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THE MASSIVE STAR NEWSLETTER

formerly known as the hot star newsletter

*

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News

Result of the MSWG-OC election

Dear members of the MSWG,

The deadline for the OC election of the Working Group on Massive Stars (MSWG) passed last week, and I am pleased to report that there was a healthy turnout (74 voters) with the following elected to the OC, or re-elected in the case of NSL (in alphabetical order)

Chris Evans
John Hillier
Lida Oskinova
Nicole St. Louis
Jorick Vink

The composition of the new OC from Jan 2013 is as follows (* newbies):

*Chris Evans, Margaret Hanson, Artemio Herrero, *John Hillier, Norbert Langer, *Lida Oskinova, Gregor Rauw, Nicole St Louis, Rich Townsend, *Jorick Vink

The new OC will vote for a new Chair (in Jan 2013), and we will keep you informed about the result.

With best regards,

Jo Puls (old Chair) and the (old) OC of the MSWG

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An international campaign for monitoring the next periastron passage of eta Carinae in 2014

We are calling for collaborators to join us in the monitoring of the next periastron passage of eta Carinae, which will occur on July 26th 2014. We are planning on an international, co-ordinated campaign to observe eta Car using as many southern telescopes as possible in order to obtain a dense, multispectral monitoring, especially around periastron passage.

We welcome the collaborations of both amateur and professional observers, as occurred during the ProAm ConVento campaign, which included a workshop after the campaign.

A document containing a detailed description of the proposed campaign can be downloaded from this link: tinyurl.com/cys65ub

A web page is currently being developed to host all the relevant informations about the campaign.

People who are interested in participating should send an e-mail to mairan.teodoro@nasa.gov. The subject must be 'etaCar2014', and the body message should contain your full name and affiliation.

Weblink: www.etacar2014.wikidot.com

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PAPERS

Abstracts of 14 accepted papers

A Magnetic Confinement vs. Rotation Classification of Massive-Star Magnetospheres

V. Petit (1), S. P. Owocki (2), G. A. Wade (3), D. H. Cohen (4), J. O. Sundqvist (2), M. Gagné (1), J. Maíz Apellániz (5), M. E. Oksala (6), D. A. Bohlender (7), Th. Rivinius (8), H. F. Henrichs (9), E. Alecian (10), R. H. D. Townsend (11), A. ud-Doula (12), the MiMeS Collaboration (13)

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Building on results from the Magnetism in Massive Stars (MiMeS) project, this paper shows how a two-parameter classification of massive-star magnetospheres in terms of the magnetic wind confinement (which sets the Alfv'en radius RA) and stellar rotation (which sets the Kepler co-rotation radius RK) provides a useful organisation of both observational signatures and theoretical predictions. We compile the first comprehensive study of inferred and observed values for relevant stellar and magnetic parameters of 64 confirmed magnetic OB stars with Teff > 16 kK. Using these parameters, we locate the stars in the magnetic confinement-rotation diagram, a log-log plot of RK vs. RA. This diagram can be subdivided into regimes of centrifugal magnetospheres (CM), with RA > RK, vs. dynamical magnetospheres (DM), with RK > RA. We show how key observational diagnostics, like the presence and characteristics of Halpha emission, depend on a star's position within the diagram, as well as other parameters, especially the expected wind mass-loss rates. In particular, we identify two distinct populations of magnetic stars with Halpha emission: namely, slowly rotating O-type stars with narrow emission consistent with a DM, and more rapidly rotating B-type stars with broader emission associated with a CM. For O-type stars, the high mass-loss rates are sufficient to accumulate enough material for line emission even within the relatively short free-fall timescale associated with a DM: this high mass-loss rate also leads to a rapid magnetic spindown of the stellar rotation. For the B-type stars, the longer confinement of a CM is required to accumulate sufficient emitting material from their relatively weak winds, which also lead to much longer spindown timescales. Finally, we discuss how other observational diagnostics, e.g. variability of UV wind lines or X-ray emission, relate to the inferred magnetic properties of these stars, and prospects for future developments in our understanding of massive-star magnetospheres.

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

Weblink: http://arxiv.org/abs/1211.0282

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Massive open star clusters using the VVV survey II. Discovery of six clusters with Wolf-Rayet stars

A.-N. Chené(1,2), J. Borissova(2,3), C. Bonatto(4), D. J. Majaess(5), G. Baume(6), J. R. A. Clarke(2,7), R. Kurtev(2), O. Schnurr(8), J.-C. Bouret(9), M. Catelan(10), J. P. Emerson(11), C. Feinstein(6), D. Geisler(1), R. de Grijs(12), A. Hervé(13), V. D. Ivanov (14), M. S. N. Kumar (15), P. Lucas(7), L. Mahy(13), F. Martins(16), F. Mauro(1), D. Minniti(3,10,17,18), C. Moni Bidin(2,3)

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Context: The ESO Public Survey "VISTA Variables in the V'ia L'actea" (VVV) provides deep multi-epoch infrared observations for an unprecedented 562 sq. degrees of the Galactic bulge, and adjacent regions of the disk. In this survey nearly 150 new open clusters and cluster candidates have been discovered. Aims: This is the second in a series of papers about young, massive open clusters observed using the VVV survey. We present the first study of six recently discovered clusters. These clusters contain at least one newly discovered Wolf-Rayet (WR) star. Methods: Following the methodology presented in the first paper of the series, wide-field, deep JHKs VVV observations, combined with new infrared spectroscopy, are employed to constrain fundamental parameters for a subset of clusters. Results: We affirm that the six studied stellar groups are real young (2-7 Myr) and massive (between 0.8 and 2.2 10^3 Msol) clusters. They are highly obscured (Av ~ 5-24 mag) and compact (1-2 pc). In addition to WR stars, two of the six clusters also contain at least one red supergiant star. We claim the discovery of 8 new WR stars, and 3 stars showing WR-like emission lines which could be classified WR or OIf. Preliminary analysis provides initial masses of ~30-50 Msol for the WR stars. Finally,we discuss the spiral structure of the Galaxy using as tracers the six new clusters together with the previously studied VVV clusters.

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Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1211.2801

Comments: 17 pages, 8 figures

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A Report on the X-ray Properties of the tau Sco Like Stars

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An increasing number of OB stars have been shown to possess magnetic fields. Although the sample remains small, it is surprising that the magnetic and X-ray properties of these stars appear to be far less correlated than expected. This contradicts model predictions, which generally indicate that the X-rays from magnetic stars are harder and more luminous than their non-magnetic counterparts. Instead, the X-ray properties of magnetic OB stars are quite diverse.

tau~Sco is one example where the expectations are better met. This bright main sequence, early B star has been studied extensively

in a variety of wavebands. It has a surface magnetic field of around 500~G, and Zeeman Doppler tomography has revealed an unusual field configuration. Furthermore, tau~Sco displays an unusually hard X-ray spectrum, much harder than similar, non-magnetic OB stars. In addition, the profiles of its UV P~Cygni wind lines have long been known to possess a peculiar morphology.

Recently, two stars, HD~66665 and HD~63425, whose spectral types and UV wind line profiles are similar to those of tau~Sco, have also been determined to be magnetic. In the hope of establishing a magnetic field -- X-ray connection for at least a sub-set of the magnetic stars, we obtained XMM-Newton EPIC spectra of these two objects. Our results for HD~66665 are somewhat inconclusive. No especially strong hard component is detected; however, the number of source counts is insufficient to {em rule out} hard emission. longer exposure is needed to assess the nature of the X-rays from this star. On the other hand, we do find that HD~63425 has a substantial hard X-ray component, thereby bolstering its close similarity to tau~Sco.

Reference: to appear in MNRAS
Status: Manuscript has been accepted

Weblink: http://lanl.arxiv.org/abs/1211.0861

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Long-term semi-regular dust formation by the WC9+B0I system WR 70

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We present infrared photometry of the WC9+B0I Wolf-Rayet binary system WR 70 (HD 137603) observed with telescopes at ESO, the SAAO and the AAT between 1983 and 2010 which shows persistent but variable circumstellar dust emission. Optical spectroscopy confirms the classification of the companion as a B0 supergiant and suggests that the Balmer lines in its spectrum suffer in-fill from wind emission. Re-examination of the reddening suggests a revised distance of 3.5~kpc. In the near-IR, the amplitude of variation increases with wavelength, with no significant variation in J (nor is there in the visible), implying that it is the amount of dust in the wind of WR 70 that is varying. Period searches show a period near 2.82~y. (1030~d.) but the variations are not strictly regular and there are other factors affecting the dust formation and repeatability of the light curves. There may be a secondary period near 5.88 yr. but there is no evidence for periods less than a year. A model of the spectral energy distribution in 1991 gives a dust formation rate of 5.9 x 10^7 M_Sun y^-1, around one-third of the available carbon from the WC9 wind going into the wind-collision region, estimating its size from average WC9 and B0Ia wind properties. The fraction of carbon going into dust varied between ~ 11 and 46 percent during our campaign, possibly as a consequence of the stars moving in an elliptical orbit.

Reference: MNRAS in Press
Status: Manuscript has been accepted

Weblink: ftp://ftp.roe.ac.uk:/pub/pmw/WR70rv.psf

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The young stellar population of IC 1613. III. New O-type stars unveiled by GTC-OSIRIS

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Recent findings hint that the winds of massive stars with poorer metallicity than the SMC may be stronger than predicted by theory. Besides calling the paradigm of radiation driven winds into question, this result would impact the predicted evolutionary paths of massive stars, their calculated ionizing radiation and mechanical feedback and the role these objects play at different stages of the Universe. The field needs a systematic study of the winds of a large set of very metal poor massive stars, but the sampling of spectral types is particularly poor in the very early types. This paper's goal is to increase the list of known O-type stars in the dwarf irregular galaxy IC1613, whose metallicity is smaller than the SMC's by roughly a factor 2.
Using the reddening-free Q-parameter, evolutionary masses and GALEX photometry, we built a list of very likely O-type stars. We obtained low-resolution R~1000 GTC-OSIRIS spectra for a fraction of them and performed spectral classification, the only way to unequivocally confirm candidate OB-stars. We have discovered 8 new O-type stars in IC1613, increasing the list of 7 known O-type stars in this galaxy by a factor of 2. The best quality spectra were analyzed with the model atmosphere code FASTWIND to derive stellar parameters. We present the first spectral type -- effective temperature scale for O-stars beyond the SMC. The derived effective temperature calibration for IC1613 is about 1000K hotter than the scale at the SMC. The analysis of an increased list of O-type stars will be crucial for the studies of the winds and feedback of massive stars at all ages of the Universe.

Reference: A&A

Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1211.4582

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Molecular emission from GG Car's circumbinary disk

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The appearance of the B[e] phenomenon in evolved massive stars such as B[e] supergiants is still a mystery. While these stars are generally found to have disks that are cool and dense enough for efficient molecule and dust condensation, the origin of the disk material is still unclear. We aim at studying the kinematics and origin of the disk in the eccentric binary system GG,Car, whose primary component is proposed to be a B[e] supergiant. Based on medium- and high-resolution near-infrared spectra we analyzed the CO-band emission detected from GG,Car. The complete CO-band structure delivers information on the density and temperature of the emitting region, and the detectable element[][13]{CO} bands allow us to constrain the evolutionary phase. In addition, the kinematics of the CO gas can be extracted from the shape of the first element[][12]{CO} band head. We find that the CO gas is located in a ring surrounding the eccentric binary system, and its kinematics agrees with Keplerian rotation with a velocity, projected to the line of sight, of $80pm 1$,km,s^{-1}. The CO ring has a column density of $(5pm 3)times 10^{21}$,cm^{-2} and a temperature of $3200pm 500$,K. In addition, the material is chemically enriched in element[][13]{C}, which agrees with the primary component being slightly evolved off the main sequence. We discuss two possible scenarios for the origin of the circumbinary disk: (i) non-conservative Roche lobe overflow, and (ii) the possibility that the progenitor of the primary component could have been a classical Be star. Neither can be firmly excluded, but for Roche lobe overflow to occur, a combination of stellar and orbital parameter extrema would be required.

Reference: Astronomy and Astrophysics
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1211.5149

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On the effects of optically thick gas (disks) around massive stars

Rolf Kuiper, Harold W. Yorke

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Numerical simulations have shown that the often cited radiation pressure barrier to accretion onto massive stars can be circumvented, when the radiation field is highly anisotropic in the presence of a circumstellar accretion disk with high optical depth. Here, these studies of the so-called flashlight effect are expanded by including the opacity of the innermost dust-free but potentially optically thick gas regions around forming massive stars. In addition to frequency-dependent opacities for the dust grains, we use temperature- and density-dependent Planck- and Rosseland mean opacities for the gas. The simulations show that the innermost dust-free parts of the accretion disks are optically thick to the stellar radiation over a substantial fraction of the solid angle above and below the disk's midplane. The temperature in the shielded disk region decreases faster with radius than in a comparison simulation with a lower constant gas opacity, and the dust sublimation front is shifted to smaller radii. The shielding by the dust-free gas in the inner disk thus contributes to an enhanced flashlight effect, which ultimately results in a smaller opening angle of the radiation pressure driven outflow and in a much longer timescale of sustained feeding of the circumstellar disk by the molecular cloud core. We conclude that it is necessary to properly account for the opacity of the inner dust-free disk regions around forming massive stars in order to correctly assess the effectiveness of the flashlight effect, the opening angle of radiation pressure driven outflows, and the lifetime and morphological evolution of the accretion disk.

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Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1211.6432

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Origin of Two Types of X-Ray Outbursts in Be/X-Ray Binaries. I. Accretion Scenarios

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We propose the new scenario for X-ray outbursts in Be/X-ray binaries that normal and giant outbursts are respectively caused by radiatively inefficient accretion flows (RIAFs) and Bondi-Hoyle-Lyttleton (BHL) accretion of the material transferred from the outermost part of a Be disk misaligned with the binary orbital plane. Based on simulated mass-transfer rates from misaligned Be disks, together with simplified accretion flow models, we show that mass-accretion rates estimated from the luminosity of the normal X-

ray outbursts are consistent with those obtained with advection-dominated accretion flows, not with the standard, radiative-cooling dominated, accretion. Our RIAF scenario for normal X-ray outbursts resolves problems that have challenged the standard disk picture for these outbursts. When a misaligned Be disk crosses the orbit of the neutron star, e.g., by warping, the neutron star can capture a large amount of mass via BHL-type accretion during the disk transit event. We numerically show that such a process can reproduce the X-ray luminosity of giant X-ray outbursts. In the case of very high Be disk density, the accretion flow associated with the disk transit becomes supercritical, giving rise to the luminosity higher than the Eddington luminosity.

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Weblink: http://arxiv.org/abs/1211.5225

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CO bandhead emission of massive young stellar objects: determining disc properties

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Massive stars play an important role in many areas of astrophysics, but numerous details regarding their formation remain unclear. In this paper we present and analyse high resolution (R ~ 30,000) near-infrared 2.3 micron spectra of 20 massive young stellar objects from the RMS database, in the largest such study of CO first overtone bandhead emission to date. We fit the emission under the assumption it originates from a circumstellar disc in Keplerian rotation. We explore three approaches to modelling the physical conditions within the disc - a disc heated mainly via irradiation from the central star, a disc heated mainly via viscosity, and a disc in which the temperature and density are described analytically. We find that the models described by heating mechanisms are inappropriate because they do not provide good fits to the CO emission spectra. We therefore restrict our analysis to the analytic model, and obtain good fits to all objects that possess sufficiently strong CO emission, suggesting circumstellar discs are the source of this emission. On average, the temperature and density structure of the discs correspond to geometrically thin discs, spread across a wide range of inclinations. Essentially all the discs are located within the dust sublimation radius, providing strong evidence that the CO emission originates close to the central protostar, on astronomical unit scales. In addition, we show that the objects in our sample appear no different to the general population of MYSOs in the RMS database, based on their near- and mid-infrared colours. The combination of observations of a large sample of MYSOs with CO bandhead emission and our detailed modelling provide compelling evidence of the presence of small scale gaseous discs around such objects, supporting the scenario in which massive stars form via disc accretion.

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Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1212.0554

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A detailed X-ray investigation of zeta Puppis - The variability on short and long timescales

Yael Naze, Lidia M. Oskinova, Eric Gosset

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Stellar winds are a crucial component of massive stars, but their exact properties still remain uncertain. To shed some light on this subject, we have analyzed an exceptional set of X-ray observations of zeya Pup, one of the closest and brightest massive stars. The sensitive lightcurves that were derived reveal two major results. On the one hand, a slow modulation of the X-ray flux (with a relative amplitude of up to 15% over 16h in the 0.3--4.0keV band) is detected. Its characteristic timescale cannot be determined with precision, but amounts from one to several days. It could be related to corotating interaction regions, known to exist in zeta Pup from UV observations. Hour-long changes, linked to flares or to the pulsation activity, are not observed in the last decade covered by the XMM observations; the 17h tentative period, previously reported in a ROSAT analysis, is not confirmed either and is thus transient, at best. On the other hand, short-term changes are surprisingly small (<1% relative amplitude for the total energy band). In fact, they are compatible solely with the presence of Poisson noise in the data. This surprisingly low level of short-term variability, in view of the embedded wind-shock origin, requires a very high fragmentation of the stellar wind, for both absorbing and emitting features (>10^5 parcels, comparing with a 2D wind model). This is the first time that constraints have been placed on the number of clumps in an O-type star wind and from X-ray observations.

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Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1212.1554

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The Initial Mass Function of Field OB Stars in the Small Magellanic Cloud

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Some theories of star formation suggest massive stars may only form in clustered environments, which would create a deficit of massive stars in low density environments. Observationally, Massey (2002) finds such a deficit in samples of the field population in the Small and Large Magellanic Clouds, with an IMF slope of {Gamma} ~ 4. These IMF measurements represent some of the largest known deviations from the standard Salpeter IMF slope of {Gamma}=1.35. Here, we carry out a comprehensive investigation of the mass function above 20 solar masses for the entire field population of the Small Magellanic Cloud, based on data from the Runaways and Isolated O Type Star Spectroscopic Survey of the SMC (RIOTS4). This is a spatially complete census of the entire field OB star population of the SMC obtained with the IMACS multi-object spectrograph and MIKE echelle spectrograph on the Magellan telescopes. Based on Monte-Carlo simulations of the evolved present-day mass function, we find the slope of the field IMF above 20 solar masses is {Gamma}=2.3+/-0.4. We extend our IMF measurement to lower masses using BV photometry from the OGLE II survey. We use a statistical approach to generate a probability distribution for the mass of each star from the OGLE photometry, and we again find {Gamma}=2.3+/-0.6 for stellar masses from 7-20 solar masses. The discovery and removal of ten runaways in our RIOTS4 sample steepens the field IMF slope to {Gamma}=2.8+/-0.5. We discuss the possible effects of binarity and star-formation history on our results, and conclude that the steep field massive star IMF is most likely a real effect.

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Weblink: http://arxiv.org/abs/1212.1205

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The 2.35 year itch of Cyg OB2#9. II. Radio monitoring

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Cyg OB2 #9 is one of a small set of non-thermal radio emitting massive O-star binaries. The non-thermal radiation is due to synchrotron emission in the colliding-wind region. Cyg OB2 #9 was only recently discovered to be a binary system and a multi-wavelength campaign was organized to study its 2011 periastron passage. We report here on the results of the radio observations obtained in this monitoring campaign. We used the Expanded Very Large Array (EVLA) radio interferometer to obtain 6 and 20 cm continuum fluxes. The observed radio light curve shows a steep drop in flux sometime before periastron. The fluxes drop to a level that is comparable to the expected free-free emission from the stellar winds, suggesting that the non-thermal emitting region is completely hidden at that time. After periastron passage, the fluxes slowly increase. We introduce a simple model to solve the radiative transfer in the stellar winds and the colliding-wind region, and thus determine the expected behaviour of the radio light

curve. From the asymmetry of the light curve, we show that the primary has the stronger wind. This is somewhat unexpected if we use the astrophysical parameters based on theoretical calibrations. But it becomes entirely feasible if we take into account that a given spectral type - luminosity class combination covers a range of astrophysical parameters. The colliding-wind region also contributes to the free-free emission, which can help to explain the high values of the spectral index seen after periastron passage. Combining our data with older Very Large Array (VLA) data allows us to derive a period P = 860.0 +- 3.7 days for this system. With this period, we update the orbital parameters that were derived in the first paper of this series.

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Weblink: http://arxiv.org/abs/1212.2381

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Thin-shell mixing in radiative wind-shocks and the Lx-Lbol scaling of 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. This paper presents 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 propose that the associated softening and weakening of the X-ray emission can be parametrized as scaling with 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 ~ Mdot^{0.6} ~ Lbol that matches the empirical scaling. To fit observed X-ray line profiles, we find such radiative-shock-mixing models require the number of shocks to drop sharply above the initial shock onset radius. This in turn implies that the X-ray luminosity should saturate and even decrease for optically thick winds with very high mass-loss rates. In the opposite limit of adiabatic shocks in low-density winds (e.g., from B-stars), the X-ray luminosity should drop steeply with Mdot^2. Future numerical simulation studies will be needed to test the general thin-shell mixing ansatz for X-ray emission.

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

Weblink: http://www.bartol.udel.edu/~owocki/preprints/LxLbol-MNRAS-Dec12.pdf

Email: owocki@bartol.udel.edu

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WR 120bb and WR 120bc: a pair of WN9h stars with possibly interacting circumstellar shells

Sonja Burgemeister (1), Vasilii V. Gvaramadze, Guy S. Stringfellow, Alexei Y. Kniazev, Helge Todt, Wolf-Rainer Hamann

(1) Universitaet Potsdam, Germany

Two optically obscured Wolf-Rayet (WR) stars have been recently discovered by means of their infrared (IR) circumstellar shells, which show signatures of interaction with each other. Following the systematics of the WR star catalogues, these stars obtain the names WR,120bb and WR,120bc. In this paper, we present and analyse new near-IR, J, H, and K-band, spectra using the Potsdam Wolf-Rayet (PoWR) model atmosphere code. For that purpose, the atomic data base of the code has been extended in order to include all significant lines in the near-IR bands.

The spectra of both stars are classified as WN9h. As their spectra are very similar the parameters that we obtained by the spectral analyses hardly differ. Despite their late spectral subtype, we found relatively high stellar temperatures of 63 kK. The wind composition is dominated by helium, while hydrogen is depleted to 25 per cent by mass.

Because of their location in the Scutum-Centaurus arm, WR,120bb and WR,120bc appear highly reddened, $A_{K_{rm s}} approx 2$ mag. We adopt a common distance of 5.8,kpc to both stars, which complies with the typical absolute K-band magnitude for the WN9h subtype of -6.5 mag, is consistent with their observed extinction based on comparison with other massive stars in the region, and allows for the possibility that their shells are interacting with each other. This leads to luminosities of $log(L/L_odot) = 5.66$ and 5.54 for WR,120bb and WR,120bc, with large uncertainties due to the adopted distance.

The values of the luminosities of WR,120bb and WR,120bc imply that the immediate precursors of both stars were red supergiants (RSG). This implies in turn that the circumstellar shells associated with WR,120bb and WR,120bc were formed by interaction between the WR wind and the dense material shed during the preceding RSG phase.

Reference: 2012, MNRAS (astro-ph 1212.3727)
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/1212.3727

Comments:

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Abstracts of 1 submitted papers

The Peculiar Balmer Decrement of SN 2009ip: Constraints on Circumstellar Geometry

Emily M. Levesque, Guy S. Stringfellow, Adam G. Ginsburg, John Bally, Brian A. Keeney

University of Colorado at Boulder

We present optical and near-IR spectroscopic observations of the luminous blue variable SN 2009ip during its remarkable photometric evolution of 2012. The spectra sample three key points in the SN 2009ip lightcurve, corresponding to its initial brightening in August (2012-A) and its dramatic rebrightening in early October (2012-B). Based on line fluxes and velocities measured in our spectra, we find a surprisingly low I(H-alpha)/I(H-beta) ratio (~1.5) in the 2012-B spectra. Such a ratio implies either a rare Case B recombination scenario where H-alpha, but not H-beta, is optically thick, or an extremely high density for the circumstellar material of n_e > 10^(13) cm^(-3). The H-alpha line intensity yields a minimum radiating surface area of >~20,000 AU^2 in H-alpha at the peak of SN 2009ip's photometric evolution. Combined with the nature of this object's spectral evolution in 2012, a high circumstellar density and large radiating surface area imply the presence of a thin disk geometry around the central star (and, consequently, a possible binary companion), suggesting that the observed 2012-B rebrightening of SN 2009ip can be attributed to the illumination of the disk's inner rim by fast-moving ejecta produced by the underlying events of 2012-A.

Reference: submitted to ApJ
Status: Manuscript has been submitted

Weblink: http://arxiv.org/abs/1211.4577

Comments:

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JOBS

POSTDOC POSITION
UNIVERSITY OF SAO PAULO, BRAZIL

vacancy@astro.iag.usp.br

Instituto de Astronomia, Geofísica e Ciências Atmosféricas
IAG/USP

Several groups at the Astronomy Department of IAG/University of Sao Paulo, Brazil, invite applications for various 2-yr postdoctoral fellowships, renewable for an additional year.

The Astronomy department of IAG consists of 35 faculty members who work in many areas, including: the dynamics of exoplanets and solar systems, astrobiology, astrometry, stellar astronomy, the interstellar medium, Galactic and extragalactic astronomy and cosmology, both theoretical and observational. Applicants with strong background in radio astronomy, high energy astrophysics or instrumentation are also encouraged to apply. IAG/USP astronomers enjoy access to international facilities including SOAR, Gemini and CFHT Observatories, as well as a 2300-core supercomputer.

Requirements are an outstanding publication list (for the career stage) and an exciting plan of work. The candidate must have interests that overlap with those of the IAG staff members (access the list of faculty members at http://www.astro.iag.usp.br/index.php?dir=inst/pessoal&file=pessoal.php?cod=docentes).

The interested candidates should send a CV, that includes a publication list, a research statement (including past work and future plans), with a maximum of five pages, and two letters of recommendation to Claudia Mendes de Oliveira at email vacancy@astro.iag.usp.br by March 31st, or until suitable candidates are found.

The successful candidate will have a fellowship reviewed and awarded by the Sao Paulo State funding agency FAPESP. Time for research is typically 80-90% with a small requirement for dedication to institute activities. The current, tax exempt monthly stipend is R$ 5,578.80 (about 2,200EUR or US$2,700 in Oct 2012). An additional Research Contingency fund (e.g., for travel, computers, etc.) of US$4,500 per year is also available. For further details, contact vacancy@astro.iag.usp.br.

Attention/Comments:

Weblink:

Email: vacancy@astro.iag.usp.br

Deadline: March 31st

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Post-doc position in stellar astrophysics

Norbert Przybilla

Institute for Astro- and Particle Physics
University of Innsbruck
Technikerstrasse 25/8
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Austria

The Institute for Astro- and Particle Physics at the University of Innsbruck invites applications for a post doc position in stellar astrophysics. The successful candidate will work on observational aspects in order to exploit the possibilities provided by the recent accession of Austria to ESO, quantitative analyses and/or modelling of stellar atmospheres, with a focus on massive, luminous stars. Participation in teaching is expected.

The appointment may start as early as March 1, 2013 and will be for four years. Applicants should have a PhD in astronomy, physics or a related field. They should send by email curriculum vitae, publication list, a brief statement of research interests, and arrange for three letters of recommendation to be sent.

Attention/Comments: job applications shall be sent
attn. Theresia Freiseisen
theresia.freiseisen@uibk.ac.at

Weblink: http://jobregister.aas.org/job_view?JobID=43992

Email: norbert.przybilla@fau.de

Deadline: January 9, 2013

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MEETINGS

Putting A Stars into Context: Evolution, Environment, and Related Stars

June 3-7, 2013

Venue: Moscow M.V. Lomonosov State University in Moscow, Russia

Main Topics:

- A-star formation: abundances and chemical peculiarities of A-type and related stars in open clusters
- A-star formation: formation and evolution of discs and planetary systems around A-type and related stars; A-star multiplicity
- A-star formation: magnetic field generation
- Fundamental parameters, chemical abundances and inhomogeneities in A-type and related stars
- Magnetic fields in Main-Sequence A-type and related stars

- Pulsation in Main-Sequence A-type and related stars
- Rotation and hydrodynamical processes in Main-Sequence A-type and related stars
- Evolution of A stars off the Main Sequence: generic aspects, magnetism and dissipation of chemical peculiarities
- Evolved A-type stars in the Galaxy and beyond

Scientific Organizing Committee:

Gautier Mathys, JAO/ESO, Chile, chair
Maryline Briquet, Universite de Liege, Belgium
Margarida Cunha, Universidade do Porto, Portugal
Oleg Kochukhov, University of Uppsala, Sweden
Friedrich Kupka, University of Vienna, Austria
Francis LeBlanc, Universite de Moncton, Canada
Lyudmila Mashonkina, Russian Academy of Sciences, Russia
Richard Monier, Universite de Nice, France
Olga Pintado, INSUGEO, Tucuman, Argentina
Hiromoto Shibahashi, University of Tokyo, Japan
Kazimierz Stepien, Warsaw University, Poland
Glenn Wahlgren, Catholic University of America, USA

Russian institutions organizing the conference:

Sternberg Astronomical Institute of Moscow M.V. Lomonosov State University,
Institute of Astronomy of the Russian Academy of Sciences,
Eurasian Astronomical Society.

Invited Speakers (confirmed):

Evelyne Alecian, Observatoire de Paris, France
Victoria Antoci, University of Vienna, Austria
Rainer Arlt, Leibniz-Institut fuer Astrophysik Potsdam, Germany
Luca Fossati, University of Bonn, Germany
Swetlana Hubrig, Leibniz-Institut fuer Astrophysik Potsdam, Germany
Heidi Korhonen, University of Copenhagen, Denmark
Jiri Krticka, Masaryk University Brno, Czech Republic
Rolf Kudritzki, University of Hawaii, USA
John D. Landstreet, University of Western Ontario, Canada
Theresa Lueftinger, University of Vienna, Austria
Stephane Mathis, Observatoire de Paris, France
Zdenek Mikulasek, Masaryk University Brno, Czech Republic
Martin Netopil, University of Vienna, Austria
Pierre North, Ecole Polytechnique Federale de Lausanne, Switzerland
Jan Robrade, Hamburg Observatory, Germany
Iosif Romanyuk, Special Astrophysical Observatory, RAS, Russia
Frederic Royer, Observatoire de Paris, France
Tatyana Ryabchikova, Institute of Astronomy, RAS, Russia
Mikhail Sachkov, Institute of Astronomy, RAS, Russia
Hideyuki Saio, Tohoku University Sendai, Japan
Denis Shulyak, Georg-August University Goettingen, Germany
Asif ud-Doula, Penn State Worthington Scranton, USA

Registration

Registration is now open and ends on April 1st 2013. Please register at your earliest convenience. Please note that timely registration is essential to ensure that visa formalities can be completed in due time. The

registration fee covers all regular meeting costs including abstract materials, welcome party, coffee breaks, conference banquet, Moskva-river cruise tour, and classical music concert. Full conference registration costs 280 Euro (11 300 Rubles). A discount of 30 Euros is provided for the participants, who pay the registration fee before April 1st 2013.

To register, point your browser to http://agora.guru.ru/astars2013/ and follow the instructions; payments can be made via credit card.

Visa

The LOC will provide a letter of invitation for a visa application should you require one. Please see http://agora.guru.ru/astars2013/ for details, and contact us through astars2013@inasan.ru for questions or requests.

Abstract submission

Contributed talks will be selected from the submitted abstracts, and there will also be a poster session. All contributions will be included in the proceedings.

More information can be found on the conference website:

http://agora.guru.ru/astars2013/

Key Dates

1 April 2013: Deadline abstract submissions
1 April 2013: Early registration closes
2 June 2013: Welcome party/Conference Begins
3-7 June 2013: Conference
1 August 2013: Deadline for submission of proceedings contributions.

Weblink: http://agora.guru.ru/astars2013/

Email: astars2013@inasan.ru

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What asteroseismology has to offer to astrophysics?

2-4 December 2013

Venue: University Foundation, Brussels, Belgium

Symposium Scope and Objective:

Stellar astrophysics is the foundation of our understanding of the nature of the Universe. The luminous energy emitted from the surfaces of stars has given astrophysicists the clues to deduce the nature of stellar structure and to map the physical changes stars undergo over their lifetimes, from birth out of the interstellar medium to death as white dwarfs, neutron stars or black holes. We have now reached the long-awaited stage where we can test and improve our understanding of stellar structure and evolution theory, with important implications for all research fields that build on this foundation. For the first time we can peer into the interiors of stars to see their structures using asteroseismology. This revolutionary new view is the result of uninterrupted space photometry, precise to parts per million, delivered for thousands of stars by the Kepler and CoRoT Space Telescopes. The primary aim of these space missions is to detect exoplanet systems, with an ultimate goal of finding Earth-like planets in the habitable zone. The ultra-high precision continuous observations obtained have produced tremendous benefits for asteroseismology. Asteroseismic inference of the exoplanet host star provides crucial input to characterise the planetary system. We can now peer into the interiors of stars in all stages of evolution, including their red giant and compact stages - for both binary and single stars - probing extreme physical conditions with unprecedented confidence. We can even perform asteroseismic galactic studies of clusters and populations in the Milky Way.

The goal of this three-day symposium is to present recent progress in asteroseismology to the broader astrophysics community and to discuss what this field may offer to other research domains in astrophysics. Keynote invited speakers will cover broad areas of importance for astrophysics; their review talks will be followed by dedicated talks on how asteroseismology has brought, or will bring improvements in that topic. In addition to these invited presentations, shorter contributed talks in this same spirit will be solicited from the community. The list of invited talks, as well as the programme, can be found on the conference website:
http://fys.kuleuven.be/ster/meetings/francqui/francqui

The purpose of this 1st announcement is to make the community aware of the symposium and to present the list of invited talks. A call for participation, registration and abstract submission for a contributed talk will be sent out in January 2013 to all those who pre-registered through the weblink below.

Weblink: http://fys.kuleuven.be/ster/meetings/francqui/francqui

Email: katrijn@ster.kuleuven.be

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