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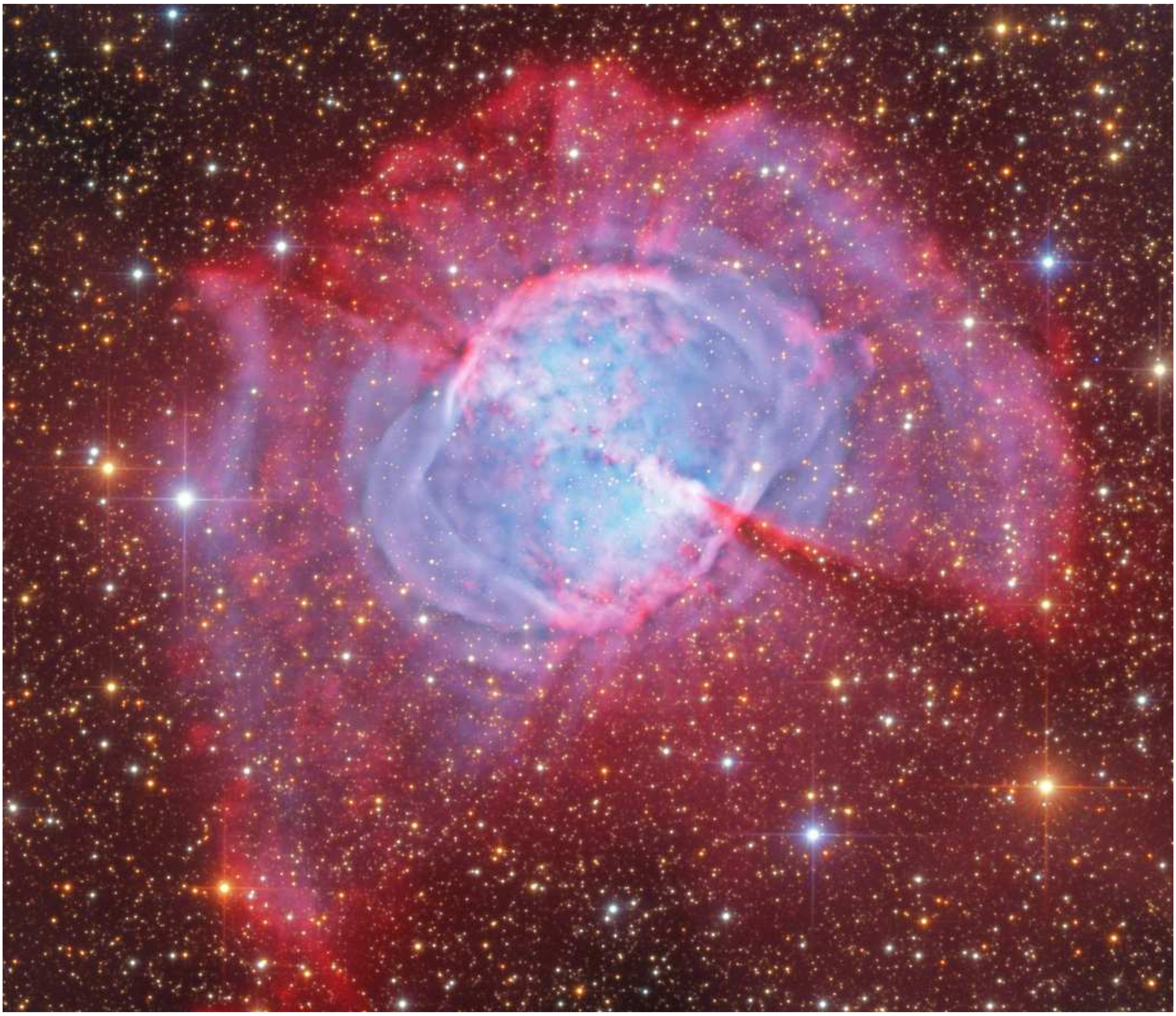

Figure 1: The planetary nebula Messier 27. More than 4 hr exposures in each of Hα, [O III] and broadband filters show a striking halo and dark filaments surounding the iconic Dumbbell nebula. The images were taken with a 14-inch f/3.8 Newtonian from Spain, by Fabian Neyer and Robert Pölzl. See http://www.starpointing.com/ccd/m27.html

Editorial

Dear Colleagues,

It is our pleasure to present you the 225$^{\rm th}$ issue of the AGB Newsletter. Please check that your abstract or announcement appeared in this, or in the previous edition. In February, after a ten-year service, the server of the Astrophysics group at Keele University died. This caused the newsletter database to be off-line for a week. The new server suffered a hickup, but it seems to have been stable for a month now so we are not expecting any further problems. However, if you tried to submit items during the times of malfunction, you may not have noticed anything wrong but they will not have entered the database (even if you did receive a confirmation e-mail). In that case, please resubmit or contact us.

Congratulations to Paul Stewart on his Ph.D.!

There is a job opening for a postdoc in Denver, and a Ph.D. position in Leuven.

Don't forget the meeting in Vietnam!

This month's Food for Thought was suggested by Sakib Rasool. Comments are welcome, as are suggestions for future Food for Thoughts.

The next issue is planned to be distributed around the 1$^{\rm st}$ of May.

Editorially Yours,
Jacco van Loon, Ambra Nanni and Albert Zijlstra

Food for Thought

This month's thought-provoking statement is:

Is the ubiquitous background Hα nebulosity in the Milky Way partly comprised of the remains of past planetary nebulæ and other ejecta?

Reactions to this statement or suggestions for next month's statement can be e-mailed to astro.agbnews@keele.ac.uk (please state whether you wish to remain anonymous)

Refereed Journal Papers

Testing the asymptotic relation for period spacings from mixed modes of red giants observed with the *Kepler* mission

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Dipole mixed pulsation modes of consecutive radial order have been detected for thousands of low-mass red-giant stars with the NASA space telescope *Kepler*. Such modes have the potential to reveal information on the physics of the deep stellar interior. Different methods have been proposed to derive an observed value for the gravity-mode period spacing, the most prominent one relying on a relation derived from asymptotic pulsation theory applied to the gravity-mode character of the mixed modes. Our aim is to compare results based on this asymptotic relation with those derived from an empirical approach for three pulsating red-giant stars. We developed a data-driven method to perform frequency extraction and mode identification. Next, we used the identified dipole mixed modes to determine the gravity-mode period spacing by means of an empirical method and by means of the asymptotic relation. In our methodology, we consider the phase offset, $\epsilon_{\rm g}$, of the asymptotic relation as a free parameter. Using the frequencies of the identified dipole mixed modes for each star in the sample, we derived a value for the gravity-mode period spacing using the two different methods. These differ by less than 5%. The average precision we achieved for the period spacing derived from the asymptotic relation is better than 1%, while that of our data-driven approach is 3%. Good agreement is found between values for the period spacing derived from the asymptotic relation and from the empirical method. Full abstract in PDF file on arXiv.

Accepted for publication in A&A
Available from arXiv:1602.02716

Problems for the WELS classification of planetary nebulæ central stars: Self-consistent nebular modelling of four candidates

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We present integral field unit (IFU) spectroscopy and self-consistent photoionisation modelling for a sample of four southern Galactic planetary nebulæ (PNe) with supposed weak emission-line (WEL) central stars. The Wide Field Spectrograph (WiFeS) on the ANU 2.3 m telescope has been used to provide IFU spectroscopy for NGC 3211, NGC 5979, My 60, and M 4-2 covering the spectral range of 3400–7000 Å. All objects are high excitation non-Type I PNe, with strong He II emission, strong [Ne V] emission, and weak low-excitation lines. They all appear to be predominantly optically-thin nebulæ excited by central stars with $T_{\rm eff} > 105$ K. Three PNe of the sample have central stars which have been previously classified as weak emission-line stars (WELS), and the fourth also shows the characteristic

recombination lines of a WELS. However, the spatially-resolved spectroscopy shows that rather than arising in the central star, the C IV and N III recombination line emission is distributed in the nebula, and in some cases concentrated in discrete nebular knots. This may suggest that the WELS classification is spurious, and that, rather, these lines arise from (possibly chemically enriched) pockets of nebular gas. Indeed, from careful background subtraction we were able to identify three of the sample as being hydrogen rich O(H)-Type. We have constructed fully self-consistent photoionization models for each object. This allows usto independently determine the chemical abundances in the nebulae, to provide new model-dependent distance estimates, and to place the central stars on the H–R diagram. All four PNe have similar initial mass ($1.5 < M/\mathrm{M}_\odot < 2.0$) and are at a similar evolutionary stage.

Accepted for publication in MNRAS
Available from arXiv:1602.08708

Imaging the dust sublimation front of a circumbinary disk

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Aims: We present the first near-IR milli-arcsecond-scale image of a post-AGB binary that is surrounded by hot circumbinary dust.
Methods: A very rich interferometric data set in six spectral channels was acquired of IRAS 08544−4431 with the new RAPID camera on the PIONIER beam combiner at the Very Large Telescope Interferometer (VLTI). A broadband image in the H band was reconstructed by combining the data of all spectral channels using the SPARCO method.
Results: We spatially separate all the building blocks of the IRAS 08544−4431 system in our milliarcsecond-resolution image. Our dissection reveals a dust sublimation front that is strikingly similar to that expected in early-stage protoplanetary disks, as well as an unexpected flux signal of 4% from the secondary star. The energy output from this companion indicates the presence of a compact circum-companion accretion disk, which is likely the origin of the fast outflow detected in H.
Conclusions: Our image provides the most detailed view into the heart of a dusty circumstellar disk to date. Our results demonstrate that binary evolution processes and circumstellar disk evolution can be studied in detail in space and over time.

Published in A&A Letters
Available from arXiv:1603.03023
and from http://www.eso.org/public/news/eso1608/

Clumpy dust clouds and extended atmosphere of the AGB star W Hya revealed with VLT/SPHERE-ZIMPOL and VLTI/AMBER

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We present visible polarimetric imaging observations of the well-studied AGB star W Hya taken with VLT/SPHERE-ZIMPOL as well as high spectral resolution long-baseline interferometric observations with the AMBER instrument of the Very Large Telescope Interferometer (VLTI). We observed W Hya with VLT/SPHERE-ZIMPOL at three wavelengths in the continuum (645, 748, and 820 nm), in the Hα line at 656.3 nm, and in the TiO band at 717 nm. The VLTI/AMBER observations were carried out in the wavelength region of the CO first overtone lines near 2.3 μm

with a spectral resolution of 12 000. Taking advantage of the polarimetric imaging capability of SPHERE-ZIMPOL combined with the superb adaptive optics performance, we have succeeded in spatially resolving three clumpy dust clouds located at ~ 50 mas ($\sim 2\ R_\star$) from the central star, revealing dust formation very close to the star. The AMBER data in the individual CO lines suggest a molecular outer atmosphere extending to $\sim 3\ R_\star$. Furthermore, the SPHERE-ZIMPOL image taken over the Hα line shows emission with a radius of up to ~ 160 mas ($\sim 7\ R_\star$). We found that dust, molecular gas, and Hα-emitting hot gas are coexisting within 2–3 $R_\star$. Our modeling suggests that the observed polarized intensity maps can reasonably be explained by large (0.4–0.5 μm) grains of Al_2O_3 or Mg_2SiO_4 or $MgSiO_3$ in an optically thin shell with an inner boundary radius of 1.9–2.0 $R_\star$. The observed clumpy structure can be reproduced by a density enhancement by a factor of 4 ± 1. The grain size derived from our polarimetric images is consistent with the prediction of the hydrodynamical models for the mass loss driven by the scattering due to micron-sized grains. The detection of the clumpy dust clouds close to the star lends support to the dust formation induced by pulsation and large convective cells as predicted by the 3-D simulations for AGB stars.

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Extreme abundance ratios in the polluted atmosphere of the cool white dwarf NLTT 19868

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We present an analysis of intermediate-dispersion spectra and photometric data of the newly identified cool, polluted white dwarf NLTT 19868. The spectra obtained with X-shooter on the Very Large Telescope (VLT)-Melipal show strong lines of calcium, and several lines of magnesium, aluminium and iron. We use these spectra and the optical-to-near infrared spectral energy distribution to constrain the atmospheric parameters of NLTT 19868. Our analysis shows that NLTT 19868 is iron poor with respect to aluminium and calcium. A comparison with other cool, polluted white dwarfs shows that the Fe to Ca abundance ratio (Fe/Ca) varies by up to approximately two orders of magnitudes over a narrow temperature range with NLTT 19868 at one extremum in the Fe/Ca ratio and, in contrast, NLTT 888 at the other extremum. The sample shows evidence of extreme diversity in the composition of the accreted material: In the case of NLTT 888, the inferred composition of the accreted matter is akin to iron-rich planetary core composition, while in the case of NLTT 19868 it is close to mantle composition depleted by subsequent chemical separation at the bottom of the convection zone.

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Radiation pressure on fluffy submicron-sized grains

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We investigate the claim that the ratio β of radiation pressure force to gravitational force on a dust grain in our solar system can substantially exceed unity for some grain sizes, provided that grain porosity is high enough. For model grains consisting of random aggregates of silicate spherules, we find that the maximum value of β is almost independent of grain porosity, but for small ($< 0.3\ \mu$m) grains, β actually decreases with increasing porosity. We also investigate the effect of metallic iron and amorphous carbon inclusions in the dust grains and find that while these inclusions do increase the radiation pressure cross-section, β remains below unity for grains with 3 pg of silicate material. These results affect the interpretation of the grain trajectories estimated from the Stardust mission, which were modeled assuming β values exceeding one. We find that radiation pressure effects are not large enough for particles Orion and Hylabrook captured by Stardust to be of interstellar origin given their reported impact velocities. We also consider

the effects of solar radiation on transverse velocities and grain spin, and show that radiation pressure introduces both transverse velocities and equatorial spin velocities of several hundred meters per second for incoming interstellar grains at 2 au. These transverse velocities are not important for modeling trajectories, but such spin rates may result in centrifugal disruption of aggregates.

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Evolution of thermally pulsing asymptotic giant branch stars V: Constraining the mass loss and lifetimes of intermediate mass, low metallicity AGB stars

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Thermally-Pulsing Asymptotic Giant Branch (TP-AGB) stars are relatively short lived (less than a few Myr), yet their cool effective temperatures, high luminosities, efficient mass-loss and dust production can dramatically effect the chemical enrichment histories and the spectral energy distributions of their host galaxies. The ability to accurately model TP-AGB stars is critical to the interpretation of the integrated light of distant galaxies, especially in redder wavelengths. We continue previous efforts to constrain the evolution and lifetimes of TP-AGB stars by modeling their underlying stellar populations. Using *Hubble* Space Telescope (HST) optical and near-infrared photometry taken of 12 fields of 10 nearby galaxies imaged via the ACS Nearby Galaxy Survey Treasury and the near-infrared HST/SNAP follow-up campaign, we compare the model and observed TP-AGB luminosity functions as well as the number ratio of TP-AGB to red giant branch stars. We confirm the best-fitting mass-loss prescription, introduced by Rosenfield et al. (2014), in which two different wind regimes are active during the TP-AGB, significantly improves models of many galaxies that show evidence of recent star formation. This study extends previous efforts to constrain TP-AGB lifetimes to metallicities ranging $-1.59 < [\mathrm{Fe/H}] < -0.56$ and initial TP-AGB masses up to $\sim 4\ \mathrm{M}_\odot$, which include TP-AGB stars that undergo hot-bottom burning.

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Wind mass transfer in S-type symbiotic binaries II. Indication of the wind focusing

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Context: The wind mass transfer from a giant to its white dwarf companion in symbiotic binaries is not well understood. For example, the efficiency of wind mass transfer of the canonical Bondi–Hoyle accretion mechanism is too low to power the typical luminosities of the accretors. However, recent observations and modelling indicate a considerably more efficient mass transfer in symbiotic binaries.
Aims: We determine the velocity profile of the wind from the giant at the near-orbital-plane region of eclipsing S-type symbiotic binaries EG And and SY Mus, and derive the corresponding spherical equivalent of the mass-loss rate. With

this approach, we indicate the high mass transfer ratio.
Methods: We achieved this aim by modelling the observed column densities taking into account ionization of the wind of the giant, whose velocity profile is derived using the inversion of Abel's integral operator for the hydrogen column density function.
Results: Our analysis revealed the spherical equivalent of the mass-loss rate from the giant to be a few times 10^{-6} $M_\odot$ yr^{-1} , which is a factor of $\gtrsim$10 higher than rates determined by methods that do not depend on the line of sight. This discrepancy rules out the usual assumption that the wind is spherically symmetric. As our values were derived from near-orbital-plane column densities, these values can be a result of focusing the wind from the giant towards the orbital plane.
Conclusions: Our findings suggests that the wind from giants in S-type symbiotic stars is not spherically symmetric, since it is enhanced at the orbital plane and, thus, is accreted more effectively onto the hot component.

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HST STIS observations of the mixing layer in the Cat's Eye Nebula

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Planetary nebulæ (PNe) are expected to have a $\sim 10^5$ K interface layer between the $\geq 10^6$ K inner hot bubble and the $\sim 10^4$ K optical nebular shell. The PN structure and evolution, and the X-ray emission depend critically on the efficiency of mixing of material at this interface layer. However, neither its location nor its spatial extent has ever been determined so far. Using high-spatial resolution HST STIS spectroscopic observations of the N V $\lambda\lambda$1239,1243 lines in the Cat's Eye Nebula (NGC 6543), we have detected this interface layer and determined its location, extent, and physical properties for the first time in a PN. We confirm that this interface layer, as revealed by the spatial distribution of the N V λ1239 line emission, is located between the hot bubble and the optical nebular shell. We estimate a thickness of 1.5×10^{16} cm and an electron density of ~ 200 cm^{-3} for the mixing layer. With a thermal pressure of $\sim 2 \times 10^{-8}$ dyn cm^{-2}, the mixing layer is in pressure equilibrium with the hot bubble and ionized nebular rim of NGC 6543.

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The chemical composition of red giants in 47 Tucanae. II. Magnesium isotopes and pollution scenarios

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The phenomenon of multiple populations in globular clusters is still far from understood, with several proposed mechanisms to explain the observed behaviour. The study of elemental and isotopic abundance patterns are crucial for investigating the differences among candidate pollution mechanisms. We derive magnesium isotopic ratios for 13 stars in the globular cluster 47 Tucanæ (NGC 104) to provide new, detailed information about the nucleosynthesis that has occurred within the cluster. For the first time, the impact of 3D model stellar atmospheres on the derived Mg isotopic ratios is investigated. Using both tailored 1D atmospheric models and 3D hydrodynamical models, we derive magnesium isotopic ratios from four features of MgH near 5135 Å in 13 giants near the tip of the RGB, using high signal-to-noise, high-resolution spectra. We derive the magnesium isotopic ratios for all stars and find no significant offset of the isotopic distribution between the pristine and the polluted populations. Furthermore, we do not detect any statistically significant differences in the spread in the Mg isotopes in either population. No trends were found between the Mg isotopes and [Al/Fe]. The inclusion of 3D atmospheres has a significant impact on the derived ^{25}Mg/^{24}Mg ratio, increasing it by a factor of up to 2.5, compared to 1D. The ^{26}Mg/^{24}Mg ratio, on the other hand, essentially remains unchanged. We confirm the results seen from other globular clusters, where no strong variation in the isotopic ratios is observed between stellar populations, for observed ranges in [Al/Fe]. We see no evidence for any significant activation of the Mg–Al burning chain. The use of 3D atmospheres causes an increase of a factor of up to 2.5 in the fraction of ^{25}Mg, resolving part of the discrepancy between the observed isotopic fraction and the predictions from pollution models.

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Spitzer mid-infrared spectroscopic observations of planetary nebulæ

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We present *Spitzer* Space Telescope archival mid-infrared (mid-IR) spectroscopy of a sample of eleven planetary nebulæ (PNe). The observations, acquired with the *Spitzer* Infrared Spectrograph (IRS), cover the spectral range 5.2–14.5 μm that includes the H_2 0–0 S(2) to S(7) rotational emission lines. This wavelength coverage has allowed us to derive the Boltzmann distribution and calculate the H_2 rotational excitation temperature ($T_{\rm ex}$). The derived excitation temperatures have consistent values $\sim 900 \pm 70$ K for different sources despite their different structural components. We also report the detection of mid-IR ionic lines of [Ar III], [S IV], and [Ne II] in most objects, and polycyclic aromatic hydrocarbon (PAH) features in a few cases. The decline of the [Ar III]/[Ne II] line ratio with the stellar effective temperature can be explained either by a true neon enrichment or by high density circumstellar regions of PNe that presumably descend from higher mass progenitor stars.

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The extinction and dust-to-gas structure of the planetary nebula NGC 7009 observed with MUSE

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The large field and wavelength range of MUSE is well suited to mapping Galactic planetary nebulæ (PN). The bright

PN NGC 7009 was observed with MUSE on the VLT during the Science Verification of the instrument in seeing of $\sim 0\farcs6$. Emission line maps in hydrogen Balmer and Paschen lines were formed from analysis of the MUSE cubes. The measured electron temperature and density from the MUSE cube were employed to predict the theoretical hydrogen line ratios and map the extinction distribution across the nebula. After correction for the interstellar extinction to NGC 7009, the internal dust-to-gas ratio (A_V/N_H) has been mapped for the first time in a PN. The extinction map of NGC 7009 has considerable structure, broadly corresponding to the morphological features of the nebula. A large-scale feature in the extinction map, consisting of a crest and trough, occurs at the rim of the inner shell. The nature of this feature was investigated and instrumental and physical causes considered; no convincing mechanisms were identified to produce this feature, other than mass loss variations in the earlier asymptotic giant branch phase. The dust-to-gas ratio A_V/N_H increases from 0.7 times the interstellar value to > 5 times from the centre towards the periphery of the ionized nebula. The integrated A_V/N_H is about 2 times the mean ISM value. It is demonstrated that extinction mapping with MUSE provides a powerful tool for studying the distribution of PN internal dust and the dust-to-gas ratio. (Abridged.)

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Searching for cool dust in the mid-to-far infrared: The mass-loss histories of the hypergiants μ Cep, VY CMa, IRC +10°420, and ρ Cas

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We present mid- and far-IR imaging of four famous hypergiant stars: the red supergiants μ Cep and VY CMa, and the warm hypergiants IRC +10°420 and ρ Cas. Our 11–37 μm SOFIA/FORCAST imaging probes cool dust not detected in visual and near-IR imaging studies. Adaptive optics 8–12 μm imaging of μ Cep and IRC +10°420 with MMT/MIRAC reveals extended envelopes that are the likely sources of these stars' strong silicate emission features. We find μ Cep's mass-loss rate to have declined by about a factor of five over a 13,000 year history, ranging from 5×10^{-6} down to $\sim 1 \times 10^{-6}$ $M_\odot$ yr^{-1}. The morphology of VY CMa indicates a cooler dust component coincident with the highly asymmetric reflection nebulæ seen in the visual and near-IR. The lack of cold dust at greater distances around VY CMa indicates that its mass-loss history is limited to the last ~ 1200 years, with an average rate of 6×10^{-4} $M_\odot$ yr^{-1}. We find two distinct periods in the mass-loss history of IRC +10°420 with a high rate of 2×10^{-3} $M_\odot$ yr^{-1} until approximately 2000 years ago, followed by an order of magnitude decrease in the recent past. We interpret this change as evidence of its evolution beyond the RSG stage. Our new infrared photometry of ρ Cas is consistent with emission from the expanding dust shell ejected in its 1946 eruption, with no evidence of newer dust formation from its more recent events.

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Available from http://adsabs.harvard.edu/abs/2016AJ....151...51S

Conference Paper

On the formation of molecules and solid-state compounds from the AGB to the PN phases

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During the asymptotic giant branch (AGB) phase, different elements are dredge-up to the stellar surface depending on progenitor mass and metallicity. When the mass loss increases at the end of the AGB, a circumstellar dust shell is formed, where different (C-rich or O-rich) molecules and solid-state compounds are formed. These are further processed in the transition phase between AGB stars and planetary nebulæ (PNe) to create more complex organic molecules and inorganic solid-state compounds (e.g., polycyclic aromatic hydrocarbons, fullerenes, and graphene precursors in C-rich environments and oxides and crystalline silicates in O-rich ones). We present an observational review of the different molecules and solid-state materials that are formed from the AGB to the PN phases. We focus on the formation routes of complex fullerene (and fullerene-based) molecules as well as on the level of dust processing depending on metallicity.

Oral contribution, published in "The 11$^{\text{th}}$ Pacific Rim Conference on Stellar Astrophysics: Physics and Chemistry of the Late Stages of Stellar Evolution", IOP Publishing Ltd. (Invited Review)
Available from arXiv:1603.00723

Thesis

Stellar astrophysics with *Cassini*: Syzygies, stardust, and the sizes of stars

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The *Cassini* spacecraft has been exploring the complex and fascinating Saturnian system for over a decade. This thesis presents *Cassini* observations employed for the study of evolved stars. Utilising the on-board near-infrared spectrometer, we demonstrate the recovery of flux calibrated stellar spectra. Data were taken from a publicly-accessible archive, and the overwhelming majority were obtained for various spacecraft engineering and calibration purposes; their application to stellar astrophysics being an opportunistic extension to the mission outcomes. An atlas of stellar spectra has been compiled utilising existing observations acquired to monitor the performance of the instrument. Exploiting archival observations of stars as they are occulted by edges within Saturn's rings, we demonstrate the recovery of stellar spatial information, specifically angular diameters, and compare these to measurements from ground-based interferometry. High-resolution two-dimensional images of stellar environments are reconstructed by tomographically combining these occultation observations from different edges within the planetary rings. An extensive astrophysical study of the evolved star Mira employing all of these techniques over multiple epochs reveals spectrally dependant molecular shells in its extended atmosphere, and allows for the appraisal of state-of-the-art models which aim to describe the atmospheres of such stars. Finally, the carbon star, IRC +10°216 is shown to be embedded in a dynamic shroud of thick dusty circumstellar clouds, challenging existing models of the inner structure of the stellar environment.

Available from http://www.physics.usyd.edu.au/~pste0726/papers/stewart_pn_thesis.pdf

Job Adverts

Institute of Astronomy, K.U. Leuven, Belgium
Ph.D. position at K.U. Leuven in collaboration with University of Nijmegen

The Institute of Astrophysics of the K.U. Leuven (Belgium) seeks a highly-motivated excellent Ph.D. candidate ready to complement our team in our project to investigate binary interaction physics in low- to intermediate mass stars.

The impact of binarity on the evolution of low- to intermediate mass stars is an important yet poorly understood domain of stellar astrophysics. This project focuses on those interacting systems where one of the components has gone through a giant star phase. Population synthesis models predict the final period distribution of evolved binaries to be bi-modal in which the "common evelope" channel results in short-period binaries ($P \sim 10$ day) and the wider systems ($P > 1000$ days) do not (strongly) interact.. The orbital periods of around 1000 days are least predicted and lie in the middle of the bi-modal distribution. However, these predictions are in stark contrast to the observed periods! Our ongoing large radial-velocity monitoring campaign using our own HERMES spectrograph on the Flemish 1.2m Mercator telescope, has resulted in the discovery of many evolved binaries with periods in-between 100 and a 2000 days. In this project we will investigate several physical interaction processes which may lead to the binaries we observe. Once the binary channels are identified, we will compute population synthesis models to evaluate the impact of the newly identified interaction processes on the predicted binary population. The project therefore involves an observational component but also a strong computational component including population synthesis. On the basis of a well constrained set of orbital data, this project aims at a significant progress in our understanding of binary interaction physics of low- to intermediate-mass stars.

In the link you will find also other vacancies at our institute.

See also http://fys.kuleuven.be/ster/vacancies

University of Denver, USA
Post-doctoral researcher

Applications are invited for a postdoctoral position to engage in scientific investigations based on far-IR mapping and spectroscopic data of the circumstellar shells of evolved stars taken with the *Herschel* Space Observatory. This work is an extension of our mini-survey of planetary nebulæ (PNe), dubbed HerPlaNS (*Herschel* Planetary Nebula Survey; PI: T. Ueta), which was performed during OT1 to probe both the gas and dust components in the target PNe, and is intended to tap into the entire *Herschel* Science Archive (HSA) to assemble far-IR imaging and spectroscopic data of the circumstellar environments of various stellar types. Through these investigations, we will consider the energetics of the entire gas-dust system as a function of location in the nebulæ. The HSA data will allow us to take this novel approach, which has rarely been taken previously. The successful applicant is expected to play a significant role in all aspects of the project, including the data processing (both images and spectra) through analysis and interpretation of the results. The applicant would work with Dr. Toshiya Ueta at the University of Denver (DU) plus his collaborators involved in the project scattered all across the globe. Beyond these duties, the successful candidate can carry out one's own research initiative (i.e., time is allowed for such activities). Applicants are welcome to contact Dr. Ueta to discuss the position further.

Preference will be given to candidates with strong evidence of scientific maturity and productivity, experience in analysis of far-IR imaging/spectroscopic data and of numerical modeling of low to high temperature gas in the circumstellar context (molecular gas, PDR, H II regions, etc.), and good writing skills. Applicants must have a Ph.D. in Astronomy, Physics, or a closely related field before assuming the post. The position can start as soon as possible, with strong preference given to applicants who can begin by the summer/fall of 2016 at the latest. Funding is guaranteed for the first year, and is expected to continue for the second year contingent upon the candidate's performance during the first year.

Candidates must apply online through https://dujobs.silkroad.com/ to be considered. Only applications submitted online will be accepted (however, applicants are highly encouraged to send the same application package directly to Dr. Ueta as well). Once within the job description online, please click New Resume/CV at the bottom of the page to begin application. Applicants must submit a cover letter, a curriculum vitæ with a publication list, a two-page statement of relevant research experience, and the names of at least two people who can be contacted for letters of recommendation (and have your references email a letter of reference directly to Dr. Ueta). NOTE: The online system is limited to uploading 5 files. Please combine content if necessary to get all content uploaded. Review will begin as soon as possible and continue until the position is filled. If you have questions regarding this position please contact: Toshiya Ueta at Toshiya.Ueta@du.edu.

The University of Denver is a private university with approximately 12,000 students located in a thriving metropolis at the base of the Rocky Mountains. The Department of Physics and Astronomy offers research programs in astrophysics, biophysics and condensed matter physics. Our diverse and dynamic faculty of 11 includes 3 women and come from 7 different countries. The University of Denver is committed to enhancing the diversity of its faculty and staff and encourages applications from women, minorities, members of the LBGT community, people with disabilities and veterans. The University is an equal opportunity/affirmative action employer. More information about the department can be found at http://www.physics.du.edu.

Announcement

Last announcement for Conference 'Blowing in the wind', 7–13 August 2016, ICISE Quy nhon, Vietnam

Dear Colleague,

We encourage you to submit an abstract before 15$^{\text{th}}$ April (new deadline) for the conference 'Blowing in the wind', to be held 7–13 August 2016 in ICISE Quy nhon, Vietnam. http://vietnam.in2p3.fr/2016/wind/ The objective of this conference is to bridge the gap between researchers working on the inside and on the outside of stars. To build this bridge, we consider a range of fields all revolving around stellar winds: stellar structure evolution and abundances, winds launching mechanisms in luminous stars (such as OB, LVB, WR or AGB stars), pulsations and dust formation, meteoritic stardust, mass transfer in binaries, winds impact on circumstellar environments, bow shocks and planetary nebulæ, mass loss and its feedback onto host galaxies and stellar clusters. Summer 2016 is timely to examine what clues ALMA's fantastic resolution provides on stellar neighbourhoods, and how the big radio telescope FAST might be put to a good use for the next advances. Most Vietnamese astronomers work on stellar environments with the tools of radioastronomy and ICISE in Quy Nhon (Vietnam) is a perfect meeting point between Eastern and Western countries. Given the diversity of the participants, emphasis will be given to introductory and review talks, and room will be kept for discussions between participants coming from different horizons. The answer, my friend, is blowing in the wind!

Invited speakers:

- Tim Bedding
- Sylvie Cabrit
- Leen Decin
- David Gobrecht

- Frank Gyngard
- Shazrene Mohamed
- Bram Ochsendorf
- Sofia Ramstedt
- Maurizio Salaris
- KyungWon Suh
- Allard Jan van Marle / Nick Cox
- Jorick Vink
- Yong Zhang

Key dead-lines:

April 15th	:	abstract registration
June 7th	:	early registration
July 27th	:	late registration

Website: http://vietnam.in2p3.fr/2016/wind/

Best wishes,
Pierre Lesaffre and Maria Lugaro

See also http://vietnam.in2p3.fr/2016/wind/