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THE MASSIVE STAR NEWSLETTER

formerly known as the hot star newsletter

*

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Closed (original deadline passed):

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Letter of Intent to become an IAU Commission -- announcement

dear friends of the MSWG,

the Organizing Committee has submitted a Letter of Intent to the IAU to turn our Working Group into an IAU Commission. You find the LoI text at the end of this message. The final decission will be taken by the IAU Executive Committee in April 2015. If you are interested in the details, visit:
http://www.iau.org/news/announcements/detail/ann14014/
http://iau.org/news/announcements/detail/ann14008/
http://www.iau.org/news/announcements/detail/ann14029/

In the next days the IAU will open an electronic poll on the proposed Commissions as part of the whole decission process. The results of the poll will be taken into account by the IAU for the final decission. All IAU members can vote for up to three of the proposed Commissions.

The Massive Stars Working Group encourages all IAU members of the group to vote in the electronic poll before its deadline (foreseen November 30), to show our interest in becoming a Commission after 20 years of uninterrupted operation of the Working Group. The IAU will announce shortly the votation procedure.

The full proposal is due in January, 31, 2015 and will be based on the LoI. If you have comments or suggestions to improve the proposal, please send them to me or to any of the members of the MSWG Organizing Committe. You find the names and addresses in the Working Group web page
http://www.astroscu.unam.mx/massive_stars

with best regards,
Artemio Herrero
chair, on behalf of the Organizing Committee of the Massive Stars Working Group
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Submission details
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Name of the Commission: Massive Stars Commission

Inter-Division Commission
Primary Division: Division G Stars and Stellar Physics
Parent Division 1: Division H Interstellar Matter and Local Universe
Parent Division 2: Division J Galaxies and Cosmology

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Commission based one existing Working Group: Division G WG Massive Stars

Rationale:
The massive stars community organized itself and created the Massive Stars Working Group (MSWG) in 1995, nearly 20 years ago. Since then, it has been in operation without interruption, being re-appointed after each General Assembly. The MSWG contains over 400 members, with more than 100 senior IAU members. These facts already indicate that their activities and interests go beyond the goals and limits of a Working Group.
The MSWG is very active in organizing, focussing and promoting massive star research. Every two months it publishes the Massive Stars Newsletter, which includes the latest accepted papers, PhD theses, upcoming meetings and workshops and job offers, as well as any information of interest for the community. Up to now, 142 Newsletters have been issued. For even faster information dissemination within the community, the MSWG maintains a 24-hours announcement service. New submissions in the last 24 hours are distributed to interested members upon subscription to this service.
One of the most important activities of the MSWG is the organization of regular meetings of broad interest to the whole massive star community, most of them IAU Symposia, with an approximate frequency of 4-5 years. In addition, numerous IAU Symposia directly related to massive stars have been organized in the intervening years. As recent examples, we may cite the IAUS 307 ("New windows on massive stars", Geneva, June 2013), IAUS 279 ("Death of Massive Stars: Supernovae and GRBs", Nikko, 2012) or IAUS 272 ("Active OB stars- structure, evolution, mass-loss and critical limits", Paris, 2010).
The activities of the MSWG are coordinated by the MSWG Organizing Committee (OC), elected by all members of the MSWG following the IAU rules and by-laws of the WG. The OC reports on the group activities to the IAU every three years at the General Assembly. All information concerning the MSWG (including by-laws, membership and Newsletter issues) can be found on the web page of the group http://www.astroscu.unam.mx/massive_stars
The MSWG started an internal discussion to become an IAU Commission some time ago. As a result, it was decided at the General Assembly in Beijing that the MSWG would apply to become a Commission once the corresponding call for Commissions Reform would have been issued by the IAU Executive Committee.
The MSWG activity fits smoothly into the expectations for new Commissions. In the announcements for Commissions Reform it is claimed that new "Commissions are thus expected to be more focussed, in areas where IAU members voluntarily choose to work usefully and effectively together to achieve specific goals, perform significant roles, or for some other particular purpose of interest to the community or to society". We are convinced that this is the case of our MSWG.
Massive star research is centred on the stars themselves, but it offers a large number of links to other areas of Astrophysics. Massive stars are very luminous and thus they can be studied individually at relatively large distances, even with the detail of high resolution spectroscopy, spectropolarimetry or interferometry. When the spatial resolution becomes insufficient, they are the key agents behind starbursts

or giant HII regions.
Massive stars span a wide range of physical parameters (masses, temperatures, energies...) and a large diversity of physical states, strongly impacting on other fields such as star formation, stellar population synthesis, galactic chemical and dynamical evolution at different redshifts or the re-ionization of the Universe, for which they have been proposed to be an active agent. From their birth to their death, massive stars go through phases of luminous OB stars, Luminous Blue Variables and hypergiants, Red Supergiants, Wolf-Rayets, Supernovae, Gamma Ray Bursts, neutron stars and black holes. The physics of these stars is complex, and thus stellar evolution and atmosphere models provide strong links between observations and analyses of individual objects. In recent times, the roles of multiplicity and magnetic fields have been added to those of rotation and stellar winds, thanks to modern spectroscopic, large scale surveys, that allow us to homogeneously study large samples
of massive stars and set constraints on their initial conditions and evolution.
With the new instrumental facilities and the developments for the immediate future, like the 30-40m telescopes and their associated instrumentation, the role of massive stars as tools to understand the nearby and far Universe will only increase, as will their role as central objects at the crossroads of different astrophysical disciplines. Because of these broad topics, we feel that the proposed Commission should be an Inter-Division Commission, hosted by Division G, but affiliated to Divisions H and J.
Turning the IAU MSWG into a Commission will benefit the whole astronomical community. It will offer a stable environment for discussion of all areas in which massive stars are involved within the IAU. The recent developments in the field still require strong research efforts for at least a decade, and the new avenues that will be opened by new telescopes and instruments will become a reality at the end of that decade. This guarantees that massive stars will remain one of the main research focuses of the astronomical community for at least the next two decades.
An IAU Commission would promote the development of the field and provide a well-defined forum for discussion and results dissemination. As an IAU Commission we will also expand our present activities. Thus, for the next years following a possible Commission status we will concentrate on the following tasks:
(a) Maintain the Massive Stars Newsletter and the 24-hours service and promote its dissemination.
(b) Continue promoting international conferences and workshops. At least 3 IAU Symposia or similar level meetings should be held between 2015 and 2025.
(c) Increase our efforts to strengthen our links with other research communities and make our results easily accessible to them. To this aim we will promote the Massive Stars Newsletter among those communities, look for common meetings and develop web tools.
(d) Foster new ways of active participation in our community, particularly for young researchers, by regular consultation and web tools. We expect also a large number of "Associates" for which these ways of participating will be of first importance.
(e) We will reinforce public outreach by means of open web pages and public talks and seminars. To this aim we will seek links with and advices from the IAU Office for Astronomy Outreach and the National Outreach Contacts.
We think that our proposal will be beneficial for the massive star researchers, the IAU and the astronomical community as a whole.
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Weblink:

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Proposed IAU Commission on Stellar Magnetism

In the context of the IAU Commission renewal process, a new Commission on Stellar Magnetism has been proposed.

To quote from the Letter of Intent: "Considering the diverse and universal impact of stellar magnetism on the physics of stars, the clear scientific and societal importance of major unsolved problems in the field (e.g. the solar dynamo, space weather), and the large, broad international community engaged in this field, we propose the organization of a Commission on Stellar Magnetism with the aim of facilitating progress in understanding all aspects of stellar magnetism and activity, and in particular to coordinate international efforts in this regard. We welcome all individuals interested in pursuing the goals of the Commission."

Over 50 new Commissions have been proposed, including 8 in Division G ("Stars and Stellar Physics").

Members of the IAU should have recently received an email invitation to vote for up to 3 of the proposed commissions as part of an "Expression of Interest" activity.

We invite Massive Stars WG members to review the proposed Stellar Magnetism Commission LOI.

Weblink: http://www.iau.org/submissions/commissionproposal/list

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voting for the new Commission on Massive Stars

dear Massive Stars Working Group members,
the IAU has started the voting procedure for the new Commissions.
As we announced a few weeks ago, the Organizing Committee of the
Massive Stars Working Group has submitted a Letter of Interest to turn our
Working Group into an IAU Commission, following previous WG decissions.

The OC encourages all WG members that are also IAU members to vote for the
new Commission on Massive Stars following the instructions given in the email
sent by the IAU General Secretary (to IAU members).

The OC also encourages all WG members to send comments and suggestions
on the LoI for the final proposal. Please send them before December 31 to
me (ahd@iac.es) or any OC member.

with best regards,
Artemio Herrero,
chair, on behalf of the Massive Stars Working Group Organizing Committee

Email: ahd@iac.es

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UV astronomy commission proposal

Dear colleagues and aficionados of ultraviolet astronomy:

Those of you who are members of the IAU will have received yesterday or today an Email from the General Secretary Thierry Montmerle announcing the start of the “indicative voting” for the new Commissions that were proposed earlier. This, because all existing Commissions will cease to exist at the coming General Assembly (GA) in August 2015 and the new ones will be established.

If you browsed through the list of commissions visible at http://www.iau.org/submissions/commissionproposal/list/, you probably noticed NC-19, which is our proposal to establish a Commission to deal with UV astronomy. The need for this Commission became evident at the last GA in Beijing, since the parent Division (XI) morphed into Division D that deals only with high energy astrophysics.

We believe that a dedicated Commission will play a major role in promoting the UV domain to a place of prominence among the different spectral domains, perhaps as much (or more) that the X-ray and IR, both in securing space missions and in educating a new generation of UV astronomers.

In order to secure these goals, we urge you to vote for NC-19 and to convince your colleagues to do the same. Please spread the word and make sure you finalize your vote before 31 December. If you are NOT a member of the IAU and have not received the GS Email, you can still help by convincing your colleagues who ARE members to vote for NC-19.

Thank you for your help, and hoping to revitalize UV astronomy,

Ana Ines Gomez de Castro, Jayant Murthy, Noah Brosch (proposers)

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Email: Noah@wise.tau.ac.il

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PAPERS

Abstracts of 30 accepted papers

Massive stars in the giant molecular cloud G23.3-0.3 and W41.

Maria Messineo (1), Karl M. Menten (1), Donald F. Figer (2), Ben Davies (3), J. Simon Clark (4), Valentin D. Ivanov (5), Rolf-Peter Kudritzki (6), R. Michael Rich (7), John W. MacKenty (8), Christine Trombley (2)

Max Planck for Radioastronomy (1), Rochester Institute of Technology (2), Liverpool John Moores University (3), The Open University (4), European Southern Observatory (5), University of Hawaii (6), University of California (7), Space Telescope Science Institute (8)

Young massive stars and stellar clusters continuously form in the Galactic disk, generating new HII regions within their natal giant molecular clouds and subsequently enriching the interstellar medium via their winds and supernovae.
Massive stars are among the brightest infrared stars in such regions; their identification permits the characterization of the star formation history of the associated cloud as well as constraining the location of stellar aggregates and hence their occurrence as a function of global environment.
We present a stellar spectroscopic survey in the direction of the giant molecular cloud G23.3-0.3. This complex is located at a distance of ~ 4-5 kpc, and consists of several HII regions and supernova remnants. We discovered 11 OfK+ stars, one candidate Luminous Blue Variable, several OB stars, and candidate red supergiants. Stars with K-band extinction from ~1.3 - 1.9 mag appear to be associated with the GMC G23.3-0.3; O and B-types satisfying this criterion have spectro-photometric distances consistent with that of the giant molecular cloud.
Combining near-IR spectroscopic and photometric data allowed us to characterize the multiple sites of star formation within it. The O-type stars have masses from 25 - 45 Msun, and ages of 5-8 Myr. Two new red supergiants were detected with interstellar extinction typical of the cloud; along with the two RSGs within the cluster GLIMPSE9, they trace an older burst with an age of 20--30 Myr. Massive stars were also detected in the core of three supernova remnants - W41, G22.7-0.2, and G22.7583-0.4917.
A large population of massive stars appears associated with the GMC G23.3-0.3, with the properties inferred for them indicative of an extended history of stars formation.

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

Weblink: http://arxiv.org/abs/1408.3558

Comments:

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Interacting supernovae from photoionization-confined shells around red supergiant stars

Jonathan Mackey (1), Shazrene Mohamed (2), Vasilii V. Gvaramadze (3,4,5), Rubina Kotak(6), Norbert Langer (1), Dominique M.-A. Meyer(1), Takashi J. Moriya (1), Hilding R. Neilson (7)

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Betelgeuse, a nearby red supergiant, is a fast-moving star with a powerful stellar wind that drives a bow shock into its surroundings. This picture has been challenged by the discovery of a dense and almost

static shell that is three times closer to the star than the bow shock and has been decelerated by some external force. The two physically distinct structures cannot both be formed by the hydrodynamic interaction of the wind with the interstellar medium. Here we report that a model in which Betelgeuse's wind is photoionized by radiation from external sources can explain the static shell without requiring a new understanding of the bow shock. Pressure from the photoionized wind generates a standing shock in the neutral part of the wind and forms an almost static, photoionization-confined shell. Other red supergiants should have much more massive shells than Betelgeuse, because the photoionization-confined shell traps up to 35 per cent of all mass lost during the red supergiant phase, confining this gas close to the star until it explodes. After the supernova explosion, massive shells dramatically affect the supernova light curve, providing a natural explanation for the many supernovae that have signatures of circumstellar interaction.

Reference: 2014, Nature, 512, 282-285
Status: Manuscript has been accepted

Weblink: http://dx.doi.org/10.1038/nature13522

Comments:

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X-ray emission from magnetic massive stars

Yael Naze (1), Veronique Petit (2), Melanie Rinbrand (3), David Cohen (4), Stan Owocki (3), Asif ud-Doula (5), Gregg A Wade (6)

(1) ULg, (2) FIT, (3) Udel, (4) Swarthm. Col., (5) Penn State Wor. Sc., (6) RMC

Magnetically confined winds of early-type stars are expected to be sources of bright and hard X-rays. To clarify the systematics of the observed X-ray properties, we have analyzed a large series of Chandra and XMM observations, corresponding to all available exposures of known massive magnetic stars (over 100 exposures covering ~60% of stars compiled in the catalog of Petit et al. 2013). We show that the X-ray luminosity is strongly correlated with the stellar wind mass-loss-rate, with a power-law form that is slightly steeper than linear for the majority of the less luminous, lower-Mdot B stars and flattens for the more luminous, higher-Mdot O stars. As the winds are radiatively driven, these scalings can be equivalently written as relations with the bolometric luminosity. The observed X-ray luminosities, and their trend with mass-loss rates, are well reproduced by new MHD models, although a few overluminous stars (mostly rapidly rotating objects) exist. No relation is found between other X-ray properties (plasma temperature, absorption) and stellar or magnetic parameters, contrary to expectations (e.g. higher temperature for stronger mass-loss rate). This suggests that the main driver for the plasma properties is different from the main determinant of the X-ray luminosity. Finally, variations of the X-ray hardnesses and luminosities, in phase with the stellar rotation period, are detected for some objects and they suggest some temperature stratification to exist in massive stars' magnetospheres.

Reference: accepted by ApJ
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1409.1690

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The modulated X-ray emission of the magnetic O8.5V-star Tr16-22

Yael Naze (1), Gregg A Wade (2), Veronique Petit (3)

(1) ULg, (2) RMC, (3) FIT - UDel

Using an extensive X-ray dataset, we analyze the X-ray emission of the massive O-star Tr16-22, which was recently found to be magnetic. Its bright X-ray emission is found to be modulated with a ~54d period. This timescale should represent the rotational timescale of the star, as for other magnetic massive stars. In parallel, new spectropolarimetric data confirm the published magnetic detection.

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

Weblink: http://arxiv.org/abs/1408.6098

Comments:

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Gas physical conditions and kinematic of the giant outflow Ou4

Romano L.M. Corradi (1,2), Nicolas Grosso (3), Agnes Acker(3), Robert Greimel (4), Patrick Guillout (3)

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(4) IGAM, Institut fur Physik, Universitat Graz, Universitatsplatz 5/II, A-8010 Graz, Austria

Ou4 is a recently discovered bipolar outflow with a projected size of more than one degree in the plane of the sky. It is apparently centred on the young stellar cluster -whose most massive representative is the triple system HR8119- inside the HII region Sh 2-129. The driving source, the nature, and the distance of Ou4 are not known. Deep narrow-band imagery of the whole nebula at arcsec resolution was obtained to study its morphology. Long-slit spectroscopy of the tips of the bipolar lobes was secured to determine the gas ionization mechanism, physical conditions, and line-of-sight velocities. An estimate of the proper motions at the tip of the south lobe using archival images is attempted. The existing multi-wavelength data for Sh 2-129 and HR 8119 are also comprehensively reviewed. The morphology of Ou4, its emission-line spatial distribution, line flux ratios, and the kinematic modelling adopting a bow-shock parabolic geometry, illustrate the expansion of a shock-excited fast collimated outflow. The radial velocities and reddening are consistent with those of Sh 2-129 and HR 8119. The improved determination of the distance to HR8119 (composed of two B0 V and one B0.5 V stars) and Sh 2-129 is 712 pc. We identify in WISE images a 5 arcmin-radius (1 pc at the distance above) bubble of emission at 22 micron emitted by hot (107 K) dust, located inside the central part of Ou4 and corresponding to several [O III] emission features of Ou4. The apparent position of Ou4 and the properties studied in this work are

consistent with the hypothesis that Ou4 is located inside the Sh 2-129 HII region, suggesting that it was launched some 90 000 yrs ago by HR8119. The outflow total kinetic energy is estimated to be ~4e47~ergs. However, the alternate possibility that Ou4 is a bipolar planetary nebula, or the result of an eruptive event on a massive AGB or post-AGB star not yet identified, cannot be ruled out.

Reference: Astronomy and Astrophysics, in press
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1407.4617, http://hal.archives-ouvertes.fr/hal-01022286

Comments:

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A multi-wavelength view on the dusty Wolf-Rayet star WR 48a

Svetozar A. Zhekov (1), Toma Tomov (2), Marcin P. Gawronski (2), Leonid N. Georgiev (3), Jura Borissova (4), Radostin Kurtev (4), Marc Gagne (5) and Marcin Hajduk (6)

(1) Space Research and Technology Institute, Sofia, Bulgaria; (2) Centre for Astronomy, Nicolaus Copernicus University, Torun, Poland; (3) Instituto de Astronomía, Universidad Nacional Autónoma de Mexico, Mexico; (4) Instituto de Fisica y Astronomia, Universidad de Valparaiso, Chile; (5) Department of Geology and Astronomy, West Chester University, West Chester, PA, USA; (6) Nicolaus Copernicus Astronomical Center, Torun, Poland

We present results from the first attempts to derive various physical characteristics of the dusty Wolf-Rayet star WR 48a based on a multi-wavelength view of its observational properties. This is done on the basis of new optical and near-infrared spectral observations and on data from various archives in the optical, radio and X-rays. The optical spectrum of WR 48a is acceptably well represented by a sum of two spectra: of a WR star of the WC8 type and of a WR star of the WN8h type. The strength of the interstellar absorption features in the optical spectra of WR 48a and the near-by stars D2-3 and D2-7 (both members of the open cluster Danks 2) indicates that WR 48a is located at a distance of ~4 kpc from us. WR 48a is very likely a thermal radio source and for such a case and smooth (no clumps) wind its radio emission suggests a relatively high mass-loss rate of this dusty WR star (dM/dt = a few x 10^(-4) solar masses per year). Long timescale (years) variability of WR 48a is established in the optical, radio and X-rays. Colliding stellar winds likely play a very important role in the physics of this object. However, some LBV-like (luminous blue variable) activity could not be excluded as well.

Reference: Monthly Notices of the Royal Astronomical Society
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1409.2684

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Eclipses and dust formation by WC9 type Wolf-Rayet stars

P. M. Williams

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Visual photometry of 16 WC8-9 dust-making Wolf-Rayet (WR) stars during 2001--2009 was extracted from the All Sky Automated Survey All Star Catalogue (ASAS-3) to search for eclipses attributable to extinction by dust formed in clumps in our line of sight. Data for a comparable number of dust-free WC6-9 stars were also examined to help characterise the dataset. Frequent eclipses were observed from WR 104, and several from WR 106, extending the 1994-2001 studies by Kato et al. (2002a,b), but not supporting their phasing the variations in WR 104 with its `pinwheel' rotation period. Only four other stars showed eclipses, WR 50 (one of the dust-free stars), WR 69, WR 95 and WR 117, and there may have been an eclipse by WR 121, which had shown two eclipses in the past. No dust eclipses were shown by the `historic' eclipsers WR 103 and WR 113. The atmospheric eclipses of the latter were observed but the suggestion by David-Uraz et al. (2012) that dust may be partly responsible for these is not supported. Despite its frequent eclipses, there is no evidence in the infrared images of WR 104 for dust made in its eclipses, demonstrating that any dust formed in this process is not a significant contributor to its circumstellar dust cloud and suggesting that the same applies to the other stars showing fewer eclipses.

Reference: MNRAS (in Press)
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1408.6759

Comments:

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Measuring the shock-heating rate in the winds of O stars using X-ray line spectra

David H. Cohen (1), Zequn Li (1), Kenneth G. Gayley (2), Stanley P. Owocki (3), Jon O. Sundqvist (3,4), Veronique Petit (3,5), Maurice A. Leutenegger (6,7)

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(3) Univ. Delaware
(4) Univ. Munich
(5) Florida Tech
(6) NASA/GSFC
(7) CRESST and UMBC

We present a new method for measuring the shock-heating rate in O star winds directly from wind-absorption-corrected X-ray emission line luminosities. This analysis method, applied to an ensemble of lines each with different temperature sensitivity, naturally generates a cumulative probability distribution of the wind shock-heating rate. We apply this new technique to the analysis of the Chandra grating spectra of five O stars and find similar results for all the sample stars: (1) roughly a tenth of the wind mass passes through a shock of 2 million K or more; (2) the distribution of shock temperatures is a strongly declining function, consistent with a power-law of index n = -3; and (3) there are indications of a

cut-off or faster fall-off in the heating rate for shock temperatures above about 10 million K. These results provide direct constraints for hydrodynamic simulations of X-ray production in O star winds.

Reference: MNRAS in press
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1409.0856

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Investigating the inner discs of Herbig Ae/Be stars with CO bandhead and Br Gamma emission

John D. Ilee (1), John Fairlamb (2), Rene D. Oudmaijer (2), Ignacio Mendigutia (2), Mario van den Ancker (3), Stefan Kraus (4), Hugh E. Wheelwright (5)

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(3) ESO, Garching; (4) University of Exeter; (5) MPIfR, Bonn

Herbig Ae/Be stars lie in the mass range between low and high mass young stars, and therefore offer a unique opportunity to observe any changes in the formation processes that may occur across this boundary. This paper presents medium resolution VLT/X-Shooter spectra of six Herbig Ae/Be stars, drawn from a sample of 91 targets, and high resolution VLT/CRIRES spectra of five Herbig Ae/Be stars, chosen based on the presence of CO first overtone bandhead emission in their spectra. The X-Shooter survey reveals a low detection rate of CO first overtone emission (7 per cent), consisting of objects mainly of spectral type B. A positive correlation is found between the strength of the CO v=2-0 and Br gamma emission lines, despite their intrinsic linewidths suggesting a separate kinematic origin. The high resolution CRIRES spectra are modelled, and are well fitted under the assumption that the emission originates from small scale Keplerian discs, interior to the dust sublimation radius, but outside the co-rotation radius of the central stars. In addition, our findings are in very good agreement for the one object where spatially resolved near-infrared interferometric studies have also been performed. These results suggest that the Herbig Ae/Be stars in question are in the process of gaining mass via disc accretion, and that modelling of high spectral resolution spectra is able to provide a reliable probe into the process of stellar accretion in young stars of intermediate to high masses.

Reference: MNRAS, in press
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1409.4897

Comments:

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Radial dependence of line profile variability in seven O9--B0.5 stars

F. Martins ^{1}, W. Marcolino ^{2}, D.J. Hillier ^{3}, J.-F. Donati ^{4}, J.-C. Bouret ^{5}

1- LUPM, CNRS & Montpellier University; 2- Universidade do Rio de Janeiro; 3- University of Pittsburgh; 4- IRAP, CNRS & Toulouse University; 5- LAM, CNRS & Aix-Marseille University

Massive stars show a variety of spectral variability: presence of discrete absorption components in UV P-Cygni profiles, optical line profile variability, X-ray variability, radial velocity modulations. Our goal is to study the spectral variability of single OB stars to better understand the relation between photospheric and wind variability. For that, we rely on high spectral resolution, high signal-to-noise ratio optical spectra collected with the spectrograph NARVAL on the Telescope Bernard Lyot at Pic du Midi. We investigate the variability of twelve spectral lines by means of the Temporal Variance Spectrum (TVS). The selected lines probe the radial structure of the atmosphere, from the photosphere to the outer wind. We also perform a spectroscopic analysis with atmosphere models to derive the stellar and wind properties, and to constrain the formation region of the selected lines. We show that variability is observed in the wind lines of all bright giants and supergiants, on a daily timescale. Lines formed in the photosphere are sometimes variable, sometimes not. The dwarf stars do not show any sign of variability. If variability is observed on a daily timescale, it can also (but not always) be observed on hourly timescales, albeit with lower amplitude. There is a very clear correlation between amplitude of the variability and fraction of the line formed in the wind. Strong anti-correlations between the different part of the temporal variance spectrum are observed. Our results indicate that variability is stronger in lines formed in the wind. A link between photospheric and wind variability is not obvious from our study, since wind variability is observed whatever the level of photospheric variability. Different photospheric lines also show different degrees of variability.

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

Weblink: http://arxiv.org/abs/1409.5057

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Time-series photometry of the O4 I(n)fp star zeta Puppis

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We report a time-series analysis of the O4I(n)fp star zeta Pup, based on optical photometry obtained with the SMEI instrument on the Coriolis satellite, 2003--2006. A single astrophysical signal is found, with P = (1.780938 pm 0.000093) d and a mean semi-amplitude of (6.9 pm 0.3) mmag. There is no evidence for persistent coherent signals with semi-amplitudes in excess of ca. 2~mmag on any of the timescales

previously reported in the literature. In particular, there is no evidence for a signature of the proposed rotation period, ca. 5.1~days; zeta Pup is therefore probably not an oblique magnetic rotator. The 1.8-day signal varies in amplitude by a factor ca. 2 on timescales of 10-100d (and probably by more on longer timescales), and exhibits modest excursions in phase, but there is no evidence for systematic changes in period over the 1000-d span of our observations. Rotational modulation and stellar-wind variability appear to be unlikely candidates for the underlying mechanism; we suggest that the physical origin of the signal may be pulsation associated with low-l oscillatory convection modes.

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A Blue Point Source at the Location of Supernova 2011dh

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We present Hubble Space Telescope (HST) observations of the field of the Type IIb supernova (SN) 2011dh in M51 performed at ≈1161 rest-frame days after explosion using the Wide Field Camera 3 and near-UV filters F225W and F336W. A star-like object is detected in both bands and the photometry indicates it has negative (F225W - F336W) color. The observed object is compatible with the companion of the now-vanished yellow supergiant progenitor predicted in interacting binary models. We consider it unlikely that the SN is undergoing strong interaction and thus estimate that it makes a small contribution to the observed flux. The possibilities of having detected an unresolved light echo or an unrelated object are briefly discussed and judged unlikely. Adopting a possible range of extinction by dust, we constrain parameters of the proposed binary system. In particular, the efficiency of mass accretion onto the binary companion must be below 50%, if no significant extinction is produced by newly formed dust. Further multiband observations are required in order to confirm the identification of the object as the companion star. If confirmed, the companion star would already be dominant in the UV-optical regime, so it would

readily provide a unique opportunity to perform a detailed study of its properties.

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iPTF13bvn: The First Evidence of a Binary Progenitor for a Type Ib Supernova

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The recent detection in archival Hubble Space Telescope images of an object at the location of supernova (SN) iPTF13bvn may represent the first direct evidence of the progenitor of a Type Ib SN. The object's photometry was found to be compatible with a Wolf-Rayet pre-SN star mass of ≈11 M &sun;. However, based on hydrodynamical models, we show that the progenitor had a pre-SN mass of ≈3.5 Msun; and that it could not be larger than ≈ 8 Msun;. We propose an interacting binary system as the SN progenitor and perform evolutionary calculations that are able to self-consistently explain the light curve shape, the absence of hydrogen, and the pre-SN photometry. We further discuss the range of allowed binary systems and predict that the remaining companion is a luminous O-type star of significantly lower flux in the optical than the pre-SN object. A future detection of such a star may be possible and would provide the first robust identification of a progenitor system for a Type Ib SN.

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Southern Massive Stars at High Angular Resolution: Observational Campaign and Companion Detection

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Multiplicity is one of the most fundamental observable properties of massive O-type stars and offers a promising way to discriminate between massive star formation theories.
Nevertheless, companions at separations between
1 and 100 milli-arcsec (mas) remain mostly unknown due to intrinsic observational limitations. At a typical distance of 2~kpc, this corresponds to projected physical separations of 2-200~AU.
The Southern MAssive Stars at High angular resolution survey (smash) was designed to fill this gap by providing the first systematic interferometric survey of Galactic massive stars. We observed 117 O-type stars with VLTI/PIONIER and 162 O-type stars with NACO/SAM, respectively probing the separation ranges 1-45 and 30-250~mas and brightness contrasts of $Delta H < 4$ and $Delta H < 5$. Taking advantage of NACO's field-of-view, we further uniformly searched for visual companions in an 8arcsec-radius down to $Delta H = 8$.
This paper describes the observations and data analysis, reports the discovery of almost 200 new companions in the separation range from 1~mas to 8arcsec and presents the catalog of detections, including the first resolved measurements of over a dozen known long-period spectroscopic binaries.

Excluding known runaway stars for which no companions are detected, 96 objects in our main sample ($delta < 0$degr; $H<7.5$) were observed both with PIONIER and NACO/SAM. The fraction of these stars with at least one resolved companion within 200~mas is 0.53. Accounting for known but unresolved spectroscopic or eclipsing companions, the multiplicity fraction at separation $rho < 8$arcsec increases to $f_mathrm{m}=0.91pm0.03$. The fraction of luminosity class V stars that have a bound companion reaches 100% at 30~mas while their average number of physically connected companions within 8arcsec is $f_mathrm{c}=2.2pm0.3$.
This demonstrates that massive stars form nearly exclusively in multiple systems. The nine non-thermal

radio emitters observed by smash are all resolved, including the newly discovered pairs HD,168112 and CPD$-$47degr2963. This lends strong support to the universality of the wind-wind collision scenario to explain the non-thermal emission from O-type stars.

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Evidence of the Evolved Nature of the B[e] Star MWC 137

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The evolutionary phase of B[e] stars is difficult to establish due to the uncertainties in their fundamental parameters. For instance, possible classifications for the Galactic B[e] star MWC 137 include pre-main-sequence and post-main-sequence phases, with a large range in luminosity. Our goal is to clarify the evolutionary stage of this peculiar object, and to study the CO molecular component of its circumstellar medium. To this purpose, we modeled the CO molecular bands using high-resolution K-band spectra. We find that MWC 137 is surrounded by a detached cool (T = 1900 +-100 K) and dense (N = (3 +- 1) x 10^{21} cm^{-2}) ring of CO gas orbiting the star with a rotational velocity, projected to the line of sight, of 84 +- 2 km/s. We also find that the molecular gas is enriched in the isotope 13C, excluding the classification of the star as a Herbig Be. The observed isotopic abundance ratio (12C / 13C = 25 +- 2) derived from our modeling is compatible with a proto-PN, main-sequence or supergiant evolutionary phase. However, based on some observable characteristics of MWC 137, we propose that the supergiant scenario seems to be the most plausible. Hence, we suggest that MWC 137 could be in an extremely short-lived phase, evolving from a B[e] supergiant to a blue supergiant with a bipolar ring nebula.

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The IACOB project: II. On the scatter of O-dwarf spectral type - effective temperature calibrations

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We are now in an era of large spectroscopic surveys of OB-type stars. Quantitative spectroscopic analysis of these modern datasets is enabling us to review the physical properties of blue massive stars with robust samples, not only revisiting mean properties and general trends, but also incorporating information about the effects of second-order parameters. We investigate the spectral type -- effective temperature (SpT - Teff) calibration for O-type dwarfs, and its claimed dependence on metallicity, using statistically-meaningful samples of stars extracted from the IACOB and VFTS surveys. We perform a homogeneous differential spectroscopic analysis of 33 Galactic and 53 LMC O~dwarfs (spanning spectral types of O4 -- O9.7) using the IACOB-GBAT package, a chi^2-fitting algorithm based on a large pre-computed grid of FASTWIND models, and standard techniques for the hydrogen/helium analysis of O-type stars. We compare the estimated effective temperatures and gravities as a function of (internally consistent) spectral classifications. While the general trend is that the temperature of a star increases with earlier spectral types and decreasing metallicity, we show that the large range of gravities found for O-type dwarfs -- spaning up to 0.45-0.50 dex in some spectral bins -- plays a critical role on the dependence of the effective temperature calibrations as a function of spectral type and metallicity. This result warns us about the use of SpT - Teff calibrations for O-dwarfs which ignore the effects of gravity, and highlights the risks of employing calibrations based on small samples. The effects of this scatter in gravities (evolutionary status) for O-type dwarfs should be included in future recipes which employ SpT - Teff calibrations.

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The Multiplicity of Massive Stars: A High Angular Resolution Survey with the HST Fine Guidance Sensor

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We present the results of an all-sky survey made with the Fine Guidance Sensor on Hubble Space Telescope to search for angularly resolved binary systems among the massive stars. The sample of 224 stars is comprised mainly of Galactic O- and B-type stars and Luminous Blue Variables, plus a few luminous stars in the Large Magellanic Cloud. The FGS TRANS mode observations are sensitive to detection of companions with an angular separation between 0."01 and 1."0 and brighter than △m=5. The FGS observations resolved 52 binary and 6 triple star systems and detected partially resolved binaries in 7 additional targets (43 of these are new detections). These numbers yield a companion detection frequency of 29% for the FGS survey. We also gathered literature results on the numbers of close spectroscopic binaries and wider astrometric binaries among the sample, and we present estimates of the frequency of multiple systems and the companion frequency for subsets of stars residing in clusters and associations, field stars, and runaway stars. These results confirm the high multiplicity fraction, especially among massive stars in clusters and associations. We show that the period distribution is approximately flat in increments of log P. We identify a number of systems of potential interest for long term orbital determinations, and we note the importance of some of these companions for the interpretation of the radial velocities and light curves of close binaries that have third companions.

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Radio emission variability and proper motions of WR 112

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We analyzed 64 radio observations at the frequency of 8.4 GHz of the Wolf-Rayet star WR 112, taken from the Very Large Array archive. These observations cover a time baseline of 13 years, from June 2000 to July 2013. The radio structure of WR 112 is consistent with it being a point source in all the epochs and with its flux density varying from 0.6 mJy to 2.1 mJy. We tried to search for periodicities in these variations but our results were not conclusive. We also looked for extended emission from the infrared nebula that surrounds WR 112, setting upper limits of 50 μJy. Finally, we used the highest angular resolution images to measure the proper motions of WR 112, obtaining μ_{α}cos(δ)=−2.6±1.1 mas/yr, and μ_{δ}=−5.4±1.4 mas/yr. These proper motions are smaller than those previously reported, but still suggest significant peculiar motions for WR 112.

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The properties of ten O-type stars in the low-metallicity galaxies IC 1613, WLM and NGC 3109

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Massive stars likely played an important role in the reionization of the Universe, and the formation of the first black holes. They are potential progenitors of long-duration gamma-ray bursts, seen up to redshifts of about ten. Massive stars in low-metallicity environments in the local Universe are reminiscent of their high redshift counterparts, emphasizing the importance of the study of their properties and evolution. In a previous paper, we reported on indications that the stellar winds of low-metallicity O stars may be stronger than predicted, which would challenge the current paradigm of massive star evolution.
In this paper, we aim to extend our initial sample of six O stars in low-metallicity environments by four. The total sample of ten stars consists of the optically brightest sources in IC1613, WLM, and NGC3109. We aim to derive their stellar and wind parameters, and compare these to radiation-driven wind theory and stellar evolution models.
We have obtained intermediate-resolution VLT/X-Shooter spectra of our sample of stars. We derive the stellar parameters by fitting synthetic Fastwind line profiles to the VLT/X-Shooter spectra using a genetic fitting algorithm. We compare our parameters to evolutionary tracks and obtain evolutionary masses and ages. We also investigate the effective temperature versus spectral type calibration for SMC and lower metallicities. Finally, we reassess the wind momentum versus luminosity diagram.
The derived parameters of our target stars indicate stellar masses that reach values of up to 50 Msun. The wind strengths of our stars are, on average, stronger than predicted from radiation-driven wind theory and reminiscent of stars with an LMC metallicity. We discuss indications that the iron content of the host galaxies is higher than originally thought and is instead SMC-like. We find that the discrepancy with theory is reduced, but remains significant for this higher metallicity. This may imply that our current understanding of the wind properties of massive stars, both in the local universe as well as at cosmic distances, remains incomplete.

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Short-term spectroscopic variability of Plaskett's star

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Plaskett's star (HD47129) is a very massive O-star binary in a post Roche-lobe overflow stage. CoRoT observations of this system revealed photometric variability with a number of frequencies. The aim of this paper is to characterize the variations in spectroscopy and investigate their origin. To sample its short-term variability, HD47129 was intensively monitored during two spectroscopic campaigns of six nights each. The spectra were disentangled and Fourier analyses were performed to determine possible periodicities and to investigate the wavelength dependence of the phase constant and the amplitude of the periodicities. Complex line profile variations are observed. Frequencies near 1.65, 0.82, and 0.37 d^-1 are detected consistently in the He I 4471, He II 4542, and N III 4510-4518 lines. These frequencies are consistent with those of the strongest signals detected in photometry. The possibilities that these variations stem from pulsations, a recently detected magnetic field or tidal interactions are discussed. Whilst all three scenarios have their strengths, none of them can currently account for all the observed properties of the line profile variations.

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Near-infrared spectroscopy of candidate red supergiant stars in clusters.

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Clear identifications of Galactic young stellar clusters farther than a few kpc from the Sun are rare, despite the large number of candidate clusters.
We aim to improve the selection of candidate clusters rich in massive stars with a multiwavelength analysis of photometric Galactic data that range from optical to mid-infrared wavelengths.
We present a photometric and spectroscopic analysis of five candidate stellar clusters,
which were selected as overdensities with bright stars (Ks <7 mag) in GLIMPSE and 2MASS images. A total of 48 infrared spectra were obtained. The combination of photometry and spectroscopy yielded six new red supergiant stars with masses from 10 Msun to 15 Msun. Two red supergiants are located at Galactic coordinates (l,b) (16.7 deg, -0.63 deg) and at a distance of about 3.9 kpc; four other red supergiants are members of a cluster at Galactic coordinates (l,b)=(49.3 deg,+0.72 deg) and at a distance of ~7.0 kpc.
Spectroscopic analysis of the brightest stars of detected overdensities and studies of interstellar extinction along their line of sights are fundamental to distinguish regions of low extinction from actual stellar

clusters. The census of young star clusters containing red supergiants is incomplete; in the existing all-sky near-infrared surveys, they can be identified as overdensities of bright stars with infrared color-magnitude diagrams characterized by gaps.

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The Cocoon Nebula and its ionizing star: do stellar and nebular abundances agree?

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Main sequence massive stars embedded in an Hii region should have the same chemical abundances as the surrounding nebular gas+dust. The Cocoon nebula (IC5146), a close-by Galactic Hii region ionized by a narrow line B0.5 V single star (BD+46 3474), is an ideal target to perform a detailed comparison of nebular and stellar abundances in the same Galactic Hii region.

We investigate the chemical content of oxygen and other elements in the Cocoon nebula from two different points of view: an empirical analysis of the nebular spectrum and a detailed spectroscopic analysis of the associated early B-type star using state-of-the-art stellar atmosphere modeling. By comparing the stellar and nebular abundances, we aim to indirectly address the long-standing problem of the discrepancy found between abundances obtained from collisionally excited lines and optical recombination lines in photoionized nebulae.

We collect long-slit spatially resolved spectroscopy of the Cocoon nebula and a high resolution optical spectrum of the ionizing star. Standard nebular techniques along with updated atomic data are used to compute the physical conditions and gaseous abundances of O, N and S in 8 apertures extracted across a semidiameter of the nebula. We perform a self-consistent spectroscopic abundance analysis of BD+46 3474 based on the atmosphere code FASTWIND to determine the stellar parameters and Si, O, and N abundances.

The Cocoon nebula and its ionizing star, located at a distance of 800±80 pc, have a very similar chemical composition as the Orion nebula and other B-type stars in the solar vicinity. This result agrees with the high degree of homogeneity of the present-day composition of the solar neighbourhood (up to 1.5 Kpc from the Sun) as derived from the study of the local cold-gas ISM. The comparison of stellar and nebular collisionally excited line abundances in the Cocoon nebula indicates that O and N gas+dust nebular values are in better agreement with stellar ones assuming small temperature fluctuations, of the order of those found in the Orion nebula ($t^2 = 0.022$). For S, the behaviour is somewhat puzzling, reaching to different conclusions depending on the atomic data set used.

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The spectroscopic Hertzsprung-Russell diagram of Galactic massive stars

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The distribution of stars in the Hertzsprung-Russell diagram narrates their evolutionary history and directly assesses their properties. Placing stars in this diagram however requires the knowledge of their distances and interstellar extinctions, which are often poorly known for Galactic stars. The spectroscopic Hertzsprung-Russell diagram (sHRD) tells similar evolutionary tales, but is independent of distance and extinction measurements. Based on spectroscopically derived effective temperatures and gravities of almost 600 stars, we derive for the first time the observational distribution of Galactic massive stars in the sHRD. While biases and statistical limitations in the data prevent detailed quantitative conclusions at this time, we see several clear qualitative trends. By comparing the observational sHRD with different state-of-the-art stellar evolutionary predictions, we conclude that convective core overshooting may be mass-dependent and, at high mass ($geq 15,M_odot$), stronger than previously thought. Furthermore, we find evidence for an empirical upper limit in the sHRD for stars with $T_{rm{eff}}$ between 10000 and 32000 K and, a strikingly large number of objects below this line. This over-density may be due to inflation expanding envelopes in massive main-sequence stars near the Eddington limit.

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High-Energy Properties of the Enigmatic Be Star gamma Cassiopeiae

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We present the results of a broad-band X-ray study of the enigmatic Be star Gamma Cassiopeiae (herein gamma Cas) based on observations made with both the Suzaku and INTEGRAL observatories. gamma Cas has long been recognized as the prototypical example of a small subclass of Be stars with moderately

strong X-ray emission dominated by a hot thermal component in the 0.5-12 keV energy range Lx ~ 10^32 - 10^33 erg s^-1. This places them at the high end of the known luminosity distribution for stellar emission, but several orders of magnitude below typical accretion powered Be X-ray binaries. The INTEGRAL observations spanned an 8 year baseline and represent the deepest measurement to date at energies above ~50 keV. We find that the INTEGRAL data are consistent within statistics to a constant intensity source above 20 keV, with emission extending up to ~100 keV and that searches for all of the previously reported periodicities of the system at lower energies led to null results. We further find that our combined Suzaku and INTEGRAL spectrum, which we suggest is the most accurate broad-band X-ray measurement of gamma Cas to date, is fitted extremely well with a thermal plasma emission model with a single absorption component. We found no compelling need for an additional non-thermal high-energy component. We discuss these results in the context of a currently favored models for gamma Cas and its analogs.

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Suzaku Monitoring of Hard X-ray Emission from Eta Carinae over a Single Binary Orbital Cycle

Kenji Hamaguchi, Michael F. Corcoran, Hiromitsu Takahashi, Takayuki Yuasa, Manabu Ishida, Theodore R. Gull, Julian M. Pittard, Christopher M. P. Russell, Thomas I. Madura

NASA/GSFC, UMBC, USRA, Hiroshima University, RIKEN, ISAS/JAXA, The University of Leeds, University of Delaware, NPP

The Suzaku X-ray observatory monitored the supermassive binary system Eta Carinae 10 times during the whole 5.5 year orbital cycle between 2005-2011. This series of observations presents the first long-term monitoring of this enigmatic system in the extremely hard X-ray band between 15-40 keV. During most of the orbit, the 15-25 keV emission varied similarly to the 2-10 keV emission, indicating an origin in the hard energy tail of the kT ~4 keV wind-wind collision (WWC) plasma. However, the 15-25 keV emission declined only by a factor of 3 around periastron when the 2-10 keV emission dropped by two orders of magnitude due probably to an eclipse of the WWC plasma. The observed minimum in the 15-25 keV emission occurred after the 2-10 keV flux had already recovered by a factor of ~3. This may mean that the WWC activity was strong, but hidden behind the thick primary stellar wind during the eclipse. The 25-40 keV flux was rather constant through the orbital cycle, at the level measured with INTEGRAL in 2004. This result may suggest a connection of this flux component to the gamma-ray source detected in this field. The Helium-like Fe Kalpha line complex at ~6.7 keV became strongly distorted toward periastron as seen in the previous cycle. The 5-9 keV spectra can be reproduced well with a two-component spectral model, which includes plasma in collision equilibrium (CE) and a plasma in non-equilibrium ionization (NEI) with tau ~1e11 cm-3 s-1. The NEI plasma increases in importance toward periastron.

Reference: Astrophysical Journal, 2014, 795, 119 (arXiv1410.6171)
Status: Manuscript has been accepted

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MY Camelopardalis, a very massive merger progenitor

J. Lorenzo (1), I. Negueruela (1), A.K.F. Val Baker (2), M. García (3), S. Simón-Díaz (4), P. Pastor (1), and M. Méndez Majuelos (5)

1-Universidad Alicante;2-University Malaya; 3-CSIC-INTA; 4-IAC; 5-IES Arroyo Hondo

Context. The early-type binary MY Cam belongs to the young open cluster Alicante 1, embedded in Cam OB3.
Aims. MY Cam consists of two early-O type main-sequence stars and shows a photometric modulation suggesting an orbital period slightly above one day. We intend to confirm this orbital period and derive orbital and stellar parameters.
Methods. Timing analysis of a very exhaustive (4607 points) light curve indicates a period of 1.1754514 ± 0.0000015 d. High-resolution spectra and the cross-correlation technique implemented in the TODCOR program were used to derive radial velocities and obtain
the corresponding radial velocity curves for MY Cam. Modelling with the stellar atmosphere code FASTWIND was used to obtain stellar parameters and create templates for cross-correlation. Stellar and orbital parameters were derived using the Wilson-Devinney code, such that a complete solution to the binary system could be described.
Results. The determined masses of the primary and secondary stars in MY Cam are 37.7 ± 1.6 and 31.6 ± 1.4 Msol , respectively. The corresponding temperatures, derived from the model atmosphere fit, are 42 000 and 39 000 K, with the more massive component being hotter. Both stars are overfilling their Roche lobes, sharing a common envelope.
Conclusions. MY Cam contains the most massive dwarf O-type stars found so far in an eclipsing binary. Both components are still on the main sequence, and probably not far from the zero-age main sequence. The system is a likely merger progenitor, owing to its very short period.

Reference: DOI: 10.1051/0004-6361/201424345
Status: Manuscript has been accepted

Weblink: http://esoads.eso.org/abs/2014arXiv1410.5575L

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Enhancement of Surface Helium Abundance in Intermediate-Mass Main-Sequence Stars

Staritsin E.

Astronomical Observatory, Ural Federal University, Yekaterinburg

The evolution of rapidly rotating 8, 4, and 2 solar masses main-sequence stars is considered together with hydrodynamical transfer in their interiors. The conditions under which turbulent erosion, semiconvection, and shear turbulence lead to partial mixing of the matter in the radiative envelope and central regions of the stars are determined. The enhancement of the surface helium abundance with time depends on both

the intensity of partial mixing in their interiors and mass loss by the stellar wind. The ratio of the number densities of helium and hydrogen at the surface can rise by the end of main-sequence stage by ~30% for a 8 solar mass star and ~10-20% for a 4 solar mass star, depending on the mass-loss rate. Partial mixing of the matter in the radiative envelope and in the central region of the star can provide an explanation for the observed enhancement of the atmospheric helium abundances of early B stars toward the end of their main-sequence evolution. The enhancement of the surface helium abundance in a 2 solar mass star is so small that it cannot be detected, and is appreciably lower than the enhancement beneath the surface.

Reference: Astronomy Reports
Status: Manuscript has been accepted

Weblink:

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Magnetorotational instability in decretion disks of critically rotating stars and the outer structure of Be and Be/X-ray disks

Jiri Krticka, Petr Kurfurst, Iva Krtickova

Masaryk University, Brno, Czech Republic

Evolutionary models of fast-rotating stars show that the stellar rotational velocity may approach the critical speed. Critically rotating stars cannot spin up more, therefore they lose their excess angular momentum through an equatorial outflowing disk. The radial extension of such disks is unknown, partly because we lack information about the radial variations of the viscosity. We study the magnetorotational instability, which is considered to be the origin of anomalous viscosity in outflowing disks. We used analytic calculations to study the stability of outflowing disks submerged in the magnetic field. The magnetorotational instability develops close to the star if the plasma parameter is large enough. At large radii the instability disappears in the region where the disk orbital velocity is roughly equal to the sound speed. The magnetorotational instability is a plausible source of anomalous viscosity in outflowing disks. This is also true in the region where the disk radial velocity approaches the sound speed. The disk sonic radius can therefore be roughly considered as an effective outer disk radius, although disk material may escape from the star to the insterstellar medium. The radial profile of the angular momentum-loss rate already flattens there, consequently, the disk mass-loss rate can be calculated with the sonic radius as the effective disk outer radius. We discuss a possible observation determination of the outer disk radius by using Be and Be/X-ray binaries.

Reference: Astronomy & Astrophysics, in press
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1410.7831

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Gas physical conditions and kinematics of the giant outflow Ou4

Romano L. M. Corradi (1,2), Nicolas Grosso (3), Agnès Acker (3), Robert Greimel (4) and Patrick Guillout (3)

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2 - Departamento de Astrofísica, Universidad de La Laguna, 38206, La Laguna, Tenerife, Spain
3 - Observatoire Astronomique de Strasbourg, Université de Strasbourg, CNRS, UMR 7550, 11 rue de l'Université, 67000 Strasbourg, France
4 - IGAM, Institut für Physik, Universität Graz, Universitätsplatz 5/II, 8010 Graz, Austria

Context. The recently discovered bipolar outflow Ou4 has a projected size of more than one degree in the plane of the sky. It is apparently centred on the young stellar cluster – whose most massive representative is the triple system HR 8119 – inside the H II region Sh 2-129. The driving source, the nature, and the distance of Ou4 are not known.

Aims. The basic properties of Ou4 and its environment are investigated to shed light on the origin of this remarkable outflow.

Methods. Deep narrow-band imagery of the whole nebula at arcsecond resolution was obtained to study the details of its morphology. Long-slit spectroscopy of the bipolar lobe tips was secured to determine the gas ionisation mechanism, physical conditions, and line-of-sight velocities. An estimate of the proper motions at the tip of the south lobe using archival plate images was attempted. The existing multi-wavelength data for Sh 2-129 and HR 8119 were also comprehensively reviewed.

Results. The observed morphology of Ou4, its emission-line spatial distribution, line flux ratios, and the kinematic modelling developed adopting a bow-shock parabolic geometry, illustrate the expansion of a shock-excited fast collimated outflow. The observed radial velocities of Ou4 and its reddening are consistent with those of Sh 2-129 and HR 8119. The improved determination of the distance to HR 8119 (composed of two B0 V and one B0.5 V stars) and Sh 2-129 is 712 pc. We identify in WISE images at 22 μm an emission bubble of 5 arcmin radius (1 pc at the distance above) emitted by hot (107 K) dust grains, located inside the central part of Ou4 and corresponding to several [O III] emission features of Ou4.

Conclusions. The apparent position of Ou4 and the properties studied in this work are consistent with the hypothesis that Ou4 is located inside the Sh 2-129 H ii region, suggesting that it was launched some 90 000 yr ago by HR 8119. The outflow total kinetic energy is estimated to be ~4e47 ergs. However, we cannot rule out the alternative possibility that Ou4 is a bipolar planetary nebula or the result of an eruptive event on a massive AGB or post–AGB star not yet identified.

Reference: A&A 570, A105 (2014)
Status: Other

Weblink: http://www.aanda.org/articles/aa/abs/2014/10/aa22718-13/aa22718-13.html

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Analytical Solutions for Radiation-Driven Winds in Massive Stars. I: The Fast Regime

Ignacio Araya(1), Michel Cure(1) and Lydia S. Cidale(2)

(1) Instituto de Fisica y Astronomia, Universidad de Valparaıso, Chile;
(2) Departamento de Espectroscopıa, Facultad de Ciencias Astronomicas y Geofısicas, Universidad Nacional de La Plata and Instituto de Astrofısica La Plata, CCT La Plata, CONICET-UNLP,
Accurate mass-loss rate estimates are crucial keys in the study of wind properties of massive stars and for testing different evolutionary scenarios. From a theoretical point of view, this implies solving a complex set of differential equations in which the radiation field and the hydrodynamics are strongly coupled. The use of an analytical expression to represent the radiation force and the solution of the equation of motion has many advantages over numerical integrations. Therefore, in this work, we present an analytical expression as a solution of the equation of motion for radiation-driven winds in terms of the force multiplier parameters. This analytical expression is obtained by employing the line acceleration expression given by Villata and the methodology proposed by Müller & Vink. On the other hand, we find useful relationships to determine the parameters for the line acceleration given by Müller & Vink in terms of the force multiplier parameters.

Reference: ApJ, 795 81 (2014)
Status: Other

Weblink: http://arxiv.org/abs/1411.0751

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Abstracts of 8 conference proceedings

Constraining general massive-star physics by exploring the unique properties of magnetic O-stars: Rotation, macroturbulence and sub-surface convection

Jon O. Sundqvist(1)

1. University Observatory of Munich

A quite remarkable aspect of non-interacting O-stars with detected surface magnetic fields is that they all are very slow rotators. This paper uses this unique property to first demonstrate that the projected rotational speeds of massive, hot stars, as derived using current standard spectroscopic techniques, can be severely overestimated when significant ``macroturbulent'' line-broadening is present. This may, for example, have consequences for deriving the statistical distribution of rotation rates in massive-star populations, and for the use of these rates in stellar evolution models. It is next shown how such macroturbulence (seemingly a universal feature of hot, massive stars) is present in all but one of the magnetic O-stars, namely NGC 1624-2. Assuming then a simple model in which NGC 1624-2's exceptionally strong, large-scale magnetic field suppresses atmospheric motions down to layers where the magnetic and gas pressures are comparable, first empirical constraints on the formation depth of this

enigmatic hot-star macroturbulence are derived. The results suggest an origin in the thin sub-surface convection zone of massive stars, consistent with a physical origin due to, e.g., stellar pulsations excited by the convective motions.

Reference: 6 pages, 2 figures, to appear in Proc. IAU307: New windows on massive stars: asteroseismology, interferometry, and spectropolarimetry, Editors: G. Meynet, C. Georgy, J.H. Groh & Ph. Stee
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1409.0028

Comments:

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Massive star population synthesis

D. Vanbeveren

Astronomy and Astrophysics Research Group
Vrije Universiteit Brussels

We review massive star population synthesis with a realistic population of binaries, research that started in the late sixties, early seventies. We focus on the comparison between observed star numbers (as a function of metallicity) and theoretically predicted numbers of stellar populations in regions of continuous star formation and in starburst regions. Special attention is given to the O-type star/WR star/red supergiant star populations, the population of blue supergiants, the supernova rates. Finally, we consider massive double compact star mergers and the link with gravitational wave sources (the advanced LIGO II).

Reference: ppt presentation of a review paper presented at the conference 'Binary systems, their evolution and environments' that was held in UlaanBaatar, Mongolia, 1-5 September 2014
Status: Conference proceedings

Weblink: http://mongolia.csp.escience.cn/dct/page/65580

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Physics of Mass Loss in Massive Stars

J. Puls(1), J.O. Sundqvist(1), N. Markova(2)

1 - University Observatory Munich, Germany
2 - Institute of Astronomy with NAO Smolyan, Bulgaria

We review potential mass-loss mechanisms in the various evolutionary stages of massive stars, from the

well-known line-driven winds of O-stars and BA supergiants to the less-understood winds from Red Supergiants. We discuss optically thick winds from Wolf-Rayet stars and Very Massive Stars, and the hypothesis of porosity-moderated, continuum-driven mass loss from stars formally exceeding the Eddington limit, which might explain the giant outbursts from Luminous Blue Variables. We finish this review with a glance on the impact of rapid rotation, magnetic fields and small-scale inhomogeneities in line-driven winds.

Reference: Invited review to appear in: New windows on massive stars: asteroseismology, interferometry, and spectropolarimetry. G. Meynet, C. Georgy, J.H. Groh & Ph. Stee, eds.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1409.3582

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Deriving extinction laws with O stars: from the IR to the UV

J. Maíz Apellániz

Centro de Astrobiología (INTA-CSIC)

We have recently derived a family of extinction laws for 30 Doradus that provides better fits to the optical photometry of obscured stars in the Galaxy and the LMC. Simultaneously, we are extending our Galactic O-Star Spectroscopic Survey (GOSSS) to fainter, more extinguished stars to obtain accurate spectral types for massive stars with more than 6 magnitudes of V-band extinction. I have combined both lines of research with 2MASS, WISE, and Spitzer photometry to obtain the 1-10 micron extinction law for O stars in the solar neighborhood. I present these results and compare them with the extinction laws in the same wavelength range derived from late-type stars and H II regions. I also discuss plans to extend the newly derived optical-IR extinction laws to the UV.

Reference: To appear in Highlights of Spanish Astrophysics VIII, Proceedings of the XI Scientific Meeting of the Spanish Astronomical Society held on September 8-12, 2014, in Teruel, Spain.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1410.5184

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A photometric variability study of massive stars in Cygnus OB2

J. Salas, J. Maíz Apellániz, and R. H. Barbá

Agrupación Astronómica de Huesca, Centro de Astrobiología, Universidad de La Serena

We have conducted a 1.5 year-long variability study of the stars in the Cygnus OB2 association, the region in the northern hemisphere with the highest density of optically visible massive stars. The survey was conducted using four pointings in the Johnson R and I bands with a 35 cm Meade LX200-ACF telescope equipped with a 3.2 Mpixel SBIG ST10-XME CCD camera and includes 300+ epochs in each

filter. A total of 1425 objects were observed with limiting magnitudes of 15 in R and 14 in I. The photometry was calibrated using reference stars with existing UBVJHK photometry. Bright stars have precisions better than 0.01 magnitudes, allowing us to detect 52 confirmed and 19 candidate variables, many of them massive stars without previous detections as variables. Variables are classified as eclipsing, pulsating, irregular/long period, and Be. We derive the phased light curves for the eclipsing binaries, with periods ranging from 1.3 to 8.5 days.

Reference: To appear in Highlights of Spanish Astrophysics VIII, Proceedings of the XI Scientific Meeting of the Spanish Astronomical Society held on September 8-12, 2014, in Teruel, Spain.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1410.6767

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The Hourglass as seen with HST/WFPC2

J. Maíz Apellániz, L. Úbeda, R. H. Barbá, J. W. MacKenty, J. I. Arias, and A. I. Gómez de Castro

CAB, STScI, ULS, STScI, ULS, UCM

We present a multi-filter HST/WFPC2 UV-optical study of the Hourglass region in M8. We have extracted the stellar photometry of the sources in the area and obtained the separations and position angles of the Herschel 36 multiple system: for Herschel 36 D we detect a possible orbital motion between 1995 and 2009. We have combined our data with archival IUE spectroscopy and measured the Herschel 36 extinction law, obtaining a different result from that of Cardelli et al. (1989) due to the improvement in the quality of the optical-NIR data, in agreement with the results of Maíz Apellániz et al. (2014). A large fraction of the UV flux around Herschel 36 arises from the Hourglass and not directly from the star itself. In the UV the Hourglass appears to act as a reflection nebula located behind Herschel 36 along the line of sight. Finally, we also detect three new Herbig-Haro objects and the possible anisotropic expansion of the Hourglass Nebula.

Reference: To appear in Highlights of Spanish Astrophysics VIII, Proceedings of the XI Scientific Meeting of the Spanish Astronomical Society held on September 8-12, 2014, in Teruel, Spain.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1410.6766

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MGB and the new Galactic O-Star Spectroscopic Survey spectral classification standard grid

J. Maíz Apellániz, E. J. Alfaro, J. I. Arias, R. H. Barbá, R. C. Gamen, A. Herrero, J. R. S. Leão, A. Marco, I. Negueruela, S. Simón-Díaz, A. Sota, and N. R. Walborn

CAB, IAA, ULS, ULS, IALP, IAC+ULL, UFRG, UA, UA, IAC+ULL, IAA, and STScI

In this poster we present three developments related to the Galactic O-Star Spectroscopic Survey (GOSSS). First, we are making public the first version of MGB, an IDL code that allows the user to compare oberved spectra to a grid of spectroscopic standards to measure spectral types, luminosity classes, rotation indexes, and spectral qualifiers. Second, we present the associated grid of standard stars for the spectral types O2 to O9.7, with several improvements over the original GOSSS grid of Sota et al. (2011). Third, we present a list of egregious classification errors in SIMBAD: stars that are or have been listed there as being of O type but that in reality are late-type stars.

Reference: To appear in Highlights of Spanish Astrophysics VIII, Proceedings of the XI Scientific Meeting of the Spanish Astronomical Society held on September 8-12, 2014, in Teruel, Spain.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1410.7615

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Asteroseismology of OB stars with hundreds of single snapshot spectra (and a few time-series of selected targets)

S. Simón-Díaz

Instituto de Astrofísica de Canarias

Imagine we could do asteroseismology of large samples of OB-type stars by using just one spectrum per target. That would be great! But this is probably a crazy and stupid idea. Or maybe not. Maybe we have the possibility to open a new window to investigate stellar oscillations in massive stars that has been in front of us for many years, but has not attracted very much our attention: the characterization and understanding of the so-called macroturbulent broadening in OB-type stars.

Reference: Proceedings IAUS307: New windows on massive stars: asteroseismology, interferometry, and spectropolarimetry. G. Meynet, C. Georgy, J.H. Groh & Ph. Stee, eds
Status: Other

Weblink: http://arxiv.org/abs/1409.2416

Comments:

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JOBS

Closed Job Offers (original deadline passed)

Tenure-track faculty position

Jim Kneller

Department of Physics
North Carolina State University
421 Riddick Hall
Campus Box 8202
Raleigh, NC 27695-8202
(919) 515-2521

Join Our Faculty!

The Department of Physics at NC State University is seeking exceptionally qualified candidates for a tenure-track position to begin Fall 2015. We are looking for faculty who will establish a highly competitive research program and will have a strong commitment to excellence in teaching and mentoring.

Astrophysics (Position Number: 00104147):
Emphasis on astrophysics or space-based astronomy that compliments the department's current strengths in computational astrophysics, supernovae and supernova remnants, stellar astrophysics, and theoretical nuclear / neutrino astrophysics.

Our Vision: We envision North Carolina State University's Department of Physics as performing creative, highly visible research in fundamental and applied science. Our vision blends fundamental physics and applications, theory and experiment, and integrates research and innovative teaching to create a vibrant intellectual atmosphere within a welcoming and collegial environment.

While these searches are broadly defined, we seek candidates who share our vision and who are open to collaborations in areas of current research strengths in our department.

Attention/Comments:

Weblink: http://physics.ncsu.edu/facultypositions/

Email: physicsjobs@ncsu.edu

Deadline: 1 November 2014

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Tenure Track Position in Astrophysics at Instituto de Astronomía, UNAM, at Ensenada, Baja California, México

Dr. Barbara Pichardo

Instituto de Astronomía of the Universidad Nacional Autónoma de México (IA-UNAM) at Ensenada, Baja California,
Mexico.

The Instituto de Astronomía of the Universidad Nacional Autónoma de México (IA-UNAM) has openings for junior faculty level, tenure track positions in astrophysics, at its branch in Ensenada, Baja California, Mexico. Applicants should hold a Ph.D. degree in astronomy or physics, and have at least two years of postdoctoral experience. Mexican citizens are particularly encouraged to apply.

Selection criteria include research accomplishments and promise of future achievement as well as opportunities to collaborate with other faculty members in Ensenada. Faculty members are expected to carry out original research and must teach astronomy and/or physics courses at the graduate and/or undergraduate level, as well as mentor students.

Institute members have access to Observatorio Astronómico Nacional in San Pedro Mártir (OAN-SPM), Baja California. Astronomers at Mexican institutions can compete for the Mexican share of observing time on the 10.4-m Gran Telescopio Canarias (GTC), the Large Millimeter Telescope (LMT), and also have competitive access to the EVLA, the VLBA, and to ALMA, via collaboration with the USA National Radio Astronomy Observatory. The Institute is a member of the Transneptunian Automated Occultation Survey-II (TAOS-II), which is being installed at OAN-SPM, the HAWC (High Altitude Water Cerenkov) Observatory and the Cerenkov Telescope Array collaboration, as well as a funding partner of the Sloan Digital Sky Survey, which will execute the SDSS-IV. The Institute has extensive computing facilities of its own and members have access to general UNAM supercomputers.

Members of the Institute conduct research in most major astronomical and astrophysical fields. Candidates are encouraged to contact individual faculty members to explore potential collaborations as well as review the facilities and instrumentation at the OAN-SPM to identify research opportunities at the site.

Inquiries can be made by email to barbara@astro.unam.mx

Additional information can be found at:
bufadora.astrosen.unam.mx/
www.astroscu.unam.mx
www.astroscu.unam.mx/job_ia

INCLUDED BENEFITS:
Health insurance is provided by UNAM.

Attention/Comments:

Weblink: http://www.astroscu.unam.mx/IA/index.php?option=com_content&view=article&id=846&Itemid=248⟨=es

Email: barbara@astro.unam.mx

Deadline: 7 October 2014

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Tenure Track Position in Astrophysics at Instituto de Astronomía, UNAM, México

Dr. Barbara Pichardo

The Instituto de Astronomía of the Universidad Nacional Autónoma de México (IA-UNAM) at
Ciudad Universitaria, UNAM
C.P. 04510
Mexico, City

The Instituto de Astronomía of the Universidad Nacional Autónoma de México (IA-UNAM) has openings for junior faculty level, tenure track positions in astrophysics, at its branch in Mexico City, Mexico.

Applicants should hold a Ph.D. degree in astronomy or physics, and have at least two years of postdoctoral experience. Preference will be given to candidates less than 40 years old, by the start date. Mexican citizens are particularly encouraged to apply.

The main selection criteria will be outstanding research accomplishments and promise of future achievement. Faculty members are expected to carry out original research, collaborate with faculty members and must teach astronomy and/or physics courses at the graduate and/or undergraduate level, as well as mentor students.

Candidates must send a complete curriculum vitae including a full list of publications, as well as a statement of previous experience and current and future professional interests, and arrange for three letters of recommendation to be sent to Dr. Barbara Pichardo at the IA-UNAM (barbara@astro.unam.mx) by 7 October 2014.

Unsigned material can be sent by e-mail; letters can be sent by e-mail (scanned) or by courier. Please do not use regular post mail.

Inquiries can be made by email to barbara@astro.unam.mx

Additional information can be found at:
www.astroscu.unam.mx
www.astroscu.unam.mx/job_ia

INCLUDED BENEFITS:
Health insurance is provided by UNAM.

Attention/Comments:

Weblink: http://www.astroscu.unam.mx/IA/index.php?option=com_content&view=article&id=846&Itemid=248⟨=es

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Deadline: 7 October 2014

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Research Position in NLTE stellar atmosphere modelling

Jiří Kubát

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Fričova 298
251 65 Ondřejov
Czech Republic

The Astronomical Institute of the Academy of Sciences of the Czech Republic (www.asu.cas.cz) opens one temporary position in its Stellar department in the field of NLTE radiative transfer and atmosphere modelling. The applicant is expected to have basic experience in this field and to have a university degree at the time of arrival.

The Stellar Department of the Astronomical Institute (http://www.asu.cas.cz) is located on the observatory campus in Ondrejov, which is situated approximately 30 km south-east of Prague. The stellar department (http://stelweb.asu.cas.cz) operates a 2m telescope with a coudé spectrograph. Czech Republic is a member state of both ESO, and has access to ESO facilities. The department includes about a dozen active researchers, with a total of about 60 scientists working at the Astronomical Institute. The department offers excellent computing facilities, running under Linux. Researchers of the stellar department also have free access to the computer cluster (http://wave.asu.cas.cz/ocas/).

The salary will be based on the standard domestic scale. The starting date is as soon as possible and the appointment is initially for 1 year. Further extension will be possible upon satisfactory scientific results, publication output, and availability of funding.

The candidates should send their applications (list of publications, curriculum vitae, and summary of their research work) and arrange two letters of recommendation to be sent directly to Dr. J. Kubát, Astronomical Institute, Fričova 298, 251 65 Ondřejov, Czech Republic; (phone +420 323620328, fax +420 323620250), preferrably via e-mail kubat@sunstel.asu.cas.cz. Applications should be received before 30th October 2014. The selection process will continue until a suitable candidate is found.

Attention/Comments:

Weblink: http://www.asu.cas.cz/~kubat/granty/14-02385S/job.html

Email: kubat@sunstel.asu.cas.cz

Deadline: 30 October 2014 or until a suitable candidate found

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Open JOB offers

Research Fellow - Nuclear Astrophysics

Alexander Heger

Monash Centre for Astrophysics
School of Mathematical Sciences
Building 28, M401
Monash University, VIC 3800
Australia

Applications are invited for a full time research fellow (Level A/B) in the wider field of stellar evolution and nuclear astrophysics with Prof. Alexander Heger at the Monash Centre for Astrophysics (MoCA) at Monash University, Melbourne, Australia.

The successful candidate must hold, or be about to obtain, a Ph.D. degree in a relevant discipline and should have experience in theoretical or numerical modelling in nuclear astrophysics in one or several of the following fields: formation and evolution of massive or very massive stars, supernovae, binary stars, stellar rotation and magnetic fields, gamma-ray burst and other transients and outbursts, galactic chemical evolution, formation and evolution first stars, and Type I X-ray burst and superbursts.

MoCA has very active research groups in Stellar Interiors and Nucleosynthesis (SINs - Lattanzio, Heger, Campbell, Mueller), High-energy Astrophysics (Galloway, Levin, Donea, Heger, Price, Mueller, Lazendic-Galloway, Thrane), Astrophysical Fluid Dynamics and MHD (Monaghan; Price - star formation), Galaxy Evolution (Bown), Numerical General Relativity, and solar physics, amongst others. The initial appointment is for two years, at level A or B depending on experience. Extension for a third year contingent upon funding, satisfactory performance, and managment approval. Commencement date should be on or before Oct. 1, 2015.

To apply for this post, follow the link provided to the job listing at Monash. Please arrange for three letters of reference to be sent to alexander.heger@monash.edu by the closing date.

Attention/Comments: For full application, please visit Monash web site at
http://jobs.monash.edu.au/jobDetails.asp?sJobIDs=528279
The application needs to be submitted through the online web form.

Weblink: http://jobregister.aas.org/job_view?JobID=49604

Email: alexander.heger@monash.edu

Deadline: Monday, 1 December 2014, 11:55pm Australian Eastern Daylight Saving Time (early morning hours in US).

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1 Postdoc and 2 PhD Positions at the University of Tübingen

Rolf Kuiper

Computational Physics^M
Institute of Astronomy and Astrophysics Tübingen^M
University of Tübingen^M
Auf der Morgenstelle 10^M
D-72076 Tübingen^M
Germany

The Institute of Astronomy and Astrophysics at the University of Tübingen (IAAT) has an opening for a Postdoc and two PhD positions within the Emmy Noether Research Group „Accretion flows and feedback in realistic models of massive star formation“.

The successful applicants will carry out original research in the field of Massive Star Formation working in the Emmy Noether group of Dr. Rolf Kuiper. Emphasis lies on the (radiation-/magneto-)hydrodynamical and chemical evolution of jets, outflows, and accretion disk around massive protostars. Applicants with previous experience in numerical modeling will be favored.

The research activities of the IAAT (http://www.tat.physik.uni-tuebingen.de) include Astronomy, Instrumental Design/ High Energy Physics, Computational Astrophysics and Relativistic Astrophysics. The focus of research of the Emmy Noether group lies in the field of massive star formation and the physics/chemistry of jets, outflows, and accretion disks.

The appointments are funded by the German Research Foundation (DFG) and paid according to German public service scale. Starting dates are negotiable. Applicants should check for details of the application procedure at links below.

The University of Tübingen seeks to increase the fraction of female scientists in research and teaching and particularly encourages applications from women. Disabled candidates are given preference if equally qualified.

For further enquires about the positions, please contact Rolf Kuiper (rolf.kuiper@uni-tuebingen.de).

Attention/Comments:

Weblink: http://www.mpia-hd.mpg.de/~kuiper

Email: rolf.kuiper@uni-tuebingen.de

Deadline: December, 15th for PhDs and January, 19th for Postdoc

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MEETINGS

The physics of evolved star:
A conference dedicated to the memory of Olivier Chesneau

June 8-12, 2015

Venue: Nice (France)

First announcement

As a talented scientist, animated with a constant passion for astronomy, Olivier Chesneau led pioneering works using visible and infrared long-baseline interferometry. Olivier used this technique to study disk formation around varied astrophysical objects, such as evolved massive stars, planetary nebulae, and novae. His foremost results include the study of the close environment of Eta Carinae and other massive stars, the first direct detection of disks in planetary nebulae, finding evidences of dust bipolar ejections by novae shortly after eruption, and the discovery of the largest yellow hypergiant star in the Milky Way. His results were often widely publicized through press releases from ESO and CNRS-INSU. The 2012 Michelson Prize of the International Astronomical Union and of Mount Wilson Institute was awarded to Olivier Chesneau for major contributions in stellar astrophysics made with long-baseline interferometry.

After his untimely departure several months ago, his friends and colleagues in Nice have decided to organize a conference that brings together experts in different fields to study the physics of evolved stars: this was Olivier's approach to tackle outstanding questions about these stars. The conference will concentrate on four different processes in evolved stars: mass loss, binarity, rotation, and astrochemistry (dust formation). Contributions are invited along these themes, from theory and numerical simulations to all observational approaches. Only two invited talks are planned to leave as much room as possible to individual contributions (oral and posters) and discussions.

The conference will be held on June 8-12, 2015, in Nice, France. Pre-registration is open (see instructions at olivier-chesneau.oca.eu) and please submit an abstract (even tentative) during registration. We expect the registration fee to be around 150 euros, and it could be waived for some students. Based on the proposed contributions received by 2014 December 15, a preliminary program will be established by the SOC and announced in early January 2015 with detailed information for registration.

Weblink: http://poe2015.sciencesconf.org/

Email: eric.lagadec@oca.eu

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Stellar Physics in Galaxies throughout the Universe

12 - 14 August 2015

Venue: Honolulu, Hawaii

A 3-day Focus Meeting entitled "Stellar Physics in Galaxies throughout the Universe" will be held during the IAU XXIX General Assembly. The meeting will bring together astronomers from the stellar physics, extragalactic astrophysics and cosmology communities to discuss how current and future results can foster progress in these disjoint science areas. Areas covered include stellar evolution of single and binary stars from the zero-age main-sequence to the terminal stage, the feedback of stars to the interstellar medium via radiation, dust production and chemical enrichment, and the properties of the most massive stars and of cosmologically significant stellar phases such as AGB and Wolf-Rayet stars. We will evaluate the limitations of our understanding of the physics of local stars and their effects on, e.g., ages, chemical composition and the initial mass function of galaxies at low to high redshift. The meeting is timely because of new results from recently commissioned telescopes and because of the prospects from future 30-m class telescopes.

Weblink: http://iau-fm7.stsci.edu

Email: leitherer@stsci.edu

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