| Active Galaxies Newsletter | *An electronic publication dedicated to the observation and theory of active galaxies* |
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*Accepted Abstracts - Submitted Abstracts - Thesis Abstracts*
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# From the Editor

Welcome to all the new subscribers, thanks to everyone who contributed to this issue of the Active Galaxies Newsletter, and a Happy New Year.

This newsletter is intended to disseminate paper abstracts, meeting announcements, job adverts and other information which may be of interest to the active galaxies community. It is produced monthly and, whilst the deadline for contributions is the last day of the month, contributions may be submitted at any time.

The Latex macros for submitting abstracts and dissertation abstracts are appended to each issue of the newsletter and are also available on the web page. Please note that the editor may reject submissions which do not use the template. As always, any suggestions or feedback regarding the newsletter are welcome.

Thanks for your continued subscription.

Megan Argo

# Abstracts of recently accepted papers

## A multi-epoch spectroscopic study of the BAL quasar APM 08279+5255 II. Emission- and absorption-line variability time lags

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The study of high-redshift bright quasars is crucial to gather information about the history of galaxy assembly and evolution. Variability analyses can provide useful data on the physics of quasar processes and their relation with the host galaxy.
In this study, we aim to measure the black hole mass of the bright lensed BAL QSO APM 08279+5255 at $z = 3.911$ through reverberation mapping, and to update and extend the monitoring of its C IV absorption line variability.
We perform the first reverberation mapping of the Si IV and C IV emission lines for a high-luminosity quasar at high redshift with the use of 138 $R$-band photometric data and 30 spectra available over 16 years of observations. We also cross-correlate the C IV absorption equivalent width variations with the continuum light curve to estimate the recombination time lags of the various absorbers and infer the physical conditions of the ionised gas.
We find a reverberation-mapping time lag of $\sim$ 900 rest-frame days for both Si IV and C IV emission lines. This is consistent with an extension of the BLR size-to-luminosity relation for active galactic nuclei up to a luminosity of $\sim 10^{48}$ erg s$^{-1}$, and implies a black hole mass of $10^{10}$ $M_\odot$. Additionally, we measure a recombination time lag of $\sim$ 160 days in the rest frame for the C IV narrow absorption system, which implies an electron density of the absorbing gas of $\sim 2.5 \cdot 10^4$ cm$^{-3}$.
The measured black hole mass of APM 08279+5255 indicates that the quasar resides in an under-massive host-galaxy bulge with $M_{bulge} \sim 7.5 M_{BH}$, and that the lens magnification is lower than $\sim 8$. Finally, the inferred electron density of the narrow-line absorber implies a distance of the order of 10 kpc of the absorbing gas from the quasar, placing it within the host galaxy.

Accepted by A&A

E-mail contact: saturnfg@roma1.infn.it
Preprint available at: http://arxiv.org/abs/1512.03195

## Radio galaxies in ZFOURGE/NMBS: no difference in the properties of massive galaxies with and without radio-AGN out to z=2.25

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In order to reproduce the high-mass end of the galaxy mass-distribution, some process must be responsible for the suppression of star-formation in the most massive of galaxies. Commonly Active Galactic Nuclei (AGN) are invoked to fulfil this role, but the exact means by which they do so is still the topic of much debate, with studies finding evidence for both the suppression and enhancement of star-formation in AGN hosts. Using the ZFOURGE and NMBS galaxy surveys, we investigate the host galaxy properties of a mass-limited ($M \geq 10^{10.5}$ $M_\odot$), high-luminosity ($L_{1.4} > 10^{24}$ W Hz$^{-1}$) sample of radio-loud Active Galactic Nuclei to a redshift of $z = 2.25$. In contrast to low redshift studies, which associate radio-AGN activity with quiescent hosts, we find that the majority of $z > 1.5$ radio-AGN are hosted by star-forming galaxies. Indeed, the stellar populations of radio-AGN are found to evolve with redshift in a manner that is consistent with the non-AGN mass-similar galaxy population. Interestingly, we find the radio-AGN fraction is constant across a redshift range of $0.25 \leq z < 2.25$, perhaps indicating that the radio-AGN duty cycle has little dependence on redshift or galaxy type. We do however see a strong relation between the radio-AGN fraction and stellar mass, with radio-AGN becoming rare below $\sim 10^{10.5}$ $M_\odot$ or a halo-mass of $10^{12}$ $M_\odot$. This halo-mass threshold is in good agreement with simulations that initiate radio-AGN feedback at this mass limit. Despite this we find that radio-AGN host star-formation rates are consistent with the non-AGN mass-similar galaxy sample, suggesting that while radio-AGN are in the right place to suppress star-formation in massive galaxies they are not necessarily responsible for doing so.

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E-mail contact: glen.rees@students.mq.edu.au
Preprint available at: http://arxiv.org/abs/1511.01988

## The ionised X–ray outflowing torus in ESO 323-G77 : low–ionisation clumps confined by homogeneous warm absorbers

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We report on the long– and short–term X–ray spectral analysis of the polar–scattered Seyfert 1.2 galaxy ESO 323-G77, observed in three epochs between 2006 and 2013 with *Chandra* and *XMM–Newton*. Four high–resolution *Chandra* observations give us a unique opportunity to study the properties of the absorbers in detail, as well as their short time–scale (days) variability. From the rich set of absorption features seen in the *Chandra* data, we identify two warm absorbers with column densities and ionisations that are consistent with being constant on both short and long time–scales, suggesting that those are the signature of a rather homogeneous and extended outflow. A third absorber, ionised to a lesser degree, is also present and it replaces the strictly neutral absorber that is ubiquitously inferred from the X–ray analysis of obscured Compton–thin sources. This colder absorber appears to vary in column density on long time–scales, suggesting a non–homogeneous absorber. Moreover, its ionisation responds to the nuclear luminosity variations on time–scales as short as a few days, indicating that the absorber is in photoionisation equilibrium with the nuclear source on these time–scales. All components are consistent with being co–spatial and located between the inner and outer edges of the so–called dusty, clumpy torus. Assuming co–spatiality, the three phases also share the same pressure, suggesting that the warm / hot phases confine the colder, most likely clumpy, medium. We discuss further the properties of the outflow in comparison with the lower resolution *XMM–Newton* data.

Accepted by MNRAS

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Preprint available at: http://arxiv.org/abs/1512.06631

## The case for inflow of the broad-line region of active galactic nuclei

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The high-ionization lines of the broad-line region (BLR) of thermal active galactic nuclei (AGNs) show blueshifts of a few hundred km/s to several thousand km/sec with respect to the low-ionization lines. This has long been thought to be due to the high-ionization lines of the BLR arising in a wind of which the far side of the outflow is blocked from our view by the accretion disc. Evidence for and against the disc-wind model is discussed. The biggest problem for the model is that velocity-resolved reverberation mapping repeatedly fails to show the expected kinematic signature of outflow of the BLR. The disc-wind model also cannot readily reproduce the red side of the line profiles of high-ionization lines. The rapidly falling density in an outflow makes it difficult to obtain high equivalent widths. We point out a number of major problems with associating the BLR with the outflows producing broad absorption lines. An explanation which avoids all these problems and satisfies the constraints of both the line profiles and velocity-resolved reverberation-mapping is a model in which the blueshifting is due to scattering off material spiraling inwards with an inflow velocity of half the velocity of the blueshifting. We discuss how recent reverberation mapping results are consistent with the scattering-plus-inflow model but do not support a disc-wind model. We propose that the anti-correlation of the apparent redshifting of H$\beta$ with the blueshifting of C IV is a consequence of contamination of the red wings of H$\beta$ by the broad wings of [O III].

Accepted for special issue of *Astrophysics and Space Science*, “Spectral Line Shapes in Astrophysics”.

E-mail contact: mgaskell@ucsc.edu
Preprint available at: http://adsabs.harvard.edu/abs/2015arXiv151208900G

## The case for cases B and C: intrinsic hydrogen line ratios of the broad-line region of active galactic nuclei, reddenings, and accretion disc sizes

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Low-redshift active galactic nuclei (AGNs) with extremely blue optical spectral indices are shown to have a mean, velocity-averaged, broad-line H$\alpha$/H$\beta$ ratio of $\approx 2.72 \pm 0.04$, consistent with the Baker-Menzel Case B value. Comparison of a wide range of properties of the very bluest AGNs with those of a luminosity-matched subset of the Dong et al. blue AGN sample indicates that the only difference is the internal reddening. Ultraviolet fluxes are brighter for the bluest AGNs by an amount consistent with the flat AGN reddening curve of Gaskell et al. (2004). The lack of a significant difference in the *GALEX* (FUV–NUV) colour index strongly rules out a steep SMC-like reddening curve and also argues against an intrinsically harder spectrum. For very blue AGNs the Ly$\alpha$/H$\beta$ ratio is also consistent with being the Case B value. The Case B ratios provide strong support for the self-shielded broad-line model of Gaskell, Klimek & Nazarova. It is proposed that the greatly enhanced Ly$\alpha$/H$\beta$ ratio at very high velocities is a consequence of continuum fluorescence in the Lyman lines (Case C).
Reddenings of AGNs mean that the far-UV luminosity is underestimated by an order of magnitude. This will be the main cause of the discrepancies between measured accretion disc sizes and the predictions of simple accretion disc theory. The greater luminosity of AGNs also resolves the photon underproduction problem for the intergalactic medium. The total mass in lower mass supermassive black holes must be greater than hitherto estimated.

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Preprint is available at http://adsabs.harvard.edu/abs/2015arXiv151209291G

## X-ray/UV variability and the origin of soft X-ray excess emission from II Zw 177

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We study X-ray and UV emission from the narrow-line Seyfert 1 galaxy II Zw 177 using a $137ks$ long and another $13ks$ short XMM observation performed in 2012 and 2001, respectively. Both observations show soft X-ray excess emission contributing $76.9 \pm 4.9\%$ in 2012 and $58.8 \pm 10.2\%$ in 2001 in the $0.3 - 2kev$ band. We find that both blurred reflection from an ionized disc and Comptonized disc emission describe the observed soft excess well. Time-resolved spectroscopy on scales of $\sim 20ks$ reveals strong correlation between the soft excess and the powerlaw components. The fractional variability amplitude $F_{var}$ derived from EPIC-pn lightcurves at different energy bands is nearly constant ($F_{var} \sim 20\%$). This is in contrast to other AGNs where the lack of short term variation in soft X-ray excess emission has been attributed to intense light bending in the framework of the "lamppost" model. Thus, the variations in powerlaw emission are most likely intrinsic to corona rather than just due to the changes of height of compact corona. The variable UV emission ($F_{var} \sim 1\%$) is uncorrelated to any of the X-ray components on short timescales suggesting that the UV emission is not dominated by the reprocessed emission. The gradual observed decline in the UV emission in 2012 may be related to the secular decline due to the changes in the accretion rate. In this case, the short term X-ray variability is not due to the changes in the seed photons but intrinsic to the hot corona.

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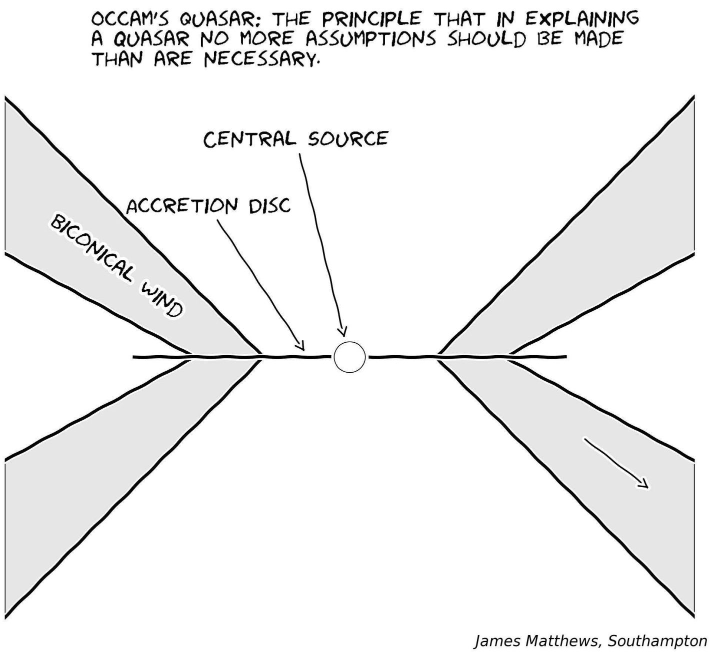
E-mail contact: mainpal@iucaa.in
Preprint available at: http://arxiv.org/abs/1601.00503



# Jobs

## Research Fellow in Radiative Hydrodynamics
## University of Southampton, UK
## Deadline: 1st February 2016

**Email contact: s.hoenig@soton.ac.uk**
**Further Information: https://jobs.soton.ac.uk/Vacancy.aspx?ref=665515WF**

The Astrogroup of the University of Southampton's Department of Physics & Astronomy invites applications for a postdoctoral research fellow in the field of hydrodynamical simulations. You will be joining an ambitious team and work with Dr Sebastian Hoenig on an ERC-funded effort to develop a new radiative hydrodynamical model of the dusty environment of active galactic nuclei (AGN).

Applications are welcome from both junior and more senior researchers with a background in hydrodynamical modelling and experience with state-of-the-art public SPH and/or moving mesh/adaptive mesh refinement codes. Previous experience with AGN is an asset, but not required.

The Southampton Astrogroup provides a stimulating and collegial environment with many opportunities to collaborate with other group members. Our main research themes are compact objects and time-domain astrophysics. We are strongly committed to diversity in the student and academic population and you will be supported in developing your career while maintaining a good work-life balance through family-friendly policies. The position will provide you with time and resources to explore and develop independent research.

The post is initially for two years, with annual extensions up to 4 years depending on performance. Arrangements for more senior candidates are negotiable. The appointment will be full time on University of Southampton Level 4 (28,982 - 35,609 commensurate to experience). In addition, the University offers an attractive benefits package and relocation assistance. A starting date of 1 July 2016 is targeted but earlier or later dates can be discussed.

If you are interested, please apply via the university's job portal (reference: 665515WF). Applications submitted by 1 February 2016 will receive full consideration, but the position remains open until filled.

Applications should consist of a cover letter, CV, publication list, and a brief statement of research interested (2 pages max). Please upload all documents as one pdf file. Moreover, three letters of reference are required with contact details to be provided on application (letter requests will be sent automatically by the application system).

Informal inquiries are particularly welcome. Please contact Dr Sebastian Hoenig, s.hoenig@soton.ac.uk (Twitter: @dustrophysix)

## Research Fellow in Observational Astrophysics
## University of Southampton, UK
## Deadline: 1st February 2016

**Email contact: s.hoenig@soton.ac.uk**
**Further Information: https://jobs.soton.ac.uk/Vacancy.aspx?ref=665315WF**

The Astrogroup of the University of Southampton's Department of Physics & Astronomy invites applications for a postdoctoral research fellow in high-resolution infrared/sub-mm studies of active galactic nuclei. You will be joining an ambitious team and work with Dr Sebastian Hoenig on an ERC-funded effort to spatially resolve the circumnuclear environment of AGN and constrain its kinematics and physical properties. New ALMA and VLT Interferometer data of nearby AGN are the main focus of the project to which you will be contributing.

Applications are welcome from both junior and more senior researchers with experience in infrared/sub-mm observations, interferometry, and/or advanced image processing. Previous work on AGN is an asset, but not required.

The Southampton Astrogroup provides a stimulating and collegial environment with many opportunities to collaborate with other group members. Our main research themes are compact objects and time-domain astrophysics. We are strongly committed to diversity in the student and academic population and you will be supported in developing your career while maintaining a good work-life balance through family-friendly policies. The position will provide you with time and resources to explore and develop independent research.

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If you are interested, please apply via the university's job portal (reference: 665315WF) (see link above). Applications submitted by 1 February 2016 will receive full consideration, but the position remains open until filled.

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