) in the outer part of the core begin to dominate the late evolution; the model evolves to an EC-SN. This is the first study to follow the most massive EC-SN progenitors to collapse, representing an evolutionary path to EC-SN in addition to that from SAGB stars undergoing thermal pulses. We also present models of an 8.75Mo super-AGB star through its entire thermal pulse phase until electron captures on 20Ne begin at its center and of a 12Mo star up to the iron core collapse. We discuss key uncertainties and how the different pathways to collapse affect the pre-supernova structure. Finally, we compare our results to the observed neutron star mass distribution.

Reference: Accepted for publication in ApJ
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1306.2030

Comments:

Email: s.w.jones@keele.ac.uk

Back to contents

Abstracts of 2 conference proceedings

Strange mode instability for micro-variations in Luminous Blue Variables

Hideyuki Saio^1, Cyril Georgy ^{2}, and Georges Meynet^3

1-Astronomical Institute, Tohoku University; 2-Centre de Recherche Astrophysique de Lyon, and Lennard-Jones Laboratories, EPSAM, Keele University; 3-Geneva Observatory, University of Geneva

If a massive star has lost significant mass during its red-supergiant stage, it would return to blue region in the HR diagram and spend a part of the core-He burning stage as a blue supergiant having a luminosity to mass ratio (L/M) considerably larger than about 10^4 (in solar units); the duration depends on the degree of internal mixing and on the metallicity. Then, various stellar pulsations are excited by enhanced kappa-mechanism and strange mode instability. Assuming these pulsations to be responsible for (at least some of) the quasi-periodic light and radial-velocity variations in alpha Cygni variables including luminous blue variables (LBVs; or S Dor variables), we can predict masses and surface compositions for these variables, and compare them with observed ones to constrain the evolutionary models. We discuss radial pulsations excited in evolutionary models of an initial mass of 40 M_odot with solar metallicity of Z=0.014, and compare them to micro-variations in the two Galactic LBVs, HR Car and HD 160529. We have found that these stars should has lost more than half of the initial mass and their surface CNO abundances should be significantly modified from the original ones showing partial H-burning products.

Reference: Fujiwara Seminar "Progress in Physics
of the Sun and Stars: A New Era in Helio- and Asteroseismology" 26 - 29 Nov. 2012, Hakone, Japan
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1305.4728

Comments:

Email: saio@astr.tohoku.ac.jp

Back to contents

The Galactic O-Star Spectroscopic Catalog (GOSC) and Survey (GOSSS): first whole-sky results and further updates

J. Maíz Apellániz (1), A. Sota (1), N. I. Morrell (2), R. H. Barbá (3), N. R. Walborn (4), E. J. Alfaro (1), R. C. Gamen (5), J. I. Arias (3), and A. T. Gallego Calvente (1)

(1) Instituto de Astrofísica de Andalucía-CSIC, Granada, Spain; (2) Las Campanas Observatory, La Serena, Chile; (3) Departamento de Física, Universidad de La Serena, La Serena, Chile; (4) Space Telescope Science Institute, Baltimore, MD, USA; (5) Instituto de Astrofísica de La Plata (CONICET, UNLP), La Plata, Argentina

The Galactic O-Star Spectroscopic Survey (GOSSS) is obtaining high quality R~2500 blue-violet spectroscopy of all Galactic stars ever classified as of O type with B < 12 and a significant fraction of those with B = 12-14. As of June 2013, we have obtained, processed, and classified 2653 spectra of 1593 stars, including all of the sample with B < 8 and most of the sample with B = 8-10, making GOSSS already the largest collection of high quality O-star optical spectra ever assembled by a factor of 3. We discuss the fraction of false positives (stars classified as O in previous works that do not belong to that class) and the implications of the observed magnitude distribution for the spatial distribution of massive stars and dust within a few kpc of the Sun. We also present new spectrograms for some of the interesting objects in the sample and show applications of GOSSS data to the study of the intervening ISM. Finally, we present the new version of the Galactic O-Star Catalog (GOSC), which incorporates the data in GOSSS-DR1, and we discuss our plans for MGB, an interactive spectral classification tool for OB stars.

Reference: 13 pages, 9 figures. To appear in "Massive Stars: From alpha to Omega", a meeting held in Rhodes, Greece, on 10-14 June 2013.
Status: Conference proceedings

Weblink:

Comments:

Email: jmaiz@iaa.es

Back to contents

Abstracts of 1 other publications

Eta Carinae Splinter session at 223rd AAS Meeting January 2014, Washington, DC, USA

Ted Gull(1), Michael Corcoran(1,2), Augusto Damineli(3), Kenji Hamaguchi(1,4), Thomas Madura(1,5), Mairan Teodoro(1,6)

(1) NASA/GSFC, (2) CREST, (3) Univ Sao Paulo, (4) UMBC, (5) NPP, (6) Brazil Science w/o Borders

Eta Carinae continues to challenge both observers and modelers as it changes in apparent brightness and spectroscopic properties, both with a 5.5-year periodicity and in the long term.

Eta Carinae will go through its next periastron passage in late July 2014. As noted by Mairan Teodoro (mairan.teodoro@nasa.gov) in the November/December 2012 Massive Star Newsletter, a call is out for

coordination of an international campaign for ground-based monitoring of this event (see www.etacar2014.wikidot.com .

We bring to your attention several additional programs: an HST/STIS multi-cycle program to map the interacting winds of Eta Carinae (see Gull et al 2009 MNRAS 396, 1308, Gull et al 2011 ApJ 743, L3 and HST programs 12750, 13014), is scheduled to continue at critical samplings across periastron through January 2015; ongoing X-Ray flux monitoring is being proposed by Mike Corcoran to use Swift to extend the studies accomplished with RXTE (see Corcoran et al, 2010 ApJ 725, 1528); ongoing CHANDRA/XMM/SUZAKU X-ray spectral studies (see Hamaguchi et al., 2012, ASPC 465, 325); 3D hydrodynamic models are being developed to increasingly characterize the interacting winds of the massive binary system and derive properties of the two massive companions (see Parkin et, 2009 MNRAS 400, 1657; Madura et al, 2012 MNRAS 420, 2064; Russell 2013 PhD thesis, UDel).

The American Astronomical Society Meeting 223 is scheduled for the first week in January 2014 near Washington, DC, USA. We are proposing a one-day splinter session within the meeting with the purpose to bring together researchers interested in providing and coordinating observations and/or models pertaining to the behavior of this intriguing binary system. Likely the session would be separated into two parts: what we currently know about the binary, its winds and ejecta and what we need to learn from the periastron event by either observation or theory.

Given the widespread interest in this massive star system, we would like to obtain an estimate of those who plan to attend and we solicit potential contributions to the splinter session independent of the main meeting. A previous session held at Mt. Rainer in 2001 for the Hubble Treasury Eta Carinae Program had an attendance of approximately 40 interested researchers. A special session at the 2009 IAU General Assembly had well over 100 attendees. Contributions to this splinter session will be separate from the main meeting. Posters and talks on Eta Carinae in the scheduled AAS meeting sessions are strongly encouraged, and will be separate from this splinter session intended to provide a focussed review on what is known about Eta Carinae and what we wish to learn through studies of the upcoming periastron event.

Those interested in participating in and/or contributing to the session should contact Ted Gull (Ted.Gull@nasa.gov) by 1 August 2013.

Reference: AAS Meeting 223 proposal
Status: Other

Weblink:

Comments:

Email: Ted.Gull@nasa.gov

Back to contents

JOBS

Post-doctoral or PhD position in stellar astrophysics

Prof. Dr. Ulrich Heber

Dr. Remeis-Sternwarte & ECAP
Astronomisches Institut
Universität Erlangen-Nürnberg
Sternwartstr. 7
D 96049 Bamberg
Germany

Applications are invited for a research position in the stellar astrophysics group of the Dr. Remeis-Sternwarte Bamberg, which is the astronomical institute of the University Erlangen-Nuremberg. The appointment starts October 1st, 2013 and can be made at the post-doctoral level for 18 month or alternatively for three years at the PhD level. The successful applicant is expected to carry out quantitative spectral analyses of high-resolution ultraviolet spectra of hot evolved stars obtained with the Hubble Space Telescope. XMM-Newton observations shall be exploited to search for X-ray emission from wind accretion in an enigmatic sdB binary. Applicants should have sound knowledge of stellar astrophysics at the appropriate level. Detailed expertise in quantitative stellar spectroscopy would be of advantage.

The remuneration is according to the German public salary scale TV-L level 13 (full time) for the post-doctoral level and at the TV-L level 13/2 (20.05 hours per week) at the PhD level. Benefits are according to the public service rules and include unemployment, healthcare and
retirement benefits.

Please send a curriculum vitae, brief statement of research interests and give the names of three referees, who might be asked for letters of reference.

Please send your application before June, 1, 2013,
by email to

ulrich.heber@sternwarte.uni-erlangen.de

or by mail to

Prof. Dr. Ulrich Heber
Astronomisches Institut
Universität Erlangen-Nürnberg
Sternwartstr. 7
D96049 Bamberg
Germany

Please state clearly whether you apply for a post-doctoral position or a PhD project.

Attention/Comments:

Weblink: http://www.sternwarte.uni-erlangen.de/ausschreib_dlr.pdf

Email: heber@sternwarte.uni-erlangen.de

Deadline: June 1, 2013

Back to contents

Postdoctoral Research Fellow

Sally Oey

University of Michigan
Astronomy Department
830 Dennison Building
Ann Arbor, MI 48109-1042
USA

Applications are invited for a postdoctoral position at the University of Michigan to work with Prof. Sally Oey on projects related to radiative feedback from massive stars, in particular, HII regions and the escape fraction of ionizing radiation. There also may be opportunity in the area of OB stars and massive star populations. The successful candidate will have access to the University of Michigan telescope facilities, including the twin 6.5-m Magellan Telescopes at Las Campanas, and the MDM 2.4-m and 1.3-m telescopes at Kitt Peak. Our department has a vibrant environment with several journal clubs and discussion groups. This position is available for two years, with possible extension for a third. The start date is flexible, to begin as soon as possible.

Applicants should have a Ph.D., and the ideal candidate will have experience with HII region imaging, spectroscopy, and photoionization
modeling.

To apply, please submit curriculum vitae, statement of research interests, and contact details for three references. Applications must be submitted via umjobs.org. Reference job posting ID 81575. Please include your available start date, and ALSO send a direct email to msoey@umich.edu to confirm that your application has been submitted. Applications received by 15 June 2013 will receive first consideration.

Inquiries may be directed to Sally Oey (msoey@umich.edu).

The University of Michigan is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

Attention/Comments:

Weblink: http://umjobs.org

Email: msoey@umich.edu

Deadline: June 30

Back to contents

Numerical Modelling of Stellar Interiors

conny.aerts@ster.kuleuven.be

Instituut voor sterrenkunde
KU Leuven
Celestijnenlaan 200D
3001 Heverlee
Belgium
fys.kuleuven.be/ster

In the Science, Engineering & Technology Group, Faculty of Science, Department of Physics and Astronomy at KU Leuven there is a full-time academic vacancy among senior academic staff in the area of Astronomy and Astrophysics. We are looking for internationally oriented candidates with an excellent research record and with educational competence within the field of numerical modelling of stellar interiors.

You are expected to collaborate with scientists of the Institute of Astronomy (IoA) in the Department of Physics and Astronomy on the one hand, and of the Centre for mathematical Plasma-Astrophysics (CmPA) in the Department of Mathematics on the other hand. Both research groups are embedded within the Faculty of Science. In the past, this faculty has systematically been given a high ranking for research and education quality by independent accreditation committees. The faculty has an extensive national and international network.
The IoA and CmPA are research centres with expertise in the topics of stellar structure and evolution, asteroseismology, interstellar and circumstellar matter, the chemistry of exoplanetary atmospheres, binary stars, solar physics, high-performance computing (HPC) in a general plasma-physical context, and MHD and kinetic descriptions of space weather. They rely on the involvement in international space missions, ground-based telescopes, and HPC-driven fundamental research collaborations.

http:// fys.kuleuven.be/ster
http://wis.kuleuven.be/CmPA

Duties

*Research

You are expected to perform high-level research in the field of numerical modelling of stellar interiors. The modelling should include angular momentum transport inside stars, with a focus on the role of internal differential rotation patterns, atomic diffusion processes, magnetic field generation, magnetoconvection, etc., through state-of-the-art local numerical magnetohydrodynamical simulations. The simulations need to provide high-resolution insights in local magnetohydrodynamics, as well as be applicable to global spherical scale geometry. Global models need to connect to current knowledge of stellar structure, variability, evolution and stellar coronal activity, and need to find feedback in spectroscopic, interferometric and asteroseismic diagnostics derived from modern data.

*Teaching

You ensure high-quality education within the area of astronomy and astrophysics, physics, and mathematics, with a clear commitment for the quality of the programme as a whole. You also contribute to the pedagogic project of the faculty/university through the supervision of master theses and as supervisor of PhD students.
You develop your teachings in accordance with KU Leuven's vision on activating and researched-based education and make use of the possibilities for the educationalist professionalisation offered by the faculty and the university.

*Service

Besides the research and the teaching assignment, you are expected to be willing to provide services to the community, in particular to amateur astronomer organisations, to the government and to Belgian industry in the framework of instrument development in the topics of the research task, in a Belgian as well as an international context.

Requirements

You have a PhD or doctoral degree in Astrophysics, Mathematics, Physics or equivalent.

You are an expert in theoretical-computational studies of stellar interiors confirmed by an excellent peer-reviewed publication record. Awareness and understanding of the observational aspects of stellar evolution are assets.

You have very good teaching and training skills, in order to contribute to the quality of the department's educational program.

Near-native proficiency of English is required. KU Leuven provides courses in academic English.

The administrative and educational language at KU Leuven is Dutch. If, at your appointment, you do not speak Dutch at all or do not speak it well, KU Leuven will provide a training offer that must equip you to be able to teach in Dutch within three years. If your teaching assignment is completely in a language other than Dutch, then it is expected that you have mastered the Dutch language to a level that will allow you to participate in the administrative meetings.

Offer

We are offering full-time employment in an intellectually challenging environment. KU Leuven is a research-intensive, internationally oriented university that carries out both fundamental and applied scientific research. It is highly inter- and multidisciplinary focused and strives for international excellence. In this regard, it actively works together with research partners in Belgium and abroad. It provides its students with an academic education that is based on high-quality scientific research.

You will work in Leuven, a historic, dynamic and lively city located in the heart of Belgium, within 20 minutes from Brussels, the capital of the European Union, and less than two hours from Paris, London and Amsterdam.

Depending on your record and qualifications, you will be appointed to or tenured in one of the grades of the senior academic staff: assistant professor, associate professor, professor or full professor. In principle, junior researchers are appointed as tenure-track assistant professor for a period of 5 years; after this period and a positive evaluation, they are permanently appointed (or tenured) as an associate professor.

Attention/Comments: Apply online following the weblink

Weblink: https://icts.kuleuven.be/apps/jobsite/vacatures/52451655?lang=en

Email: conny.aerts@ster.kuleuven.be

Deadline: September 30, 2014

Back to contents

MEETINGS

Giants of Eclipse

2013 July 29 - August 2

Venue: Hyatt Regency Hotel, Monterey, California

"Giants of Eclipse" will provide a forum to discuss the physics of cool giant stars, examine new data for those objects, and compare the latest theories. Studies of giants in eclipsing binaries have afforded us a means of deriving precise cool-star physics, and the role of these systems as astrophysical calibrators is central to the meeting. The minute details of the eclipses of ζ Aurigae systems and other binaries will be examined along with new results from the mysterious two-year eclipse of ε Aurigae. Some of the long-standing and challenging aspects of these systems are now being tackled with new-generation techniques, and novel technologies such as Kepler, involving young scientists.

Weblink: http://aas.org/meetings/aastcs-3-giants-eclipse-meeting-monterey-california

Email: elizabeth.griffin@nrc-cnrc.gc.ca

Back to contents

IAUS 302 - Full program and registration deadline

2013, August 25-30

Venue: Biarritz, France

The program of IAUS 302 is now available online!
http://iaus302.sciencesconf.org/program

The full list of abstracts (including posters) can be found here:
http://iaus302.sciencesconf.org/browse/session

The deadline for registration is on July 21! To join us in Biarritz at the end of August, we invite you to proceed to the registration page:
http://iaus302.sciencesconf.org/registration/index

The SOC and LOC of IAUS 302

Weblink: http://iaus302.sciencesconf.org

Email: iaus302@sciencesconf.org

Back to contents