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THE MASSIVE STAR NEWSLETTER

formerly known as the hot star newsletter

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Postdoc position in Theoretical Astrophysics

Meetings

International Workshop on Spectral Stellar Libraries - 3rd Edition

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News

IAU Symposia and Focus Meetings in 2018

Dear Members of IAU Commission on Massive Stars and Massive Star Newsletter subscribers,

You have probably already received a reminder for the submission of Letters of Interest for

- IAU Symposia in 2018
- IAU Focus Meetings in 2018

From the OC of the Massive Stars Commission we would like to encourage our members to submit proposals of interest for our community.
Below you find some useful information.

9 IAU Symposia will be selected for 2018, 6 of them for the IAU General Assembly in Vienna, 20-31 August 2018. About 15 IAU Focus Meetings (depending on schedule) will be selected, all of them to be held during the GA.

Letters of Intent are due by September, 15th, 2016.

Full proposals are due by December, 15th, 2016.

The electronic form for the submission is the same for Symposia and FM. For letters of interest, the link is:

http://www.iau.org/science/meetings/proposals/loi/

and for full proposals:

https://www.iau.org/science/meetings/proposals/lop/

Note that the LoI shall include the Coordinating Division, and that the President shall be contacted previously. All LoIs received by the deadline will be posted on the IAU web pages, allowing prospective proposers to consider possible collaboration or coordination before embarking in the preparation of the full-fledged proposal. After that, draft proposals should be submitted to Coordinating Divisions and other interested bodies (associated Divisions, Commissions and Working Groups) for advice and letters of endorsement, early enough to be included in the final form submitted to IAU.

Symposia held during the GA last for 3.5 days. Other IAU Symposia last for 5 days and cannot be held within 3 months of the GA. FMs last for 1-2 days.

You find all the information about IAU meetings in

http://www.iau.org/science/meetings/rules/

With best regards,
Artemio Herrero
on behalf of the OC of the IAU Commission G2 on Massive Stars

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PAPERS

Abstracts of 13 accepted papers

Sub-mm free-free emission from the winds of massive stars in the age of ALMA

S. Daley-Yates, I. R. Stevens, T. D. Crossland

University of Birmingham

The thermal radio and sub-mm emission from the winds of massive stars is investigated and the contribution to the emission due to the stellar wind acceleration region and clumping of the wind is quantified. Building upon established theory, a method for calculating the thermal radio and sub-mm emission using results for a line-driven stellar outflow according to Castor, Abbott & Klein (1975) is presented. The results show strong variation of the spectral index for 10 2 GHz < {\nu} < 10 4 GHz. This corresponds both to the wind acceleration region and clumping of the wind, leading to a strong dependence on the wind velocity law and clumping parameters. The Atacama Large Millimeter/sub-mm Array (ALMA) is the first observatory to have both the spectral window and sensitivity to observe at the high frequencies required to probe the acceleration regions of massive stars. The deviations in the predicted flux levels as a result of the inclusion of the wind acceleration region and clumping are sufficient to be detected by ALMA, through deviations in the spectral index in different portions of the radio/sub-mm spectra of massive stars, for a range of reasonable mass-loss rates and distances. Consequently both mechanisms need to be included to fully understand the mass-loss rates of massive stars.

Reference: arXiv:1608.08380v2
Status: Manuscript has been accepted

Weblink:

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Chandra View of Magnetically Confined Wind in HD191612: Theory versus Observations

Yael Naze (1), Asif ud-Doula (2), Svetozar A. Zhekov (3)

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High-resolution spectra of the magnetic star HD191612 were acquired using the Chandra X-ray observatory at both maximum and minimum emission phases. We confirm the flux and hardness variations previously reported with XMM-Newton, demonstrating the great repeatability of the behavior of HD191612 over a decade. The line profiles appear typical for magnetic massive stars: no significant line shift, relatively narrow lines for high-Z elements, and formation radius at about 2R*. Line ratios confirm the softening of the X-ray spectrum at the minimum emission phase. Shift or width variations appear of limited amplitude at most (slightly lower velocity and slightly increased broadening at minimum emission phase, but within 1--2 sigma of values at maximum). In addition, a fully self-consistent 3D magnetohydrodynamic (MHD) simulation of the confined wind in HD191612 was performed. The simulation results were directly fitted to the data leading to a remarkable agreement overall between them.

Reference: accepted by ApJ
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1608.08741

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Apsidal motion in the massive binary HD152218

Rauw G.(1), Rosu S.(1), Noels A.(1), Mahy L.(1), Schmitt J.H.M.M.(2), Godart M.(1); Dupret M.-A.(1), Gosset E.(1)

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Massive binary systems are important laboratories in which to probe the properties of massive stars and stellar physics in general. In this context, we analysed optical spectroscopy and photometry of the eccentric short-period early-type binary HD 152218 in the young open cluster NGC 6231. We reconstructed the spectra of the individual stars using a disentangling code. The individual spectra were then compared with synthetic spectra obtained with the CMFGEN model atmosphere code. We furthermore analysed the light curve of the binary and used it to constrain the orbital inclination and to derive absolute masses of 19.8 +/- 1.5 and 15.0 +/- 1.1 solar masses. Combining radial velocity measurements from over 60 years, we show that the system displays apsidal motion at a rate of (2.04^{+.23}_{-.24}) degree/year. Solving the Clairaut-Radau equation, we used stellar evolution models, obtained with the CLES code, to compute the internal structure constants and to evaluate the theoretically predicted rate of apsidal motion as a function of stellar age and primary mass. In this way, we determine an age of 5.8 +/- 0.6 Myr for HD 152218, which is towards the higher end of, but compatible with, the range of ages of the massive star population of NGC 6231 as determined from isochrone fitting.

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

Weblink: http://arxiv.org/abs/1609.02735

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Characterisation of red supergiants in the Gaia spectral range

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The infrared Calcium Triplet and its nearby spectral region have been used for spectral and luminosity classification of late-type stars, but the samples of cool supergiants (CSGs) used have been very limited (in size, metallicity range, and spectral types covered). The spectral range of the Gaia Radial Velocity Spectrograph (RVS) covers most of this region but does not reach the main TiO bands in this region, whose depths define the M sequence. We study the behaviour of spectral features around the Calcium Triplet and develop effective criteria to identify and classify CSGs, comparing their efficiency with other methods previously proposed. We measure the main spectral features in a large sample (almost 600) of CSGs from three different galaxies, and we analyse their behaviour through a principal component analysis. Using the principal components, we develop an automatised method to differentiate CSGs from other bright late-type stars, and to classify them. The proposed method identifies a high fraction of the supergiants (SGs) in our test sample, which cover a wide metallicity range (SGs from the SMC, the LMC, and the Milky Way) and with spectral types from G0 up to late-M. In addition, it is capable to separate most of the non-SGs in the sample, identifying as SGs only a very small fraction of them. A comparison of this method with other previously proposed shows that it is more efficient and selects less interlopers. A way to automatically assign a spectral type to the SGs is also developed. We apply this study to spectra at the resolution and spectral range of the Gaia RVS, with a similar success rate. The method developed identifies and classifies CSGs in large samples, with high efficiency and low contamination, even in conditions of wide metallicity and spectral-type ranges.

Reference: Astronomy & Astrophysics
Status: Manuscript has been accepted

Weblink: https://arxiv.org/abs/1609.04063

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On the existence of accretion-driven bursts in massive star formation

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Accretion-driven luminosity outbursts are a vivid manifestation of variable mass accretion onto protostars. They are known as the so-called FU Orionis phenomenon in the context of low-mass protostars. More recently, this process has been found in models of primordial star formation. Using numerical radiation hydrodynamics simulations, we stress that present-day forming massive stars also experience variable accretion and show that this process is accompanied by luminous outbursts induced by the episodic accretion of gaseous clumps falling from the circumstellar disk onto the protostar. Consequently, the process of accretion-induced luminous flares is also conceivable in the high-mass regime of star formation and we propose to regard this phenomenon as a general mechanism that can affect protostars regardless of their mass and/or the chemical properties of the parent environment in which they form. In addition to the commonness of accretion-driven outbursts in the star formation machinery, we conjecture that luminous flares from regions hosting forming high-mass star may be an observational implication of the fragmentation of their accretion disks.

Reference: MNRAS Letters (2016) doi: 10.1093/mnrasl/slw187
Status: Manuscript has been accepted

Weblink: http://mnrasl.oxfordjournals.org/content/early/2016/09/15/mnrasl.slw187.abstract

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Bow shock nebulae of hot massive stars in a magnetized medium

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A significant fraction of OB-type, main-sequence massive stars are classified as run-away and move supersonically through the interstellar medium (ISM). Their strong stellar winds interact with their surroundings where the typical strength of the local ISM magnetic field is about 3.5-7 microG, which can result in the formation of bow shock nebulae. We investigate the effects of such magnetic fields, aligned with the motion of the flow, on the formation and emission properties of these circumstellar structures. Our axisymmetric, magneto-hydrodynamical simulations with optically-thin radiative cooling, heating and anisotropic thermal conduction show that the presence of the background ISM magnetic field affects the projected optical emission our bow shocks at Ha and [OIII] lambda 5007 which become fainter by about 1-2 orders of magnitude, respectively. Radiative transfer calculations against dust opacity indicate

that the magnetic field slightly diminishes their projected infrared emission and that our bow shocks emit brightly at 60 micron. This may explain why the bow shocks generated by ionizing runaway massive stars are often difficult to identify. Finally, we discuss our results in the context of the bow shock of Zeta Ophiuchi and we support the interpretation of its imperfect morphology as an evidence of the presence of an ISM magnetic field not aligned with the motion of its driving star.

Reference: doi: 10.1093/mnras/stw2537
Status: Manuscript has been accepted

Weblink: http://mnras.oxfordjournals.org/content/early/2016/10/05/mnras.stw2537.abstract?keytype=ref&ijkey=uLtsP0ASPYyc8RF

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A close encounter of the massive kind

J. Maíz Apellániz, H. Sana, R. H. Barbá, J.-B. Le Bouquin, & R. C. Gamen

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We have used (a) HST ACS imaging and STIS spectroscopy, (b) ground-based PIONIER/VLT long-baseline interferometry, and (c) ground-based spectroscopy from different instruments to study the orbit of the extreme multiple system HD 93 129 Aa,Ab, which is composed of (at least) two very massive stars in a long-period orbit with e>0.92 that will pass through periastron in 2017/2018. In several ways, the system is an eta Car precursor. Around the time of periastron passage the two very strong winds will collide and generate an outburst of non-thermal hard X-ray emission without precedent in an O+O binary since astronomers have been able to observe above Earth's atmosphere. A coordinated multiwavelength monitoring in the next two years will enable a breakthrough understanding of the wind interactions in such extreme close encounters. Furthermore, we have found evidence that HD 93 129 Aa may be a binary system itself. In that case, we could witness a three-body interaction that may yield a runaway star or a stellar collision close to or shortly after the periastron passage. Either of those outcomes would be unprecedented, as they are predicted to be low-frequency events in the Milky Way.

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

Weblink: https://arxiv.org/abs/1609.08521

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VLTI/AMBER spectro-interferometry of the late-type supergiants V766 Cen (=HR 5171 A), sigma Oph, BM Sco, and HD 206859

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Aims: We add four warmer late-type supergiants to our previous spectro-interferometric studies of red giants and supergiants.
Methods: We measure the near-continuum angular diameter, derive fundamental parameters, discuss the evolutionary stage, and study extended atmospheric atomic and molecular layers.
Results: V766 Cen (=HR 5171 A) is found to be a high-luminosity (log L/L_sun=5.8+-0.4) source of effective temperature 4290+-760 K and radius 1490+-540 R_sun, located in the Hertzsprung-Russell (HR) diagram close to both the Hayashi limit and Eddington limit; this source is consistent with a 40 M_sun evolutionary track without rotation and current mass 27-36 M_sun. V766 Cen exhibits NaI in emission arising from a shell of radius 1.5 R_Phot and a photocenter displacement of about 0.1 R_Phot. It shows strong extended molecular (CO) layers and a dusty circumstellar background component. The other three sources are found to have lower luminosities of about log L/L_sun=3.4-3.5, corresponding to 5-9 M_sun evolutionary tracks. They cover effective temperatures of 3900 K to 5300 K and radii of 60-120 R_sun. They do
not show extended molecular layers as observed for higher luminosity red supergiants of our sample. BM Sco shows an unusually strong contribution by an over-resolved circumstellar dust component.
Conclusions: V766 Cen is a red supergiant located close to the Hayashi limit instead of a yellow hypergiant already evolving back toward warmer effective temperatures as discussed in the literature. Our observations of the NaI line and the extended molecular layers suggest an optically thick pseudo-photosphere at about 1.5 R_Phot at the onset of the wind. The stars sigma Oph, BM Sco, and HD 206859 are more likely high-mass red giants instead of red supergiants as implied by their luminosity class Ib. This leaves us with an unsampled locus in the HR diagram corresponding to luminosities log L/L_sun of 3.8-4.8 or masses 10-13 M_sun, possibly corresponding to the mass region where stars explode as (type II-P) supernovae during the red supergiant stage. With V766 Cen, we now confirm that our previously found relation of increasing strength of extended molecular layers with increasing luminosities extends to double our previous luminosities and up to the Eddington limit. This might further point to steadily increasing radiative winds with increasing luminosity.

Reference: Astronomy & Astrophysics (A&A), accepted
arXiv:1610.01927
Status: Manuscript has been accepted

Weblink: http://adsabs.harvard.edu/abs/2016arXiv161001927W

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A new prescription for the mass-loss rates of WC and WO stars

F. Tramper, H. Sana, A. de Koter

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We present a new empirical prescription for the mass-loss rates of carbon and oxygen sequence Wolf-Rayet stars as a function of their luminosity, surface chemical composition, and initial metallicity. The new prescription is based on results of detailed spectral analyses of WC and WO stars, and improves the often applied Nugis & Lamers (2000) relation. We find that the mass-loss rates of WC and WO stars (with $X=0$ and $Y < 0.98$) can be expressed as $\log{\dot{M}} = -9.20 + 0.85\log{(L/L_{\odot})} + 0.44\log{Y} + 0.25\log{(Z_{\mathrm{Fe}}/Z_{\mathrm{Fe}, \odot})}$. This relation is based on mass-loss determinations that assume a volume-filling factor of 0.1, but the prescription can easily be scaled to account for other volume-filling factors. The residual of the fit is $\sigma = 0.06$ dex. We investigated whether the relation can also describe the mass loss of hydrogen-free WN stars and showed that it can when an adjustement of the metallicty dependence ($\log{\dot{M}} \propto 1.3\log{(Z_{\mathrm{Fe}}/Z_{\mathrm{Fe}, \odot})}$) is applied. Compared to Nugis & Lamers (2000), $\dot{M}$ is less sensitive to the luminosity and the surface abundance, implying a stronger mass loss of massive stars in their late stages of evolution. The modest metallicity dependence implies that if WC or WO stars are formed in metal deficient environments, their mass-loss rates are higher than currently anticipated. These effects may result in a larger number of type Ic supernovae and less black holes to be formed, and may favour the production of superluminous type Ic supernovae through interaction with C and O rich circumstellar material or the dense stellar wind.

Reference: ApJ
Status: Manuscript has been accepted

Weblink: https://arxiv.org/abs/1610.03800

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Protostellar Outflows and Radiative Feedback from Massive Stars. II. Feedback, Star Formation Efficiency, and Outflow Broadening

Rolf Kuiper, Neal J. Turner, Harold W. Yorke

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We perform two-dimensional axially symmetric radiation-hydrodynamic simulations to assess the impact of outflows and radiative force feedback from massive protostars by varying when the protostellar outflow starts, the ratio of ejection to accretion rates, and the strength of the wide angle disk wind component. The star formation efficiency, i.e. the ratio of final stellar mass to initial core mass, is dominated by radiative forces and the ratio of outflow to accretion rates. Increasing this ratio has three effects: First, the protostar grows slower with a lower luminosity at any given time, lowering radiative feedback. Second, bipolar cavities cleared by the outflow are larger, further diminishing radiative feedback on disk and core scales. Third, the higher momentum outflow sweeps up more material from the collapsing envelope, decreasing the protostar's potential mass reservoir via entrainment. The star formation efficiency varies with the ratio of ejection to accretion rates from 50% in the case of very weak outflows to as low as 20% for very strong outflows. At latitudes between the low density bipolar cavity and the high density accretion disk, wide angle disk winds remove some of the gas, which otherwise would be part of the accretion flow onto the disk; varying the strength of these wide angle disk winds, however, alters the final star formation efficiency by only ±6%. For all cases, the opening angle of the bipolar outflow cavity remains below 20 degree during early protostellar accretion phases, increasing rapidly up to 65 degree at the onset of radiation pressure feedback.

Reference: Kuiper, Turner, & Yorke (2016), eprint arXiv:1609.05208
Status: Manuscript has been accepted

Weblink: http://adsabs.harvard.edu/abs/2016arXiv160905208K

Comments: accepted for publication at ApJ

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Modeling the early evolution of massive OB stars with an experimental wind routine. The first bi-stability jump and the angular momentum loss problem

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Context. Stellar evolution models of massive stars are very sensitive to the adopted mass-loss scheme. The magnitude and evolution of mass-loss rates significantly affect the main sequence evolution, and the properties of post-main sequence objects, including their rotational velocities.

Aims. Driven by potential discrepancies between theoretically predicted and observationally derived mass-loss rates in the OB star range, we particularly aim to investigate the response to mass-loss rates that are lower than currently adopted, in parallel with the mass-loss behavior at the ``first'' bi-stability jump.

Methods. We perform 1D hydrodynamical model calculations of single $20 - 60 \, M_{\odot}$ Galactic ($Z = 0.014$) stars where the effects of stellar winds are already significant during the main sequence phase. We develop an experimental wind routine to examine the behavior and response of the models under the influence of different mass-loss rates. This observationally guided, simple and flexible wind routine is not a new mass-loss description but a useful tool based on the Wind-momentum Luminosity Relation and other scaling relations, and provides a meaningful base for various tests and comparisons.

Results. The main result of this study indicates a dichotomy when accounting for currently debated problems regarding mass-loss rates of hot massive stars. In a fully diffusive approach, and for commonly adopted initial rotational velocities, lower mass-loss rates than theoretically predicted require to invoke an additional source of angular momentum loss (either due to bi-stability braking, or yet unidentified) to brake down surface rotational velocities. On the other hand, a large jump in the mass-loss rates due to the bi-stability mechanism (a factor 5 - 7 predicted by Vink et al. (2000, Astronomy \& Astrophysics, 362, 295), but a factor 10 - 20 in modern models of massive stars) is challenged by observational results, and might be avoided if the early mass-loss rates agreed with the theoretically predicted values.

Conclusions. We conclude that simultaneously adopting lower mass-loss rates and a significantly smaller jump in the mass-loss rates over the bi-stability region (both compared to presently used prescriptions) would require an additional mechanism for angular momentum loss to be present in massive stars. Otherwise, the observed rotational velocities of a large population of B supergiants, that are thought to be the evolutionary descendants of O stars, would remain unexplained.

Reference: Astronomy & Astrophysics. astro-ph:1610.04812
Status: Manuscript has been accepted

Weblink: https://arxiv.org/abs/1610.04812

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A propelling neutron star in the enigmatic Be-star gamma Cassiopeia

K. Postnov, L. Oskinova, J. M. Torrejon

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The enigmatic X-ray emission from the bright optical star, gamma Cassiopeia, is a long-standing problem. gamma Cas is known to be a binary system consisting of a Be-type star and a low-mass (M~1Msun) companion of unknown nature orbiting in the Be-disk plane. Here we apply the quasi-spherical accretion theory onto a compact magnetized star and show that if the low-mass companion of gamma Cas is a fast spinning neutron star, the key observational signatures of gamma Cas are remarkably well reproduced. Direct accretion onto this fast rotating neutron star is impeded by the propeller

mechanism. In this case, around the neutron star magnetosphere a hot shell is formed that emits thermal X-rays in qualitative and quantitative agreement with observed properties of the X-ray emission from gamma Cas. We suggest that gamma Cas and its analogs constitute a new subclass of Be-type X-ray binaries hosting rapidly rotating neutron stars formed in supernova explosions with small kicks. The subsequent evolutionary stage of gamma Cas and its analogs should be the X Per-type binaries comprising low-luminosity slowly rotating X-ray pulsars. The model explains the enigmatic X-ray emission from gamma Cas, and also establishes evolutionary connections between various types of rotating magnetized neutron stars in Be-binaries.

Reference: MNRAS
Status: Manuscript has been accepted

Weblink: https://arxiv.org/abs/1610.07799

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The Tarantula Massive Binary Monitoring project: II. A first SB2 orbital and spectroscopic analysis for the Wolf-Rayet binary R145

T. Shenar, N. D. Richardson, D. P. Sablowski, R. Hainich, H. Sana, A. F. J. Moffat, H. Todt, W.-R. Hamann, L. M. Oskinova, A. Sander, F. Tramper, N. Langer, A. Z. Bonanos, S. E. de Mink, G. Graefener, P. A. Crowther, J. S. Vink, L. A. Almeida, A. de Koter, R. Barba, A. Herrero, K. Ulaczyk

University of Potsdam

We present the first SB2 orbital solution and disentanglement of the massive Wolf-Rayet binary R145 (P = 159d) located in the Large Magellanic Cloud. The primary was claimed to have a stellar mass greater than 300Msun, making it a candidate for the most massive star known. While the primary is a known late type, H-rich Wolf-Rayet star (WN6h), the secondary could not be so far unambiguously detected. Using moderate resolution spectra, we are able to derive accurate radial velocities for both components. By performing simultaneous orbital and polarimetric analyses, we derive the complete set of orbital parameters, including the inclination. The spectra are disentangled and spectroscopically analyzed, and an analysis of the wind-wind collision zone is conducted.
The disentangled spectra and our models are consistent with a WN6h type for the primary, and suggest that the secondary is an O3.5 If*/WN7 type star. We derive a high eccentricity of e = 0.78 and minimum masses of M1 sin^3 i ~ M2 sin^3 i ~ 13 +- 2 Msun, with q = M2 / M1 = 1.01 +- 0.07. An analysis of emission excess stemming from a wind-wind collision yields a similar inclination to that obtained from polarimetry (i = 39 +- 6deg). Our analysis thus implies M1 = 53^{+40}_{-20} and M2 = 54^{+40}_{-20} Msun, excluding M1 > 300Msun. A detailed comparison with evolution tracks calculated for single and binary stars, as well as the high eccentricity, suggest that the components of the system underwent quasi-homogeneous evolution and avoided mass-transfer. This scenario would suggest current masses of ~ 80 Msun and initial masses of Mi,1 ~ 105 and Mi,2 ~ 90Msun, consistent with the upper limits of our derived orbital masses, and would imply an age of ~2.2 Myr.

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

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Abstracts of 1 submitted papers

3D Hydrodynamic Simulations of Carbon Burning in Massive Stars

Andrea Cristini (1), Casey Meakin (2,3,4), Raphael Hirschi (1,5), David Arnett (2), Cyril Georgy (1,6), Maxime Viallet (7)

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We present the first detailed three-dimensional (3D) hydrodynamic implicit large eddy simulations of turbulent convection of carbon burning in massive stars. The simulations start with initial radial profiles mapped from a carbon burning shell within a 15 solar mass 1D stellar evolution model. We consider 4 resolutions from 128^3 to 1024^3 zones. The turbulent flow properties of these carbon burning simulations are very similar to the oxygen burning case. We performed a mean field analysis of the kinetic energy budgets within the Reynolds-averaged Navier-Stokes framework. For the upper convective boundary region, we find that the inferred numerical dissipation is insensitive to resolution for linear mesh resolutions between 512 and 1,024 grid points. For the stiffer and more stratified lower boundary, our highest resolution model still shows signs of decreasing dissipation suggesting that it is not yet fully resolved numerically. We estimate the widths of the upper and lower boundaries to be roughly 30% and 10% of the local pressure scale heights, respectively. The shape of the boundaries is significantly different from those used in stellar evolution models, which assume strict Ledoux or Schwarzschild boundaries. Entrainment rates derived for the carbon shell are consistent with those derived for the oxygen shells and with the entrainment law commonly used in the meteorological and atmosphere science communities. The entrainment rate is roughly inversely proportional to the bulk Richardson number. We thus suggest the use of the bulk Richardson number as a means to apply the results of 3D hydrodynamics simulations to 1D stellar evolution modelling.

Reference: MN-16-3621-MJ
Status: Manuscript has been submitted

Weblink: https://arxiv.org/abs/1610.05173

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Abstracts of 1 conference proceedings

Evolution of intermediate mass and massive binary stars: physics, mass loss, and rotation.

Dany Vanbeveren & Nicki Mennekens

Vrije Universiteit Brussels, Belgium

In the present review we discuss the past and present status of the interacting OB-type binary frequency. We critically examine the popular idea that Be-stars and supergiant sgB[e] stars are binary evolutionary products. The effects of rotation on stellar evolution in general, stellar population studies in particular, and the link with binaries will be evaluated. Finally a discussion is presented of massive double compact star binary mergers as possible major sites of chemical enrichment of r-process elements and as the origin of recent aLIGO GW events.

Reference: Invited paper to appear in the proceedings of the June 2016 conference 'The B[e] Phenomenon: Forty Years of Studies'.
Status: Conference proceedings

Weblink: arXiv: 1609.02401

Comments:

Email: dvbevere@vub.ac.be

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Closed Job Offers (original deadline passed)

Postdoc position in Sheffield: Massive Stars in Starburst Galaxies

Prof Paul Crowther

Dept of Physics & Astronomy, University of Sheffield, Sheffield, S3 7RH, UK

Postdoc position to work on a STFC-funded project entitled “Massive Stars in Starburst Regions” with Prof Paul Crowther to support an observational programme based upon ground- and space-based datasets from VLT, HST and Chandra. Key questions to be addressed involve the contribution of individual stars to the integrated light in starburst regions, the binary fraction of massive stars in starburst regions and the origin of very massive stars.

You will take a lead role in the analysis of existing spectroscopic datasets, and should have a PhD in astrophysics or a closely related field. Preference will be given to applicants with observational or theoretical experience in one or more of the following fields: stellar atmospheres, evolution of massive stars, young star clusters. A good track record of published research is also expected.

Attention/Comments: The post is fixed-term for 17 months from January 2017 in the first instance. Job Reference UOS014506

Weblink: http://www.sheffield.ac.uk/jobs

Email: Paul.crowther@sheffield.ac.uk

Deadline: 31 Oct 2016

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Postdoc position in Theoretical Astrophysics

Raphael Hirschi

Keele University, UK

Fixed Term for 6 months

Keele University wishes to appoint a Research Associate in order to conduct research on theoretical stellar astrophysics.
The appointed Research Associate will work in the group of Dr Raphael Hirschi within the Astrophysics Group at Keele University as part of an ERC-funded project entitled "Stellar HYdrodynamics, Nucleosynthesis and Evolution" (SHYNE). The ERC starting grant awarded to Dr Hirschi provides funding for a dedicated 1000+-CPU-core computer cluster, including 288 CPU-cores sharing memory via numascale technology.

You will lead the component of this project related to 3D-1D modelling of stellar interiors. This will include a range of computer simulations including 1D stellar evolution and 3D hydrodynamics simulations with as main goal to improve modelling of convection and rotation in stellar evolution. The PDRA will also contribute to the other components of the project and be encouraged to develop their own research program and their leadership skills.

Applicants should have or expect to obtain a PhD in theoretical stellar astrophysics or a related area and should have a demonstrated aptitude for research. Experience in stellar evolution modelling, 3D hydrodynamic simulations or parallel programming (CUDA/MPI/OpenMP) is highly desirable.

For more details of this post and the Keele Astrophysics Group, and for information on how to apply, see http://www.astro.keele.ac.uk.

For further enquiries please contact Dr Raphael Hirschi at r.hirschi@keele.ac.uk.

Attention/Comments:

Weblink: http://www.astro.keele.ac.uk/shyne

Email: r.hirschi@keele.ac.uk

Deadline: 31 October 2016

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MEETINGS

International Workshop on Spectral Stellar Libraries - 3rd Edition

6th to 10th Feb 2017

Venue: Campos do Jordao, Brazil

Libraries of stellar spectra play an important role in different fields of astrophysics. They can serve as reference for the classification and automatic analysis of large stellar spectroscopic surveys, or be employed in the spectral modelling of galaxies, among other applications. These libraries may either consist of observed or theoretical spectra, and vary by their wavelength coverage, parameter space domain and resolution.

The goals of this workshop are to present the recent efforts in this area, in particular in four domains: Stellar Libraries as Templates for Stars, SLs for Chemical Evolution, SLs for Stellar Population studies and SLs in the Big Data Era.

This is the 3rd Edition of this workshop, following the editions in Delhi in 2011 and Lyon in 2013.

Registration is now open. For more information, please visit https://sites.google.com/site/iwssl2017/

Weblink: https://sites.google.com/site/iwssl2017/

Email: pcoelho@usp.br

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