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THE MASSIVE STAR NEWSLETTER

formerly known as the hot star newsletter

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News

Gaia Data Access: Usage Scenarios: Request for Input from the Community

As announced and discussed at the GREAT Plenary Meeting PM4 in Brussels (http://great.ast.cam.ac.uk/Greatwiki/GreatMeet-20110621) - the Gaia Archive Preparation group and Gaia Science Team are currently in the process of refining the requirements for the access to the Gaia Data Products.

From this, the Gaia DPAC (http://www.rssd.esa.int/gaia/dpac) will be implementing the systems required to give access to the rich Gaia data products, through the Gaia Archive.

The pages at http://great.ast.cam.ac.uk/Greatwiki/GaiaDataAccess provide public information as to the nature of Gaia data, the planning and development of the Gaia archive and access systems, and give a chance for the community to participate in the development process, through for instance providing

example science scenarios for how they might wish to utilise and access the data.

If you wish to add your 'use cases' describing how you would wish to access Gaia Data - then please visit http://great.ast.cam.ac.uk/Greatwiki/GaiaDataAccess and add your data access scenario(s) to one of the topic areas:

* GDAS-BR: Browsing and qualitative exploration: including simple usages of first-time users
* GDAS-SA: Science alerts
* GDAS-ED: Early data access: thus access to data from the first releases
* GDAS-EG: Extra Galactic science
* GDAS-GA: Galactic science
* GDAS-ST: Stars and Stellar Physics science
* GDAS-SO: Solar System science
* GDAS-FP: Fundamental Physics science
* GDAS-PR: Public outreach for the non-astronomer/non-scientist
* GDAS-OA: Other and advanced usage scenarios

Those usage scenarios received before *Thursday 25 Nov 2011* will receive full consideration when developing the technical requirements for the development of the Gaia Archive.

We encourage you to add your use cases, and comments, to help us ensure that the best possible Gaia archive is developed.

Yours,

Nicholas Walton, Timo Prusti, Francois Mignard

(GREAT co-chair/ Gaia Project Scientist/ DPACE Chair)

Weblink: http://great.ast.cam.ac.uk/Greatwiki/GaiaDataAccess

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PAPERS

Abstracts of 22 accepted papers

A Third Massive Star Component in the sigma Orionis AB System

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We report on the detection of a third massive star component in the σ Orionis AB system, traditionally considered as a binary system. The system has been monitored by the IACOB Spectroscopic Survey of

Northern Massive Stars program, obtaining 23 high-resolution FIES@NOT spectra with a time span of ~2.5 years. The analysis of the radial velocity curves of the two spectroscopic components observed in the spectra has allowed us to obtain the orbital parameters of the system, resulting in a high eccentric orbit (e ~ 0.78) with an orbital period of 143.5 ± 0.5 days. This result implies the actual presence of three stars in the σ Orionis AB system when combined with previous results obtained from the study of the astrometric orbit (with an estimated period of ~157 years).

Reference: 2011, ApJ, 742, 55S
Status: Manuscript has been accepted

Weblink: http://adsabs.harvard.edu/abs/2011ApJ...742...55S

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The Photometric and Spectral Evolution of the 2008 Luminous Optical Transient in NGC 300

Roberta M. Humphreys (1), Howard E. Bond (2) Luigi R. Bedin, (3) Alceste Z. Bonanos (4), Kris Davidson (1), L. A. G. Berto Monard (5), Jose L. Prieto (6), and Frederick M. Walter (7)

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The 2008 optical transient in NGC 300 is one of a growing class of intermediate-luminosity transients that brighten several orders ofmagnitude from a previously optically obscured state. The origin of their eruptions is not understood. Our multi-wavelength photometry and spectroscopy
from maximum light to more than a year later provide a record of its post-eruption behavior. We describe its changing spectral-energy distribution, the evolution of its absorption- and emission line-spectrum, the development of a bipolar outflow, and the rapid transition from a dense wind to an optically thin ionized wind. In addition to strong, narrow hydrogen lines, the F-type
absorption-line spectrum of the transient is characterized by strong Ca II and [Ca II] emission. The very broad wings of the Ca II
triplet and the asymmetric [Ca II] emission lines are due to strong Thomson scattering in the expanding ejecta. Post-maximum, the hydrogen and Ca II lines developed double-peaked emission profiles that we attribute to a bipolar outflow. Between approximately 60 and 100 days after maximum, the F-type absorption spectrum, formed in its dense wind, weakened and the wind became transparent to ionizing radiation. We discuss the probable evolutionary state of the transient and similar objects such as SN~2008S, and conclude thatthey were most likely post-red supergiants or post-AGB stars on a blue loop to warmer temperatures when the eruption occurred. These objects are not LBVs.

Reference: Asreophysical Journal
Status: Manuscript has been accepted

Weblink: arXiv:1109.5131

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A generalised porosity formalism for isotropic and anisotropic effective opacity and its effects on X-ray line attenuation in clumped O star winds

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We present a generalised formalism for treating the porosity-associated reduction in continuum opacity that occurs when individual clumps in a stochastic medium become optically thick. As in previous work, we concentrate on developing bridging laws between the limits of optically thin and thick clumps. We consider geometries resulting in either isotropic or anisotropic effective opacity, and, in addition to an idealised model in which all clumps have the same local overdensity and scale, we also treat an ensemble of clumps with optical depths set by Markovian statistics. This formalism is then applied to the specific case of bound-free absorption of X-rays in hot star winds, a process not directly affected by clumping in the optically thin limit. We find that the Markov model gives surprisingly similar results to those found previously for the single clump model, suggesting that porous opacity is not very sensitive to details of the assumed clump distribution function. Further, an anisotropic effective opacity favours escape of X-rays emitted in the tangential direction (the `venetian blind' effect), resulting in a 'bump' of higher flux close to line centre as compared to profiles computed from isotropic porosity models. We demonstrate how this characteristic line shape may be used to diagnose the clump geometry, and we confirm previous results that for optically thick clumping to significantly influence X-ray line profiles, very large porosity lengths, defined as the mean free path between clumps, are required. Moreover, we present the first X-ray line profiles computed directly from line-driven instability simulations using a 3-D patch method, and find that porosity effects from such models also are very small. This further supports the view that porosity has, at most, a marginal effect on X-ray line diagnostics in O stars, and therefore that these diagnostics do indeed provide a good `clumping insensitive' method for deriving O star mass-loss rates.

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Weblink: http://arxiv.org/abs/1111.1762

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Near- and Mid-Infrared colors of evolved stars in the Galactic plane. The Q1 and Q2 parameters.

Maria Messineo, Karl Menten, Ed Churchwell, and Harm Habing

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Mass-loss from evolved stars chemically enriches the interstellar medium (ISM). Stellar winds from massive stars and their explosions as supernovae shape the ISM
and trigger star formation. Studying evolved stars is fundamental for understanding galaxy formation and evolution at any redshift.
We aim to establish a photometric classification scheme for Galactic mass-losing evolved stars (e.g., WR, RSG, and AGB stars) with the goal of identifying new ones, and subsequently to use these samples as tracers of Galactic structure.
We searched for counterparts of known Galactic WR, LBV, RSG, and O-rich AGB stars in the 2MASS, GLIMPSE, and MSX catalogs, and we analyzed their properties with near- and mid-infrared color-color diagrams.
We used the Q1 parameter, which is a measure of the deviation from the interstellar reddening vector in the J-H versus H-Ks diagram, and we defined a new parameter, Q2, which is a measure of the deviation from the interstellar reddening vector in the J-Ks versus Ks-[8.0] diagram. The latter plane enables to distinguish between interstellar and circumstellar reddening, and to identify stars with circumstellar envelopes. WR stars and late-type mass-losing stars (AGBs and RSGs) are distributed in two different regions of the $Q1$ versus Ks-[8.0] diagram. A sequence of increasing [3.6]-[4.5] and [3.6]-[8.0] colors with increasing pulsation amplitudes (SRs, Miras, and OH/IR stars) is found. Spectra of Miras and OH/IR stars have stronger water absorption at 3.0 um than SR stars or most of the RSGs. Masing Miras stars have water, but stronger SiO (~ 4 um) and CO2 absorption (~ 4.25 um), as
suggested by their [3.6]-[4.5] colors, bluer than those of non masing stars. A fraction of RSGs (22%) have the bluest [3.6]-[4.5] colors, but small Q2 values. We propose a new set of photometric criteria to distinguish among IR bright Galactic stars.
The GLIMPSE catalog is a powerful tool for photometric classification of Galactic mass-losing evolved stars. Our new criteria will yield many new RSGs and WRs.

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Status: Manuscript has been accepted

Weblink: http://www.aanda.org/articles/aa/pdf/forth/aa17772-11.pdf

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Constraining the Absolute Orientation of Eta Carinae's Binary Orbit: A 3-D Dynamical Model for the Broad [Fe III] Emission

Thomas I. Madura(1), Theodore R. Gull(2), Stanley P. Owocki(3), Jose H. Groh(1), Atsuo T. Okazaki(4), and Christopher M. P. Russell(3)

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We present a three-dimensional (3-D) dynamical model for the broad [Fe III] emission observed in Eta Carinae using the Hubble Space Telescope/Space Telescope Imaging Spectrograph (HST/STIS). This model is based on full 3-D Smoothed Particle Hydrodynamics (SPH) simulations of Eta Car's binary colliding winds. Radiative transfer codes are used to generate synthetic spectro-images of [Fe III] emission line structures at various observed orbital phases and STIS slit position angles (PAs). Through a parameter study that varies the orbital inclination i, the PA (theta) that the orbital plane projection of the line-of-sight makes with the apastron side of the semi-major axis, and the PA on the sky of the orbital axis, we are able, for the first time, to tightly constrain the absolute 3-D orientation of the binary orbit. To simultaneously reproduce the blue-shifted emission arcs observed at orbital phase 0.976, STIS slit PA = +38 degrees, and the temporal variations in emission seen at negative slit PAs, the binary needs to have an i ~ 130 to 145 degrees, theta ~ -15 to +30 degrees, and an orbital axis projected on the sky at a PA ~ 302 to 327 degrees east of north. This represents a system with an orbital axis that is closely aligned with the inferred polar axis of the Homunculus nebula, in 3-D. The companion star, Eta B, thus orbits clockwise on the sky and is on the observer's side of the system at apastron. This orientation has important implications for theories for the formation of the Homunculus and helps lay the groundwork for orbital modeling to determine the stellar masses.

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Status: Manuscript has been accepted

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Imaging the time evolution of Eta Carinae's colliding winds with HST

Theodore R. Gull, Thomas I. Madura, Jose H. Groh and Michael F. Corcoran

A: NASA/GSFC, B,C: MPIR, D: CRESST & NASA/GSFC

We report new HST/STIS observations that map the high-ionization forbidden line emission in the inner arcsecond of Eta Car, the first that fully image the extended wind-wind interaction region of the massive colliding wind binary. These observations were obtained after the 2009.0 periastron at orbital phases 0.084, 0.163, and 0.323 of the 5.54-year spectroscopic cycle. We analyze the variations in brightness and morphology of the emission, and find that blue-shifted emission (−400 to −200 km s−1) is symmetric and elongated along the northeast-southwest axis, while the red-shifted emission (+100 to +200 km s−1) is asymmetric and extends to the north- northwest. Comparison to synthetic images generated from a 3-D dynamical model strengthens the 3-D orbital orientation found by Madura et al. (2011), with an inclination i ≈ 138◦, argument of periapsis ω ≈ 270◦, and an orbital axis that is aligned at the same PA on the sky as the symmetry axis of the Homunculus, 312◦. We discuss the potential that these and future mappings have for constraining the stellar parameters of the companion star and the long-term variability of the system.

Reference: ApJ 743, L3

Status: Manuscript has been accepted

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Recurrent dust formation by WR 48a on a 30-year timescale

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We present infrared photometry of the WC8 Wolf-Rayet system WR 48a observed with telescopes at ESO, the SAAO and the AAT between 1982 and 2011 which show a slow decline in dust emission from the previously reported outburst in 1978--79 until about 1997, when significant dust emission was still evident. This was followed by a slow rise, accelerating to reach and overtake the first (1978) photometry, demonstrating that the outburst observed in 1978--79 was not an isolated event, but that they recur at intervals of 32+ years. This suggests that WR 48a is a long-period dust maker and colliding-wind binary (CWB). The locus of WR 48a in the (H-L), K colour-magnitude diagram implies that the rate of dust formation fell between 1979 and about 1997 and then increased steadily until 2011. Superimposed on the long-term variation are secondary (`mini') eruptions in (at least) 1990, 1994, 1997, 1999 and 2004, characteristic of relatively brief episodes of additional dust formation. Spectra show evidence for an Oe or Be companion to the WC8 star, supporting
the suggestion that WR 48a is a binary system and indicating a system luminosity consistent with the association of WR 48a and the young star clusters Danks 1 and Danks 2. The range of dust formation suggests that these stars are in an elliptical orbit having e ~ 0.6. The size of the orbit implied by the minimum period, together with the WC wind velocity and likely mass-loss rate, implies that the post-shock WC wind is adiabatic throughout the orbit -- at odds with the observed dust formation. A similar conflict is observed in the `pinwheel' dust-maker WR 112.

Reference: MNRAS
Status: Manuscript has been accepted

Weblink: http://www.roe.ac.uk/~pmw/WR48a3.pdf

Comments:

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He II 4686 in eta Carinae: collapse of the wind-wind collision region during periastron passage

M. Teodoro (1), A. Damineli (1), J. I. Arias (2), F. X. de Araújo (3 and 4), R. H. Barbá (5), M. F. Corcoran (6), M. Borges Fernandes (3), E. Fernández-Lajús (7 and 8), L. Fraga (9), R. C. Gamen (7 and 8), J. F. González (5), J. H. Groh (10), J. L. Marshall (11), P. J. McGregor (12), N. Morrell (13), D. C. Nicholls (12), E. R. Parkin (12), C. B. Pereira (3), M. M. Phillips (13), G. R. Solivella (7 and 8), J. E. Steiner (1), M. Stritzinger (14 and 15), I. Thompson (16), C. A. O. Torres (17), M. A. P. Torres (18 and 19), M. I. Zevallos-Herencia (3)

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The periodic spectroscopic events in eta Carinae are now well established and occur near the periastron passage of two massive stars in a very eccentric orbit. Several mechanisms have been proposed to explain the variations of different spectral features, such as an eclipse by the wind-wind collision boundary, a shell ejection from the primary star or accretion of its wind onto the secondary. All of them have problems explaining all the observed phenomena. To better understand the nature of the cyclic events, we performed a dense monitoring of eta Carinae with 5 Southern telescopes during the 2009 low excitation event, resulting in a set of data of unprecedented quality and sampling. The intrinsic luminosity of the He II 4686 emission line (L~310 Lsun) just before periastron reveals the presence of a very luminous transient source of extreme UV radiation emitted in the wind-wind collision (WWC) region. Clumps in the primary's wind probably explain the flare-like behavior of both the X-ray and He II 4686 light-curves. After a short-lived minimum, He II 4686 emission rises again to a new maximum, when X-rays are still absent or very weak. We interpret this as a collapse of the WWC onto the "surface" of the secondary star, switching off the hard X-ray source and diminishing the WWC shock cone. The recovery from this state is controlled by the momentum balance between the secondary's wind and the clumps in the primary's wind.

Reference: Accepted for publication in The Astrophysical Journal.
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Comments: Two-column style; 18 pages, 10 figures, and 1 table.

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He II 4686 in eta Carinae: collapse of the wind-wind collision region during periastron passage

M. Teodoro (1), A. Damineli (1), J. I. Arias (2), F. X. de Ara'ujo (3 and 4), R. H. Barb'a (5), M. F. Corcoran (6), M. Borges Fernandes (3), E. Fern'andez-Laj'us (7 and 8), L. Fraga (9), R. C. Gamen (7 and 8), J. F. Gonz'alez (5), J. H. Groh (10), J. L. Marshall (11), P. J. McGregor (12), N. Morrell (13), D. C. Nicholls (12), E. R. Parkin (12), C. B. Pereira (3), M. M. Phillips (13), G. R. Solivella (7 and 8), J. E. Steiner (1), M. Stritzinger (14 and 15), I. Thompson (16), C. A. O. Torres (17), M. A. P. Torres (18 and 19), M. I. Zevallos-Herencia (3)

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The periodic spectroscopic events in eta Carinae are now well established and occur near the periastron passage of two massive stars in a very eccentric orbit. Several mechanisms have been proposed to explain the variations of different spectral features, such as an eclipse by the wind-wind collision boundary, a shell ejection from the primary star or accretion of its wind onto the secondary. All of them have problems explaining all the observed phenomena. To better understand the nature of the cyclic events, we performed a dense monitoring of eta Carinae with 5 Southern telescopes during the 2009 low excitation event, resulting in a set of data of unprecedented quality and sampling. The intrinsic luminosity of the He II 4686 emission line (L~310 Lsun) just before periastron reveals the presence of a very luminous transient source of extreme UV radiation emitted in the wind-wind collision (WWC) region. Clumps in the primary's wind probably explain the flare-like behavior of both the X-ray and He II 4686 light-curves. After a short-lived minimum, He II 4686 emission rises again to a new maximum, when X-rays are still absent or very weak. We interpret this as a collapse of the WWC onto the "surface" of the secondary star, switching off the hard X-ray source and diminishing the WWC shock cone. The recovery from this state is controlled by the momentum balance between the secondary's wind and the clumps in the primary's wind.

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Radiation-driven winds of hot luminous stars XVI. Expanding atmospheres of massive and very massive stars and the evolution of dense stellar clusters

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Context. Starbursts play an essential role in the evolution of galaxies. In these environments, massive stars, with their short lifetimes, are of particular importance. The stellar winds ofmassive stars significantly influence not only on their surroundings, but the associated mass loss also profoundly affects the evolution of the stars themselves. The evolution of the dense cores of massive starburst clusters is also affected by dynamical processes induced by N-body interactions, in addition to the evolution of each star, and the formation of very massive stars with masses up to several thousand solar masses may be decisive for the evolution of the cluster. The interpretation of the corresponding observations relies mainly on the theoretical modeling of such starbursts, which is a major challenge.

Aims. The primary objective is to introduce an advanced diagnostic method of O-type stellar atmospheres with winds, including an assessment of the accuracy of the determinations of abundances, stellar and wind parameters. Moreover, observational results are interpreted in the framework of our stationary, one-dimensional theory of line driven winds. Possible effects caused by nonhomogeneous time dependent structures are also discussed.

Methods. We combine consistent models of expanding atmospheres with stellar evolutionary calculations of massive and very massive (up to several 1000 solar masses) single stars with regard to the evolution of dense stellar clusters. Essential in this context are accurate dynamic parameters of the winds of very massive stars. Because the atmospheric mass outflow has substantial influence on the radiation field and the atomic occupation numbers, and the radiation field and the occupation numbers in turn directly influence the radiative acceleration and thus the strength and velocity of the outflow, the determination of the hydrodynamic structures requires a highly consistent treatment of the statistical equilibrium and the hydrodynamic and radiative processes in the expanding atmospheres.

Results. We present computed mass loss rates, terminal wind velocities, and spectral energy distributions of massive and very massive stars of different metallicities, calculated from atmospheric models with an improved level of consistency. These computations have important implications for (i) the primordial chemical enrichment of Population III very massive stars; (ii) the age determination of globular clusters; and (iii) the formation of intermediate mass black holes in dense stellar clusters with respect to the importance of stellar wind mass loss for the evolution of their progenitor stars.

Conclusions. Stellar evolutionary calculations, using the mass loss rates of very massive stars obtained in the present paper, show that very massive stars with a low metallicity lose only a very small amount of their mass; thus it is unlikely that very massive population III stars cause a significant helium enrichment of the interstellar medium. Solar-metallicity stars have higher mass-loss rates, but these are not so high to exclude very massive stars of solar metallicity, formed by dynamical processes in dense clusters, from ending their life massive enough to form intermediate-mass black holes.

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Pre-print available on astro-ph.
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Comments: Two-column style: 40 pages, 25 figures, and 15 tables.

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On the stability of radiation-pressure-dominated cavities

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Context:
When massive stars exert a radiation pressure onto their environment that is higher than their gravitational attraction (super-Eddington condition), they launch a radiation-pressure-driven outflow, which creates cleared cavities.
These cavities should prevent any further accretion onto the star from the direction of the bubble, although it has been claimed that a radiative Rayleigh-Taylor instability should lead to the collapse of the outflow cavity and foster the growth of massive stars.

Aims:
We investigate the stability of idealized radiation-pressure-dominated cavities, focusing on its dependence on the radiation transport approach used in numerical simulations for the stellar radiation feedback.

Methods:
We compare two different methods for stellar radiation feedback: gray flux-limited diffusion (FLD) and ray-tracing (RT).
Both methods are implemented in our self-gravity radiation hydrodynamics simulations for various initial density structures of the collapsing clouds, eventually forming massive stars.
We also derive simple analytical models to support our findings.

Results:
Both methods lead to the launch of a radiation-pressure-dominated outflow cavity.
However, only the FLD cases lead to prominent instability in the cavity shell.
The RT cases do not show such instability; once the outflow has started, it precedes continuously.
The FLD cases display extended epochs of marginal Eddington equilibrium in the cavity shell, making them prone to the radiative Rayleigh-Taylor instability.
In the RT cases, the radiation pressure exceeds gravity by 1-2 orders of magnitude.
The radiative Rayleigh-Taylor instability is then consequently suppressed.
It is a fundamental property of the gray FLD method to neglect the stellar radiation temperature at the location of absorption and thus to underestimate the opacity at the location of the cavity shell.

Conclusions:
Treating the stellar irradiation in the gray FLD approximation underestimates the radiative forces acting on the cavity shell.
This can lead artificially to situations that are affected by the radiative Rayleigh-Taylor instability.
The proper treatment of direct stellar irradiation by massive stars is crucial for the stability of radiation-pressure-dominated cavities.

Reference: A&A
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1111.5625v1

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The first X-ray survey of Galactic Luminous Blue Variables

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(Univ. of Liege)

Aims: The X-ray emission of massive stars has been studied when these objects are in their main-sequence phase, as well as in their Wolf-Rayet phase. However, the X-ray properties of the transitional Luminous Blue Variable (LBV) phase remain unknown.
Methods: Using a dedicated but limited XMM survey as well as archival XMM and Chandra observations, we performed the first X-ray survey of LBVs: about half of the known LBVs or candidate LBVs are studied.
Results: Apart from the well known X-ray sources eta Car and Cyg OB2 #12, four additional LBVs are detected in this survey, though some doubt remains on the association with the X-ray source for two of these. For the other LBVs, upper limits on the flux were derived, down to $log[L_{rm X}/L_{rm BOL}]-9.4$ for PCyg. This variety in the strength of the X-ray emission is discussed, with particular emphasis on the potential influence of binarity.

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

Weblink: http://arxiv.org/abs/1111.6375

Comments:

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High-resolution X-ray spectroscopy of the magnetic Of?p star HD148937

Y. Naze, S.A. Zhekov, N.R. Walborn

(ULg, U of Col. and Space and solar-terrestrial research inst., STScI)

High-resolution data of the peculiar magnetic massive star HD148937 were obtained with Chandra-HETGS, and are presented here in combination with a re-analysis of the older XMM-RGS data. The lines of the high-Z elements (Mg, Si, S) were found to be unshifted and relatively narrow (FWHM of about 800km/s), i.e. narrower than the O line recorded by RGS, which possibly indicates that the hot plasma is multi-thermal and has several origins. These data further indicate a main plasma temperature of about 0.6keV and a formation of the X-ray emission at about one stellar radius above the photosphere. From the spectral fits and the H-to-He line ratios, the presence of very hot plasma is however confirmed, though with a smaller relative strength than for the prototype magnetic oblique rotator $theta^1$,Ori,C. Both stars thus share many similarities, but HD148937 appears less extreme than $theta^1$,Ori,C despite having also a large magnetic confinement parameter.

Reference: accepted by ApJ
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1111.7186

Comments:

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Extended Non-Thermal Emission Possibly Associated with Cyg OB2 #5

Gisela N. Ortiz-Leon(1), Luis F. Rodriguez(1,2), and Mauricio Tapia(3)

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Cyg OB2 #5 is a contact binary system (O6.5-7+O5.5-6) with associated radio continuum emission. Two compact (<=0.3") radio continuum components have been reported previously: the primary one is associated with the contact binary and the secondary one is an arc-like source 0.8" to the NE of the primary. This arc-like source results from the interaction of the winds of the contact binary and a B-type star in the region.In this paper we report the detection of an extended (about 30"), non-thermal component to the NE of the compact components. We propose that this extended emission could be an unresolved background source (i. e. a radio galaxy), extended galactic emission, or non-thermal emission related with relativistic electrons that are produced in the shock between the contact binary and the B-type star and that are carried away to large distances by the wind from the contact binary.

Reference: Revista Mexicana de Astronomia y Astrofisica, in press.
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1111.6486

Comments:

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A detailed X-ray investigation of zeta Puppis I. The dataset and some preliminary results

Yael Naze, Carlos Arturo Flores, Gregor Rauw

ULg - Univ. Guanajuato - ULg

Aims: zeta Puppis, one of the closest and brightest massive stars, was the first early-type object observed by the current generation of X-ray observatories. These data provided some surprising results, confirming partly the theoretical predictions while simultaneously unveiling some problematic mismatches with expectations. In this series of papers, we perform a thorough study of zeta Puppis in X-rays, using a

decade of XMM observations.

Methods: zeta Puppis was observed 18 times by XMM, totaling 1Ms in exposure. This provides the highest-quality high-resolution X-ray spectrum of a massive star to date, as well as a perfect dataset for studying X-ray variability in an "archetype" object.

Results: This first paper reports on the data reduction of this unique dataset and provides a few preliminary results. On the one hand, the analysis of EPIC low-resolution spectra shows the star to have a remarkably stable X-ray emission from one observation to the next. On the other hand, the fitting by a wind model of individual line profiles recorded by RGS confirms the wavelength dependence of the line morphology.

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

Weblink: http://arxiv.org/abs/1112.0862

Comments:

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Predictions for mass-loss rates and terminal wind velocities of massive O-type stars

L. E. Muijres (Amsterdam), Jorick S. Vink (Armagh), A. de Koter (Amsterdam), P.E. Mueller (Keele), N. Langer (Bonn)

Amsterdam, Armagh, Keele, Bonn

Mass loss forms an important aspect of the evolution of massive stars, as well as for the enrichment of the surrounding ISM. Our goal is to predict accurate mass-loss rates and terminal wind velocities. These quantities can be compared to empirical values, thereby testing radiation-driven wind models. One specific issue is that of the "weak-wind problem", where empirically derived mass-loss rates fall orders of magnitude short of predicted values. We employ an established Monte Carlo model and a recently suggested new line acceleration formalism to solve the wind dynamics consistently. We provide a new grid of mass-loss rates and terminal wind velocities of O stars, and compare the values to empirical results. Our models fail to provide mass-loss rates for main-sequence stars below a luminosity of log(L/Lsun) = 5.2, where we run into a fundamental limit. At luminosities below this critical value there is insufficient momentum transferred in the region below the sonic point to kick-start the acceleration. This problem occurs at the location of the onset of the weak-wind problem. For O dwarfs, the boundary between being able to start a wind, and failing to do so, is at spectral type O6/O6.5. The direct cause of this failure is a combination of the lower luminosity and a lack of Fe V lines at the wind base. This might indicate that another mechanism is required to provide the necessary driving to initiate the wind. For stars more luminous than log(L/Lsun) = 5.2, our new mass-loss rates are in excellent agreement with the mass-loss prescription by Vink et al. 2000. This implies that the main assumption entering the method of the Vink et al. prescriptions - i.e. that the momentum equation is not explicitly solved for - does not compromise the reliability of the Vink et al. results for this part of parameter space (Abridged).

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

Weblink: http://arxiv.org/abs/1112.0944

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In pursuit of gamma-ray burst progenitors: the identification of a sub-population of rotating Wolf-Rayet stars

Jorick S. Vink (Armagh), G. Graefener (Armagh), T. J. Harries (Exeter)

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Long gamma-ray bursts involve the most powerful cosmic explosions since the Big Bang. Whilst it has been established that GRBs are related to the death throes of massive stars, the identification of their progenitors has proved challenging. Theory suggests that rotating Wolf-Rayet stars are the best candidates, but their strong stellar winds shroud their surfaces, preventing a direct measurement of their rotation. Fortunately, linear spectropolarimetry may be used to probe the flattening of their winds due to stellar spin. Spectropolarimetry surveys show that an 80% majority of WR stars have spherically symmetric winds and are thus rotating slowly, yet a small 20% minority display a spectropolarimetric signature indicative of rotation. Here we find a highly significant correlation between WR objects that carry the signature of stellar rotation and the subset of WR stars with ejecta nebulae that have only recently transitioned from a red sugergiant or luminous blue variable phase. As these youthful WR stars have yet to spin-down due to mass loss, they are the best candidate GRB progenitors identified to date. When we take recently published WR ejecta nebula numbers we find that five out of the six line-effect WR stars are surrounded by ejecta nebulae. The statistics imply that the null hypothesis of no correlation between line-effect WR stars and ejecta nebulae can be rejected at the 0.0004% level. Given that four line-effect and WR ejecta nebula have spectroscopically been confirmed to contain nucleosynthetic products, we argue that the correlation is both statistically significant and physically convincing. The implication is that we have identified a WR sub-population that fulfills the necessary criteria for making GRBs. Finally, we discuss the potential of identifying GRB progenitors via spectropolarimetry with extremely large telescopes.

Reference: Astronomy & Astrophysics Letters
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1111.5806

Comments:

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Stellar envelope inflation near the Eddington limit. Implications for the radii of Wolf-Rayet stars and luminous blue variables

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Context: It has been proposed that the envelopes of luminous stars may be subject to substantial radius inflation. The peculiar structure of such inflated envelopes, with an almost void, radiatively dominated region beneath a thin, dense shell could mean that many in reality compact stars are hidden below inflated envelopes, displaying much lower effective temperatures. The inflation effect has been discussed in relation to the radius problem of WR stars, but has yet failed to explain the large observed radii of Galactic WR stars.
Aims: We wish to obtain a physical perspective of the inflation effect, and study the consequences for the radii of WR stars, and LBVs. For WR stars the observed radii are up to an order of magnitude larger than predicted by theory, whilst S Doradus-type LBVs are subject to humongous radius variations, which remain as yet ill-explained.
Methods: We use a dual approach to investigate the envelope inflation, based on numerical models for stars near the Eddington limit, and a new analytic formalism to describe the effect. An additional new aspect is that we take the effect of density inhomogeneities (clumping) within the outer stellar envelopes into account.
Results: Due to the effect of clumping we are able to bring the observed WR radii in agreement with theory. Based on our new formalism, we find that the radial inflation is a function of a dimensionless parameter W, which largely depends on the topology of the Fe-opacity peak, i.e., on material properties. For W>1, we discover an instability limit, for which the stellar envelope becomes gravitationally unbound, i.e. there no longer exists a static solution. Within this framework we are also able to explain the S Doradus-type instabilities for LBVs like AG Car, with a possible triggering due to changes in stellar rotation. The stellar effective temperatures in the upper HR diagram are potentially strongly affected by the inflation effect.
Conclusions: This may have particularly strong effects on the evolved massive LBV and WR stars just prior to their final collapse, as the progenitors of SNe Ibc, SNe II, and long GRBs.

Reference: Astronomy & Astrophysics
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1112.1910

Comments: 15 pages, 11 Figures

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Yellow supergiants as supernova progenitors: an indication of strong mass loss for red supergiants?

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The increasing observed number of supernova events allows for finding ever more frequently the progenitor star in archive images. In a few cases, the progenitor star is a yellow supergiant star. The estimated position in the Hertzsprung-Russell diagram of these stars is not compatible with the theoretical tracks of classical single star models. According to several authors, the mass-loss rates during the red supergiant phase could be underestimated. We study the impact of an increase of these mass-loss rates on the position of 12 to 15 Modot stars at the end of their nuclear life, in order to reconcile the theoretical tracks with the observed yellow supergiant progenitors. We perform calculations of 12 to 15 Modot rotating stellar models using the Geneva stellar evolution code. To account for the uncertainties in the mass-loss rates during the RSG phase, we increase the mass-loss rate of the star (between 3 and 10 times the standard one) during that phase and compare the evolution of stars undergoing such high mass-loss rates with models computed with the standard mass-loss prescription. We show that the final position of the models in the Hertzsprung-Russell diagram depends on the mass loss they undergo during the red supergiant phase. With an increased mass-loss rate, we find that some models end their nuclear life at positions that are compatible with the observed position of several supernova progenitors. We conclude that an increased mass-loss rate (whom physical mechanism still need to be clarified) allows single star models to reproduce simultaneously the estimated position in the HRD of the YSG SN progenitors, as well as the SN type.

Reference: A&A Letters (2011) in press, arXiv number 1111.7003
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1111.7003

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The first determination of the viscosity parameter in the circumstellar disk of a Be Star

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Be stars possess gaseous circumstellar decretion disks, which are well described using standard $alpha$-disk theory.
The Be star 28,CMa recently underwent a long outburst followed by a long period of quiescence, during which the disk dissipated. Here we present the first time-dependent models of the dissipation of a viscous decretion disk.
By modeling the rate of decline of the V-band excess, we determine that the viscosity parameter $alpha=1.0pm0.2$, corresponding to a mass injection rate $dot{M}=(3.5pm 1.3) times 10^{-8} M_sun,mathrm{yr}^{-1}$.
Such a large value of $alpha$ suggests that the origin of the turbulent viscosity is an instability in the disk whose growth is limited by shock dissipation. The mass injection rate is more than an order of magnitude larger than the wind mass loss rate inferred from UV observations, implying that the mass injection mechanism most likely is not the stellar wind, but some other mechanism.

Reference: To appear in The Astrophysical Journal Letters
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1112.0053

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Grids of stellar models with rotation
I. Models from 0.8 to 120 Msun at solar metallicity (Z = 0.014)

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Many topical astrophysical research areas, such as the properties of planet host stars, the nature of the progenitors of different types of supernovae and gamma ray bursts, and the evolution of galaxies, require complete and homogeneous sets of stellar models at different metallicities in order to be studied during the whole of cosmic history. We present here a first set of models for solar metallicity, where the effects of rotation are accounted for in a homogeneous way.

We computed a grid of 48 different stellar evolutionary tracks, both rotating and non-rotating, at Z = 0.014, spanning a wide mass range from 0.8 to 120 Msun. For each of the stellar masses considered, electronic tables provide data for 400 stages along the evolutionary track and at each stage, a set of 43 physical data are given. These grids thus provide an extensive and detailed data basis for comparisons with the observations. The rotating models start on the ZAMS with a rotation rate v_ini/v_crit = 0.4. The

evolution is computed until the end of the central carbon-burning phase, the early AGB phase, or the core helium-flash for, respectively, the massive, intermediate, and both low and very low mass stars. The initial abundances are those deduced by Asplund and collaborators, which best fit the observed abundances of massive stars in the solar neighbourhood. We update both the opacities and nuclear reaction rates, and introduce new prescriptions for the mass-loss rates as stars approach the Eddington and/or the critical velocity. We account for both atomic diffusion and magnetic braking in our low-mass star models.

The present rotating models provide a good description of the average evolution of non-interacting stars. In particular, they reproduce the observed main-sequence width, the positions of the red giant and supergiant stars in the HR diagram, the observed surface compositions and rotational velocities. Very interestingly, the enhancement of the mass loss during the red-supergiant stage, when the luminosity becomes supra-Eddington in some outer layers, help models above 15-20 Msun to lose a significant part of their hydrogen envelope and evolve back into the blue part of the HR diagram. This result has interesting consequences for the blue to red supergiant ratio, the minimum mass for stars to become Wolf-Rayet stars, and the maximum initial mass of stars that explode as type II-P supernovae.

Reference: A&A, in press
arXiv:1110.5049
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1110.5049

Comments: 19 pages, 15 figures
Electronic tables on CDS

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Observational effects of magnetism in O stars: surface nitrogen abundances

F. Martins (1), C. Escolano (1), G.A. Wade, (2), J.-F. Donati (3), J.-C. Bouret (4,5), the MiMeS collaboration

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We investigate the surface nitrogen content of the six magnetic O stars known to date as well as of the early B-type star tau Sco. We compare these abundances to predictions of evolutionary models to isolate the effects of magnetic field on the transport of elements in stellar interiors. We conduct a quantitative spectroscopic analysis of the sample stars with state-of-the-art atmosphere models. We rely on high signal-to-noise ratio, high resolution optical spectra obtained with ESPADONS at CFHT and NARVAL at TBL. Atmosphere models and synthetic spectra are computed with the code CMFGEN. Values of N/H together with their uncertainties are determined and compared to predictions of evolutionary models. We find that the magnetic stars can be divided into two groups: one with stars displaying no N enrichment (one object); and one with stars most likely showing extra N enrichment (5 objects). For one star (Theta1 Ori C) no robust conclusion can be drawn due to its young age. The star with no N enrichment is the one with the weakest magnetic field, possibly of dynamo origin. It might be a star having experienced strong magnetic braking under the condition of solid body rotation, but its rotational velocity is still relatively large. The five stars with high N content were probably slow rotators on the zero age main sequence, but they have surface N/H typical of normal O stars, indicating that the presence of a (probably fossil)

magnetic field leads to extra enrichment. These stars may have a strong differential rotation inducing shear mixing. Our results should be viewed as a basis on which new theoretical simulations can rely to better understand the effect of magnetism on the evolution of massive stars.

Reference: Astronomy and Astrophysics
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1112.2497

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Abstracts of 6 conference proceedings

Population Synthesis at the Crossroads

Claus Leitherer(1) & Sylvia Ekstrom(2)

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The current state-of-the-art of population synthesis is reviewed. The field is currently undergoing major revisions with the recognition of several key processes as new critical ingredients. Stochastic effects can artificially enhance or suppress certain evolutionary phases and/or stellar mass regimes and introduce systematic biases in, e.g., the determination of the stellar initial mass function. Post-main-sequence evolution is often associated with irregular variations of stellar properties on ultra-short time-scales. Examples are asymptotic giant branch stars and luminous blue variables, both of which are poorly treated in the models. Stars rarely form in isolation, and the fraction of truly single stars may be very small. Therefore, stellar multiplicity must be accounted for since many systems will develop tidal interaction over the course of their evolution. Last but not least, stellar rotation can drastically increase stellar temperatures and luminosities, which in turn leads to revised mass-to-light ratios in population synthesis models.

Reference: Review talk, IAU Symp. 284, The Spectral Energy Distribution of Galaxies, Preston (UK), September 2011, eds. R. J. Tuffs and C. C. Popescu
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1111.5204

Comments:

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Wind Models for Very Massive Stars in the Local Universe

Jorick S. Vink (Armagh), J. M. Bestenlehner (Armagh), G. Graefener (Armagh), A. de Koter (Amsterdam), N. Langer (Bonn)

Armagh Observatory

Some studies have claimed the existence of a stellar upper-mass limit of 150 Msun. A factor that is often overlooked concerns the issue that there might be a significant difference between the present-day and the initial mass of the most massive stars - as a result of mass loss. The upper-mass limit may be substantially higher, possibly exceeding 200 Msun. The issue of the upper mass-limit will however remain uncertain as long as there is only limited quantitative knowledge of mass loss in close proximity to the Eddington (= Gamma) limit. For this reason, we present mass-loss predictions from Monte Carlo radiative transfer models for very massive stars up to 300 Msun. Using our new dynamical approach, we find an upturn or "kink" in the mass-loss versus Gamma dependence, at the point where our model winds become optically thick. These are the first mass-loss predictions where the transition from optically thin O-star winds to optically thick Wolf-Rayet winds has been resolved.

Reference: To appear in Four Decades of Research on Massive Stars, ASP Conf. Ser.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1112.0936

Comments:

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The theory of stellar winds

Jorick S. Vink

Armagh Observatory

We present a brief overview of the theory of stellar winds with a strong emphasis on the radiation-driven outflows from massive stars. The resulting implications for the evolution and fate of massive stars are also discussed. Furthermore, we relate the effects of mass loss to the angular momentum evolution, which is particularly relevant for the production of long and soft gamma-ray bursts. Mass-loss rates are not only a function of the metallicity, but are also found to depend on temperature, particularly in the region of the bi-stability jump at 21 000 Kelvin. We highlight the role of the bi-stability jump for Luminous Blue Variable (LBV) stars, and discuss suggestions that LBVs might be direct progenitors of supernovae. We emphasize that radiation-driven wind studies rely heavily on the input opacity data and linelists, and that these are thus of fundamental importance to both the mass-loss predictions themselves, as well as to our overall understanding of the lives and deaths of massive stars.

Reference: Astrophysics and Space Science, Vol 336, Issue 1, pp. 163-167 (special HEDLA 2010 Issue)
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1112.0952

Comments:

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The Physical Basis of the Lx ~ Lbol Empirical Law for O-star X-rays

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X-ray satellites since Einstein have empirically established that the X-ray luminosity from single O-stars scales linearly with bolometric luminosity, Lx~ 10^-7 Lbol. But straightforward forms of the most favored model, in which X-rays arise from instability-generated shocks embedded in the stellar wind, predict a steeper scaling, either with mass loss rate Lx ~Mdot Lbol^1.7 if the shocks are radiative, or with Lx ~Mdot^2 ~Lbol^3.4 if they are adiabatic. We present here a generalized formalism that bridges these radiative vs. adiabatic limits in terms of the ratio of the shock cooling length to the local radius. Noting that the thin-shell instability of radiative shocks should lead to extensive mixing of hot and cool material, we then propose that the associated softening and weakening of the X-ray emission can be parametrized by the cooling length ratio raised to a power m, the “mixing exponent.” For physically reasonable values m=0.4, this leads to an X-ray luminosity Lx ~ Lbol that matches the empirical scaling. We conclude by noting that such thin-shell mixing may also be important for X-rays from colliding wind binaries, and that future numerical simulation studies will be needed to test this thin-shell mixing ansatz for X-ray emission.

Reference: To appear in "Four Decades of Research on Massive Stars", proceedings of a conference held 11-15 July 2011 in Saint-Michel-des-Saints, Quebec to honor the retirement of Tony Moffat.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1110.0891

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New Galactic Candidate Luminous Blue Variables and Wolf-Rayet Stars

Guy S. Stringfellow (1), Vasilii V. Gvaramadze (2), Yuri Beletsky (3) and Alexei Y. Kniazev (4)

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(4) South African Astronomical Observatory and Southern African Large Telescope Foundation, PO Box 9, 7935 Observatory, Cape Town, South Africa

We have undertaken a near-infrared spectral survey of stars associated with compact mid-IR shells recently revealed by the MIPSGAL (24 microns) and GLIMPSE (8 microns) Spitzer surveys, whose morphologies are typical of circumstellar shells produced by massive evolved stars. Through spectral similarity with known Luminous Blue Variable (LBV) and Wolf-Rayet (WR) stars, a large population of candidate LBVs (cLBVs) and a smaller number of new WR stars are being discovered. This significantly increases the Galactic cLBV population and confirms that nebulae are inherent to most (if not all) objects of this class.

Reference: To appear in the proceedings of IAU Symposium 282 "From Interacting Binaries to Exoplanets: Essential Modeling Tools", eds. Mercedes Richards & Ivan Hubeny.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1112.2685

Comments: 2 pages, 1 figure.

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Spectral Identification of New Galactic cLBV and WR Stars

G. S. Stringfellow (1), V. V. Gvaramadze (2), Y. Beletsky (3) and A.Y. Kniazev (4,2)

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We have undertaken a near-IR spectral survey of stars associated with compact nebulae recently revealed by the Spitzer and WISE imaging surveys. These circumstellar nebulae, produced by massive evolved stars, display a variety of symmetries and shapes and are often only evident at mid-IR wavelengths. Stars associated with ~50 of these nebulae have been observed. We also obtained recent spectra of previously confirmed (known) luminous blue variables (LBVs) and candidate LBVs (cLBVs). The spectral similarity of the stars observed when compared directly to known LBVs and Wolf-Rayet (WR) stars indicate many are newly identified cLBVs, with a few being newly discovered WR stars, mostly of WN8-9h spectral type. These results suggest that a large population of previously unidentified cLBVs and related transitional stars reside in the Galaxy and confirm that circumstellar nebulae are inherent to most (c)LBVs.

Reference: To appear in "Four Decades of Research on Massive Stars: A Scientific Meeting in Honour of Anthony F. J. Moffat", ASP Conference series, 2012, eds. Laurent Drissen, Nicole St Louis, Carmelle Robert, and Anthony F.J. Moffat.
Status: Conference proceedings

Weblink: http://arxiv.org/abs/1112.2686

Comments: 3 pages, 2 figures

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Abstracts of 1 other publications

White paper on Massive Stars for 2010 CASCA/LRP

Anthony F.J. Moffat & Nicole St-Louis

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Last year we submitted a White Paper as input information to the Long Range Plan Committee of the Canadian Astronomical Society. In this WP we outlined several discovery highlights in the area of massive stars involving Canadian astronomers during the past decade (2000-2009). We thought this might be of interest to others in the general massive-star community. A pdf version is available at the accompanying web-site address.

Reference: Submitted to CASCA/LRP
Status: Other

Weblink: http://www.astro.umontreal.ca/~moffat/WP2010Canada/

Comments:

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JOBS

PhD position in stellar physics at IRSOL, Switzerland. Topic: Planet engulfing scenarios

Michele Bianda

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A Swiss-NSF-funded PhD position is now open at the solar physics research institute Istituto Ricerche Solari Locarno, IRSOL, located in Locarno in the Southern part of Switzerland. The project will be carried out in collaboration with the University of Geneva, and Kiepenheuer Institut in Freiburg,

Germany. The PhD student will be enrolled as a PhD student at the University of Geneva.

The PhD student will have the opportunity to work in a lively small group on a challenging and cutting-edge topic. The work will address on planet engulfing scenarios considering both theoretical and observational aspects. The goal will be to study the consequences on the star involved in the process of planet engulfing, through numerical modeling, and to find corresponding observational signatures. The PhD student is expected to get familiar with the instrumentation and the observational techniques at the IRSOL observatory, where it will be possible to carry out spectroscopy observations of bright stars and to perform calibration observations on the Sun. Fainter stars will be observed at the Gregor telescope in Tenerife or at other large telescopes.

We are seeking an outstanding and highly motivated candidate with a MSc or equivalent degree in astrophysics, astronomy or physics with interests in observational techniques and numerical modeling. The candidates should send a letter of motivation, a CV, academic transcripts and contact details of three potential referees by post or by email to the address below. Electronic material should be sent in a single PDF-file.

IRSOL - via Patocchi - CH-6605 Locarno Monti – Switzerland
Email: info@irsol.ch with CC: mbianda@irsol.ch
Links: www.irsol.ch

Gross annual salary: ~ 40000 CHF (ca. 34000 EUR)
Review of applications will begin November 14, 2011. Start date: to be agreed

For more information please contact:
Dr. Michele Bianda (IRSOL): mbianda@irsol.ch, +41 91 743 42 26
Prof. Georges Meynet (University of Geneva): Georges.Meynet@unige.ch
Prof. Svetlana Berdjugina (KIS): sveta@kis.uni-freiburg.de

Attention/Comments:

Weblink: http://www.irsol.ch/Concorso_dottorando.pdf

Email: info@irsol.ch

Deadline:

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MEETINGS

IR View of Massive stars - special session at IAU GA

august 2012

Venue: beijing, china

After the initial announcement sent some weeks ago, please find below a link to be kept informed of the meeting and possibly to be considered for an oral presentation.

Weblink: http://www.gaphe.ulg.ac.be/IAU_XXVIII/prereg.php

Email: naze@astro.ulg.ac.be

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Circumstellar Dynamics at High Resolution (second announcement)

Feb. 27th to Mar. 02nd, 2012

Venue: Foz do Iguaçu, Brazil

Second Announcement
(please circulate among your colleagues)

ESO Workshop: Circumstellar Dynamics at High Resolution
Foz do Iguaçu, Brazil, February 27 - March 02, 2012
http://www.eso.org/sci/meetings/2012/csdyn.html
Info: csdyninfo@eso.org

This workshop aims at bringing together the active community of hot stellar astrophysicists, both theoreticians and observers, along the common topic of what can be learned from high resolution observations. The key topics of the workshop are:
- Circumstellar Disks & Outflows
- Delta Sco and Be stars as laboratories for CS disk physics
- Dynamics of Circumstellar Material and tidal interactions in hot binaries
- Massive star formation out of a dynamic environment
- Magnetospheres of Hot Stars

*** REGISTRATION ***

Registrations are open at http://www.eso.org/sci/meetings/2012/csdyn.html. The deadline for early registration is Dec. 17th. (200 USD). After this date, the registration fee will amount to 250 USD (deadline for late registration is Jan. 13th).

This workshop is co-sponsored by ESO, Nara (Núcleo de Apoio à Pesquisa em Radioastronomia) and the University of São Paulo.

We are looking forward to see you in Brazil in February!

Alex C. Carciofi & Thomas Rivinius, for the SOC

Weblink: http://www.eso.org/sci/meetings/2012/csdyn.html

Email: csdyninfo@eso.org

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The Mass Loss Return from Stars to Galaxies

March 28 - 30, 2012

Venue: Space Telescope Science Institute, Baltimore, MD, USA

In this small workshop of about 60 participants, we will discuss the topic of mass-loss return to galaxies and the resulting dust and metal enrichment process. The workshop will be about 2.5 days and involve talks and audience wide discussions. We have plenty of room for contributed talks and posters. As the title suggests, the focus of our workshop is four areas:

1) The parameterizations of mass-loss rates and their basis in fact for both massive stars and intermediate mass stars.

2) The variations in mass loss due to quiescent/smooth, eruptive/episodic, or explosive processes and to the effects of binary companions.

3) How these parameterizations affect both theoretical modeling of stellar evolution and estimates for mass-loss return to galaxies from stellar populations.

4) The composition in dust, metals and total gas of the ejecta and how these are incorporated into dust and chemical evolution of galaxies.

Weblink: http://www.stsci.edu/institute/conference/mass-loss-return

Email: fullerton@stsci.edu

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Joint Discussion on Very Massive Stars in the Local Universe

August 2012

Venue: Beijing, China

Please find below a link to PRE-REGISTER.
(This helps the SOC with the distribution of presentations)

Weblink: http://www.arm.ac.uk/IAU/

Email: jsv@arm.ac.uk

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Circumstellar Dynamics at High Resolution

Feb. 27th - Mar. 02nd

Venue: Foz do Iguaçu, Brazil

Last announcement

ESO Workshop: Circumstellar Dynamics at High Resolution
Foz do Iguaçu, Brazil, February 27 - March 02, 2012
http://www.eso.org/sci/meetings/2012/csdyn.html
Info: csdyninfo@eso.org

The deadline for late registration is approaching fast: Jan 13th.

Financial support
Support is available to partially cover hotel expenses for a few students and post-docs.
Applications can be submitted by via the registration form.

Sessions will be held on:
1 - Circumstellar Disks & Outflows: Theory
2 - Circumstellar Disks & Outflows: Observations
3 - Delta Sco and Be stars as laboratories for CS disk physics
4 - Dynamics of Circumstellar Material and tidal interactions in hot binaries
5 - Massive star formation out of a dynamic environment
6 - Magnetospheres of Hot Stars

Confirmed invited speakers:
E. Alecian (Observatoire de Paris, France)
J. Bjorkman (Univ. of Toledo, US)
D. Cohen (Swarthmore College)
W. Dent (ALMA)
W.-J. de Wit (ESO)
J. Groh (Max-Planck-Institute for Radioastronomy, Germany)
C. Jones (Univ. of Western Ontario, Canada)
M. Krumholz (Univ. of California, US)
A. M. Magalhães (Univ. of São Paulo, Brazil)
F. Millour (Univ. of Nice, France)
A. Miroshnichenko (Univ. of North Carolina at Greensboro, US)
A. Okazaki (Hokkai-Gakuen Univ., Japan)
R. Oudmaijer (Univ. of Leeds, UK)
S. Owocki (Univ. of Delaware, US)
R. Townsend (Univ. of Wisconsin, US)
A. ud-Doula (Penn State W. Scranton, US)

SOC:
D. Baade
A. C. Carciofi (co-chair)
J. E. Bjorkman
A. Daminelli
W. Dent
A. Domiciano de Souza
Th. Rivinius (co-chair)
S. Stefl
J. Vink
G. Wade

Venue:
The workshop will take place in Foz do Iguaçu, Brazil, close to the magnificent Iguaçu Waterfalls, a network of 275 waterfalls in the Iguaçu River that lies in the border of Brazil and Argentina.

Tours:
Two visits to the waterfalls are planned during the workshop. For more details, see
http://www.eso.org/sci/meetings/2012/csdyn/local.html#par_title

We look forward to see you in Brazil next February!
Alex Carciofi, for the SOC

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Email: csdyninfo@eso.org

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