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Abstracts of 15 accepted papers

The super-orbital modulation of supergiant high-mass X-ray binaries

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The long-term X-ray lightcurves of classical supergiant X-ray binaries and supergiant fast X-ray transients show relatively similar super-orbital modulations, which are still lacking a sound interpretation. We propose that these modulations are related to the presence of corotating interaction regions (CIRs) known to thread the winds of OB supergiants. To test this hypothesis, we couple the outcomes of 3-D hydrodynamic models for the formation of CIRs in stellar winds with a simplified recipe for the accretion onto a neutron star. The results show that the synthetic X-ray light curves are indeed modulated by the presence of the CIRs. The exact period and amplitude of these modulations depend on a number of parameters governing the hydrodynamic wind models and on the binary orbital configuration. To compare our model predictions with the observations, we apply the 3-D wind structure previously shown to well explain the appearance of discrete absorption components in the UV time series of a prototypical B0.5I-type supergiant. Using the orbital parameters of IGRJ16493-4348 which has the same B0.5I donor spectral type, the period and modulations in the simulated X-ray light-curve are similar to the observed ones, thus providing support to our scenario. We propose, that the presence of CIRs in donor star winds should be considered in future theoretical and simulation efforts of wind-fed X-ray binaries.

Weblink: http://adsabs.harvard.edu/cgi-bin/bib_query?arXiv:1710.01877

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Properties of six short-period massive binaries: a study of the effects of binarity on surface chemical abundances

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A significant fraction of massive stars are found in multiple systems. The effect of binarity on stellar evolution is poorly constrained. In particular, the role of tides and mass transfer on surface chemical abundances is not constrained observationally. The aim of this study is to investigate the effect of binarity on the stellar properties and surface abundances of massive binaries. We perform a spectroscopic analysis of six Galactic massive binaries. The spectra of individual components are obtained from a spectral disentangling method and are subsequently analyzed by means of atmosphere models. The stellar parameters and CNO surface abundances are determined. Most systems are made of main-sequence stars. Three systems are detached, two are in contact and no information is available for the sixth system. For eleven out of the twelve stars studied the surface abundances are only mildly affected by stellar evolution and mixing. They are not different from those of single stars, within the uncertainties. The secondary of XZ~Cep is strongly chemically enriched. Considering previous determinations of surface abundance in massive binary systems suggests that the effect of tides on chemical mixing is limited, whereas mass transfer and removal of outer layers of the mass donor leads to the appearance of chemically processed material at the surface, although this is not systematic. The evolutionary masses of the components of our six systems are on average 16.5% higher than the dynamical masses. Some systems seem to have reached synchronization, while others may still be in a transitory phase.

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Status: Manuscript has been accepted

Weblink: https://arxiv.org/abs/1709.00937

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X-rays from the colliding wind binary WR 146

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The X-ray emission from the massive binary WR 146R is analysed in the framework of the colliding stellar wind (CSW) picture. The theoretical CSW model spectra match well the shape of the observed X-ray spectrum of WR 146R but they overestimate considerably the observed X-ray flux (emission measure). This is valid both in the case of complete temperature equalization and in the case of partial electron heating at the shock fronts (different electron and ion temperatures), but, there are indications for a better correspondence between model predictions and observations for the latter. To reconcile the model predictions and observations, the mass-loss rate of WR 146 must be reduced by a factor of 8 – 10 compared to the currently accepted value for this object (the latter already takes clumping into account). No excess X-ray absorption is derived from the CSW modelling.

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Weblink: https://arxiv.org/abs/1709.01023

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Emission Lines in the Near-infrared Spectra of the Infrared Quintuplet Stars in the Galactic Center

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We report the detection of a number of emission lines in the 1.0--2.4μm spectra of four of the five bright infrared dust-embedded stars at the center of the Galactic center's Quintuplet Cluster. Spectroscopy of the central stars of these objects is hampered not only by the large interstellar extinction that obscures all objects in the Galactic center, but also by the large amounts of warm circumstellar dust surrounding each of the five. The pinwheel morphologies of the dust observed previously around two of them are indicative of Wolf-Rayet colliding wind binaries; however, infrared spectra of each of the five have until now revealed only dust continua steeply rising to long wavelengths and absorption lines and bands from interstellar gas and dust. The emission lines detected, from ionized carbon and from helium, are broad and confirm that the objects are dusty late-type carbon Wolf-Rayet stars.

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Weblink: http://lanl.arxiv.org/pdf/1707.06894v1

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Close binary evolution. III. Impact of tides, wind magnetic braking and internal angular momentum transport

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We discuss the evolution of a 10 $M_\odot$ star in a close binary system with a 7 $M_\odot$ companion using the Geneva stellar evolution code. The initial orbital period is 1.2 days. The 10 $M_\odot$ star has a surface magnetic field of 1 kG. Various initial rotations are considered. We use two different approaches for the internal angular momentum transport. In one of them angular momentum is transported by shear and meridional currents. In the other, a strong internal magnetic field imposes nearly perfect solid-body rotation. The evolution of the primary is computed until the first mass transfer episode occurs. The cases of different values for the magnetic fields, for various orbital periods and mass ratios are briefly discussed. We show that, independently of the initial rotation rate of the primary and the efficiency of the internal angular momentum transport, the surface rotation of the primary will converge, in a time that is short with respect to the main-sequence lifetime, towards a slowly-evolving velocity that is different from the synchronization velocity. This "equilibrium angular velocity" is always inferior to the angular orbital velocity. In a given close binary system at this equilibrium stage, the difference between the spin and the orbital angular velocities becomes larger when the mass losses and/or the surface magnetic field increase. The treatment of the internal angular momentum transport has a strong impact on the evolutionary tracks in the Hertzsprung-Russell Diagram as well as on the changes of the surface abundances resulting from rotational mixing. Our modeling suggests that the presence of an undetected close companion might explain rapidly-rotating stars with strong surface magnetic fields, having ages well above the magnetic braking timescale. Our models predict that the rotation of most stars of this type increases as a function of time, except for a first initial phase in spin-down systems. The measure of their surface abundances, together when possible with their mass-luminosity ratio, provide interesting constraints on the transport efficiencies of angular momentum and chemical species. Close binaries, when studied at phases predating any mass transfer, are key objects to probe the physics of rotation and magnetic fields in stars.

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Status: Manuscript has been accepted

Weblink: https://arxiv.org/abs/1709.01902

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A Tale of Two Impostors: SN2002kg and SN1954J in NGC 2403

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We describe new results on two supernova impostors in NGC 2403, SN 1954J(V12) and SN 2002kg(V37). For the famous object SN 1954J we combine four critical observations: its current SED, its Halpha emission line profile, the Ca II triplet in absorption in its red spectrum, and the brightness compared to its pre-event state. Together these strongly suggest that the survivor is now a hot supergiant with T ~ 20000 K, a dense wind, substantial circumstellar extinction, and a G-type supergiant companion. The hot star progenitor of V12's giant eruption was likely in the post-red supergiant stage and had already shed a lot of mass. V37 is a classical LBV/S Dor variable. Our photometry and spectra observed during and after its eruption show that its outburst was an apparent transit on the HR Diagram due to enhanced mass loss and the formation of a cooler, dense wind. V37 is an evolved hot supergiant at ~10^6 Lsun with a probable initial mass of 60 -80 Msun.

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Multi-epoch VLTI-PIONIER imaging of the supergiant V766 Cen: Image of the close companion in front of the primary

M. Wittkowski (1), F. J. Abellan (2), B. Arroyo-Torres (3,4), A. Chiavassa (5), J. C. Guirado (2,6), J. M. Marcaide (2), A. Alberdi (3), W. J. de Wit (7), K.-H. Hofmann (8), A. Meilland (5), F. Millour (5), S. Mohamed (9,10,11), J. Sanchez-Bermudez (12)

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The star V766 Cen (=HR 5171A) was originally classified as a yellow hypergiant but lately found to more likely be a 27-36 Msun red supergiant (RSG). Recent observations indicated a close eclipsing companion in the contact or common-envelope phase. Here, we aim at imaging observations of V766 Cen to confirm the presence of the close companion. We used near-infrared H -band aperture synthesis imaging at three epochs in 2014, 2016, and 2017, employing the PIONIER instrument at the Very Large Telescope Interferometer (VLTI). The visibility data indicate a mean Rosseland angular diameter of 4.1+/-0.8 mas, corresponding to a radius of 1575+/-400 Rsun. The data show an extended shell (MOLsphere) of about 2.5 times the Rosseland diameter, which contributes about 30% of the H-band flux. The reconstructed images at the 2014 epoch show a complex elongated structure within the photospheric disk with a contrast of about 10%. The second and third epochs show qualitatively and quantitatively different structures with a single very bright and narrow feature and high contrasts of 20-30%. This feature is located toward the south-western limb of the photospheric stellar disk. We estimate an angular size of the feature of 1.7+/-0.3 mas, corresponding to a radius of 650+/-150 Rsun, and giving a radius ratio of 0.42+0.35/-0.10} compared to the primary stellar disk. We interpret the images at the 2016 and 2017 epochs as showing the close companion, or a common envelope toward the companion, in front of the primary. At the 2014 epoch, the close companion is behind the primary and not visible. Instead, the structure and contrast at the 2014 epoch are typical of a single RSG harboring giant photospheric convection cells. The companion is most likely a cool giant or supergiant star with a mass of 5+15/-3 Msun.

Reference: A&A, 606, L1
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Weblink: https://www.aanda.org/articles/aa/full_html/2017/10/aa31569-17/aa31569-17.html

Comments: See also the ESO picture of the week at
https://www.eso.org/public/images/potw1740a/

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Forming spectroscopic massive proto-binaries by disk fragmentation

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The surroundings of massive protostars constitute an accretion disc which has numerically been shown to be subject to fragmentation and responsible for luminous accretion-driven outbursts. Moreover, it is suspected to produce close binary companions which will later strongly influence the star's future evolution in the Hertzsprung-Russell diagram. We present three-dimensional gravitation-radiation-hydrodynamic numerical simulations of 100 Mo pre-stellar cores. We find that accretion discs of young massive stars violently fragment without preventing the (highly variable) accretion of gaseous clumps onto the protostars. While acquiring the characteristics of a nascent low-mass companion, some disc fragments migrate onto the central massive protostar with dynamical properties showing that its final Keplerian orbit is close enough to constitute a close massive proto-binary system, having a young high-mass and a low-mass component. We conclude on the viability of the disc fragmentation channel for the formation of such short-period binaries, and that both processes --close massive binary formation and accretion bursts-- may happen at the same time. FU-Orionis-type bursts, such as observed in the young high-mass star S255IR-NIRS3, may not only indicate ongoing disc fragmentation, but also be considered as a tracer for the formation of close massive binaries -- progenitors of the subsequent massive spectroscopic binaries -- once the high-mass component of the system will enter the main-sequence phase of its evolution.

Reference: Monthly Notices of the Royal Astronomical Society:stx2551
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Weblink: http://adsabs.harvard.edu/abs/2017arXiv171001162M

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A dearth of OH/IR stars in the Small Magellanic Cloud

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We present the results of targeted observations and a survey of 1612-, 1665-, and 1667-MHz circumstellar OH maser emission from asymptotic giant branch (AGB) stars and red supergiants (RSGs) in the Small Magellanic Cloud (SMC), using the Parkes and Australia Telescope Compact Array radio telescopes. No clear OH maser emission has been detected in any of our observations targeting luminous, long-period, large-amplitude variable stars, which have been confirmed spectroscopically and photometrically to be mid- to late-M spectral type. These observations have probed 3 - 4 times deeper than any OH maser survey in the SMC. Using a bootstrapping method with LMC and Galactic OH/IR star samples and our SMC observation upper limits, we have calculated the likelihood of not detecting maser emission in any of the two sources considered to be the top maser candidates to be less than 0.05%, assuming a similar pumping mechanism as the LMC and Galactic OH/IR sources. We have performed a population comparison of the Magellanic Clouds and used Spitzer IRAC and MIPS photometry to confirm that we have observed all high luminosity SMC sources that are expected to exhibit maser emission. We suspect that, compared to the OH/IR stars in the Galaxy and LMC, the reduction in metallicity may curtail the dusty wind phase at the end of the evolution of the most massive cool stars. We also suspect that the conditions in the circumstellar envelope change beyond a simple scaling of abundances and wind speed with metallicity.

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The dusty aftermath of SN Hunt248: merger-burst remnant?

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SN Hun248 was classified as a nonterminal eruption (a SN "impostor") from a directly identified and highly variable cool hypergiant star. The 2014 outburst achieved peak luminosity equivalent to that of the historic eruption of luminous blue variable (LBV) Eta Car, and exhibited a multipeaked optical light curve that rapidly faded after ~100 days. We report ultraviolet (UV) through optical observations of SN Hunt248 with the Hubble Space Telescope (HST) about 1 yr after the outburst, and mid-infrared

observations with the Spitzer Space Telescope before the burst and in decline. The HST data reveal a source that is a factor of ~10 dimmer in apparent brightness than the faintest available measurement of the precursor star. The UV-optical spectral energy distribution (SED) requires a strong Balmer continuum, consistent with a hot B4-B5 photosphere attenuated by grey circumstellar extinction. Substantial mid-infrared excess of the source is consistent with thermal emission from hot dust with a mass of 10^{-6} - 10^{-5} MSun and a geometric extent that is comparable to the expansion radius of the ejecta from the 2014 event. SED modeling indicates that the dust consists of relatively large grains (>0.3 um), which could be related to the grey circumstellar extinction that we infer for the UV-optical counterpart. Revised analysis of the precursor photometry is also consistent with grey extinction by circumstellar dust, and suggests that the initial mass of the star could be twice as large as previously estimated (nearly ~60 MSun). Reanalysis of the earlier outburst data shows that the peak luminosity and outflow velocity of the eruption are consistent with a trend exhibited by stellar merger candidates, prompting speculation that SN Hunt248 may also have stemmed from a massive stellar merger or common-envelope ejection.

Reference: Mauerhan, J. et al. 2017, MNRAS, in press, arXiv:1702.00430
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Weblink: https://arxiv.org/abs/1702.00430

Comments:

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An X-ray Study of Two B+B Binaries: AH Cep and CW Cep

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AH Cep and CW Cep are both early B-type binaries with short orbital periods of 1.8 d and 2.7 d, respectively. All four components are B0.5V types. The binaries are also double-lined spectroscopic and eclipsing. Consequently, solutions for orbital and stellar parameters make the pair of binaries ideal targets for a study of the colliding winds between two B~stars. Chandra ACIS-I observations were obtained to determine X-ray luminosities. AH Cep was detected with an unabsorbed X-ray luminosity at a 90% confidence interval of (9-33)e30 erg/s, or (0.5-1.7)e-7 LBol, relative to the combined Bolometric luminosities of the two components. While formally consistent with expectations for embedded wind shocks, or binary wind collision, the near-twin system of CW Cep was a surprising non-detection. For CW Cep, an upper limit was determined with LX/LBol < 1e-8, again for the combined components. One difference between these two systems is that AH Cep is part of a multiple system. The X-rays from AH Cep may not arise from standard wind shocks nor wind collision, but perhaps instead from magnetism in any one of the four components of the system. The possibility could be tested by searching for cyclic X-ray variability in AH Cep on the short orbital period of the inner B stars.

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Weblink: http://lanl.arxiv.org/abs/1710.05764

Comments:

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Winds from stripped low-mass Helium stars and Wolf-Rayet stars

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We present mass-loss predictions from Monte Carlo radiative transfer models for helium (He) stars as a function of stellar mass, down to 2 Msun. Our study includes both massive Wolf-Rayet (WR) stars and low-mass He stars that have lost their envelope through interaction with a companion. For these low-mass He-stars we predict mass-loss rates that are an order of magnitude smaller than by extrapolation of empirical WR mass-loss rates. Our lower mass-loss rates make it harder for these elusive stripped stars to be discovered via line emission, and we should attempt to find them through alternative methods instead. Moreover, lower mass-loss rates will make it less likely that low-mass He stars provide stripped-envelope supernovae (SNe) of type Ibc. We express our mass-loss predictions as a function of L and Z, and not as a function of the He abundance, as we do not consider this physically astute given our earlier work. The exponent of the dM/dt vs. Z dependence is found to be 0.61, which is less steep than relationships derived from recent empirical atmospheric modelling. Our shallower exponent will make it more challenging to produce "heavy" black holes of order 40 Msun, as recently discovered in the gravitational wave event GW 150914, making low metallicity for these types of events even more necessary.

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Are some CEMP-s stars the daughters of spinstars?

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Carbon-Enhanced Metal-Poor (CEMP)-s stars are long-lived low-mass stars with a very low iron content as well as overabundances of carbon and s-elements. Their peculiar chemical pattern is often explained by pollution from an asymptotic giant branch (AGB) star companion.
Recent observations have shown that most CEMP-s stars are in binary systems, providing support to the AGB companion scenario. A few CEMP-s stars, however, appear to be single. We inspect four apparently single CEMP-s stars and discuss the possibility that they formed from the ejecta of a previous-generation massive star, referred to as the "source" star. In order to investigate this scenario, we computed low-metallicity massive-star models with and without rotation and including complete s-process nucleosynthesis. We find that non-rotating source stars cannot explain the observed abundance of any of the four CEMP-s stars. Three out of the four CEMP-s stars can be explained by a 25 $M_{\odot}$ source

star with $v_{\rm ini} \sim 500$ km s^{-1} (spinstar). The fourth CEMP-s star has a high Pb abundance that cannot be explained by any of the models we computed. Since spinstars and AGB predict different ranges of [O/Fe] and [ls/hs], these ratios could be an interesting way to further test these two scenarios.

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BRITE-Constellation high-precision time-dependent photometry of the early-O-type supergiant Zeta Puppis unveils the photospheric drivers of its small- and large-scale wind structures

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(21) SASER Team, Domain Observatory, Australia
(22) SASER Team, Dogsheaven Observatory, Brazil
(23) SASER Team, Latham Observatory, Australia
(24) SASER Team, R. F. Joyce Observatory, New Zealand

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From 5.5 months of dual-band optical photometric monitoring at the 1 mmag level, BRITE-Constellation has revealed two simultaneous types of variability in the O4I(n)fp star Zeta Puppis: one single periodic non-sinusoidal component superimposed on a stochastic component. The monoperiodic component is the 1.78 d signal previously detected by Coriolis/SMEI, but this time along with a prominent first harmonic. The shape of this signal changes over time, a behaviour that is incompatible with stellar oscillations but consistent with rotational modulation arising from evolving bright surface inhomogeneities. By means of a constrained non-linear light curve inversion algorithm we mapped the locations of the bright surface spots and traced their evolution. Our simultaneous ground-based multi-site spectroscopic monitoring of the star unveiled cyclical modulation of its He II 4686 wind emission line with the 1.78-day rotation period, showing signatures of Corotating Interaction Regions (CIRs) that turn out to be driven by the bright photospheric spots observed by BRITE. Traces of wind clumps are also observed in the He II 4686 line and are correlated with the amplitudes of the stochastic component of the light variations probed by BRITE at the photosphere, suggesting that the BRITE observations additionally unveiled the photospheric drivers of wind clumps in Zeta Pup and that the clumping phenomenon starts at the very base of the wind. The origins of both the bright surface inhomogeneities and the stochastic light variations remain unknown, but a subsurface convective zone might play an important role in the generation of these two types of photospheric variability.

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Weblink: https://arxiv.org/abs/1710.08414

Comments: 44 pages, 28 figures, 6 Tables

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2D wind clumping in hot, massive stars from hydrodynamical line-driven instability simulations using a pseudo-planar approach

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1 - KU Leuven; 2 - University of Delaware; 3 - University of Munich

Context: Clumping in the radiation-driven winds of hot, massive stars arises naturally due to the strong, intrinsic instability of line-driving (the `LDI'). But LDI wind models have so far mostly been limited to 1D, mainly because of severe computational challenges regarding calculation of the multi-dimensional radiation force. Aims: To simulate and examine the dynamics and multi-dimensional nature of wind structure resulting from the LDI. Methods: We introduce a `pseudo-planar', `box-in-a-wind' method that allows us to efficiently compute the line-force in the radial and lateral directions, and then use this approach to carry out 2D radiation-hydrodynamical simulations of the time-dependent wind. Results: Our 2D simulations show that the LDI first manifests itself by mimicking the typical shell-structure seen in 1D models, but how these shells then quickly break up into complex 2D density and velocity structures,

characterized by small-scale density `clumps' embedded in larger regions of fast and rarefied gas. Key results of the simulations are that density variations in the well-developed wind statistically are quite isotropic and that characteristic length-scales are small; a typical clump size is ~0.01R at 2R, thus resulting also in rather low typical clump-masses ~10^17 g. Overall, our results agree well with the theoretical expectation that the characteristic scale for LDI-generated wind-structure is of order the Sobolev length. We further confirm some earlier results that lateral `filling-in' of radially compressed gas leads to somewhat lower clumping factors in 2D simulations than in comparable 1D models. We conclude by discussing an extension of our method toward rotating LDI wind models that exhibit an intriguing combination of large- and small-scale structure extending down to the wind base.

Reference: arXiv:1710.07780, Accepted for A&A
Status: Manuscript has been accepted

Weblink: http://adsabs.harvard.edu/abs/2017arXiv171007780S

Comments:

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CLOSED JOBS

Fizeau exchange visitors program in optical interferometry - call for applications

Josef Hron & Peter Abraham

European Interferometry Initiative

The Fizeau exchange visitors program in optical interferometry funds (travel and accommodation) visits of researchers to an institute of his/her choice (within the European Community) to perform collaborative work and training on one of the active topics of the European Interferometry Initiative. The visits will typically last for one month, and strengthen the network of astronomers engaged in technical, scientific and training work on optical/infrared interferometry. The program is open for all levels of astronomers (Ph.D. students to tenured staff), with priority given to PhD students and young postdocs. Non-EU based missions will only be funded if considered essential by the Fizeau Committee.
Applicants are strongly encouraged to seek also partial support from their home or host institutions.

The deadline for applications is October 15. Fellowships can be awarded for missions to be carried out between December 2017 and May 2018!

Further informations and application forms can be found at: www.european-interferometry.eu

The program is funded by OPTICON/H2020.

Please distribute this message also to potentially interested colleagues outside of your community!

Looking forward to your applications,
Josef Hron & Peter Abraham
(for the European Interferometry Initiative)

Reference: www.european-interferometry.eu
Status: Other

Weblink: www.european-interferometry.eu

Comments:

Email: fizeau@european-interferometry.eu

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MUNI Award in Science and Humanities

Jiri Krticka

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Czech Republic

Masaryk University, Brno, Czech Republic opens a call for excellent scientists for working on their own scientific projects. The award offers the opportunity to get:
- 5 years long tenure-track professorship with a possibility to gain a permanent contract.
- A budget of approx. 230 000 USD/ a year for a 5 year period.
- Associate or full professorship.
- Laboratory and office space for the research team.
- Welcome service and administrative support.

Scientists willing to work in the field of research of individual DTPA members (massive stars, chemically peculiar stars, binaries, open clusters, and related fields) may wish to contact local person to get the support.

Attention/Comments:

Weblink: https://gamu.muni.cz/en/mash

Email: krticka@physics.muni.cz

Deadline: November 3rd, 2017

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MEETINGS

Imaging of Stellar Surfaces

March 5 - 9, 2018

Venue: ESO Headquarters, Garching, Germany

First Announcement

ESO Workshop "Imaging of Stellar Surfaces"

http://www.eso.org/sci/meetings/2018/Imaging-Stellar-Surfaces.html

March 5 - 9, 2018

Venue: ESO Headquarters, Garching, Germany

Maximum number of participants: 70

Scientific Rationale:
Until very recently, all information about mechanisms affecting the stellar surface came either from indirect observations or from studies of the Sun. The stellar surface is the locus where we first interface with the mechanisms happening at the interior of the stars such as convection, magnetic field, and diffusion producing abundance anomalies. Studying stellar surfaces is important for advancing our understanding of these physical processes.

There is currently a tremendous advance of different observational techniques that enable us to resolve the surfaces of stars other than the sun. The Very Large Telescope Interferometer (VLTI) is transitioning from its first generation instruments, which focused on spectro-interferometry, to the second generation instruments, which focus on spectro-imaging and astrometry. The VLTI instrument PIONIER has already shown its capabilities and great potential to resolve stellar surfaces, while the instruments GRAVITY and MATISSE are coming into operations. The VLT instrument SPHERE is resolving the surfaces of the apparently largest stars as well. At the same time, ALMA observations have suceeded to resolve stellar surfaces at millimetre wavelengths with its long baselines. A number of other interferometers at optical and radio wavelengths have been successful to resolve stellar surfaces as well, including CHARA, VLA, e-MERLIN.

In the last one or two years we have seen great progress in resolving surfaces of active stars such as zet And, of red giants such as R Dor, of asymptotic giant branch stars such as Mira or R Scl, and of red supergiants such as Betelgeuse, Antares, VY CMa, with these different techniques at multiple wavelengths from the visual to the radio.

Stellar atmosphere models have also been advancing, during a similar time frame, from 1D models to 3D models including the effects of convection. Interaction between observations and theory of stellar atmospheres is of utmost importance to constrain the models and to advance our understanding of physical processes such as pulsation, convection, chromospheric activity.

This workshop aims to bring together observers from different techniques and wavelengths and theoreticians working on stellar atmosphere and stellar structure. Presentations will include recent individual results of stellar surface mapping and the corresponding modelling. Observational strategies to advance in this field will be discussed. In addition, we will dedicate a session to the prospect of resolving stellar surfaces of stars other than the sun with future facilities such as the ELT or the JWST, or with intensity interfermetry/CTA.

We also aim to share technical, observational, and modeling expertise with a larger community. We will discuss how the different communities (VLT, VLTI, CHARA, ALMA, HST/JWST) deal with the image reconstruction problem and with the physical interpretation of the images.

We aim at a focused workshop with ample of time for discussions on recent images of stellar surfaces and atmospheres (out to below a few stellar radii), the observational strategies, and the relevant physical processes. The number of participants will be limited to 70.

SOC:
Bernd Freytag (Uppsala University, Sweden), Xavier Haubois (ESO), Liz Humphreys (ESO, co-chair),

Lynn Matthews (MIT Haystack, USA), Claudia Paladini (ESO), Oskar von der Luehe (Albert-Ludwigs-Universitat Freiburg, Germany), Markus Wittkowski (ESO, co-chair)

Invited Speakers: to be confirmed

Topics:
- The Sun as a star: Physical processes affecting the Sun's surface and overviews of recent observations at optical and sub-mm wavelengths
- Physical processes
-- Convection
-- Pulsation
-- Magnetic fields
-- Chromospheric activity
-- Close companions
-- Rotation
- Red giants including active giants
- Asymptotic giant branch stars
- Red supergiants
- Imaging techniques and observational strategies
- Future facilities

We plan to start the workshop on Monday lunchtime and to finish on Friday lunchtime.

Contact: ioss@eso.org

Weblink: http://www.eso.org/sci/meetings/2018/Imaging-Stellar-Surfaces.html

Email: ioss@eso.org

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Star Formation and Young Stars in Cygnus

31st January - 2nd February 2018

Venue: Keele University, UK

The Cygnus star forming complex is the nearest truly massive star forming region to the Sun. It is home to hundreds of thousands of young stars and many thousands of massive O and B-type stars, in multiple star clusters and OB associations, including the prominent Cygnus OB2 association. In the massive Cygnus X giant molecular cloud star formation is still ongoing in numerous sites, particularly the DR21 molecular filament, which is actively forming massive stars. The region has drawn comparison with young massive clusters and star forming regions in our galaxy and in neighbouring galaxies, yet at a distance of only 1.4 kpc it can be studied at a level of detail not accessible to more distant regions.

Following many exciting results from NASA’s Spitzer and Chandra space telescopes and ESA’s Herschel Space Obser- vatory we are poised to enter a new era of discovery thanks to upcoming data releases from ESA’s astrometric Gaia satellite and forthcoming spectrosopic surveys with WEAVE/WHT. This workshop will bring together experts in the Cygnus region to present recent results and discuss our understanding of the entire Cygnus star forming complex.

The final day of the meeting will focus on planning the upcoming WHT/WEAVE survey of Cygnus (P.I. A. Herrero) and will be open to survey members and interested individuals from WEAVE member countries.

There is no registration fee for this meeting, but the number of participants will be limited so prior registration is required. If you would like to attend please send an email to nick.nwright@gmail.com including your full name and affiliation.

If you would like to present an oral contribution at the meeting please also send a title and brief abstract by 1st December 2017. We will endeavour to provide all attendees with an opportunity to present their work.

Organisers: Nick Wright (Keele University) and Artemio Herrero (Instituto de Astrofisica de Canarias)

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

Email: nick.nwright@gmail.com

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