Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
No. 149 — August 2009	Editor: Rob Beswick (agnews@manchester.ac.uk)

Accepted Abstracts - Submitted Abstracts - Thesis Abstracts
Jobs Adverts - Meetings Adverts - Special Announcements

From the Editor

The Active Galaxies Newsletter is produced monthly. The deadline for contributions is the last friday of the month. 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.

As always as editor of the newsletter I am very interested to hear any suggestions or feedback regarding the newsletter. So do not hesitate in emailing me your suggestions.

Many thanks for your continued subscription.

Rob Beswick

Probing the Origins of the C IV and Fe Kα Baldwin Effects

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We use UV/optical and X-ray observations of 272 radio-quiet Type 1 AGNs and quasars to investigate the C IV Baldwin Effect (BEff). The UV/optical spectra are drawn from the *Hubble Space Telescope*, *International Ultraviolet Explorer* and Sloan Digital Sky Survey archives. The X-ray spectra are from the *Chandra* and *XMM-Newton* archives. We apply correlation and partial-correlation analyses to the equivalent widths, continuum monochromatic luminosities, and $\alpha_{\rm ox}$, which characterizes the relative X-ray to UV brightness. The equivalent width of the C IV $\lambda1549$ emission line is correlated with both $\alpha_{\rm ox}$ and luminosity. We find that by regressing $l_\nu(2500\,\text{Å})$ with EW(C IV) and $\alpha_{\rm ox}$, we can obtain tighter correlations than by regressing $l_\nu(2500\,\text{Å})$ with only EW(C IV). Both correlation and regression analyses imply that $l_\nu(2500\,\text{Å})$ is not the only factor controlling the changes of EW(C IV); $\alpha_{\rm ox}$ (or, equivalently, the soft X-ray emission) plays a fundamental role in the formation and variation of C IV. Variability contributes at least 60% of the scatter of the EW(C IV)-$l_\nu(2500\,\text{Å})$ relation and at least 75% of the scatter of the of the EW(C IV)-$\alpha_{\rm ox}$ relation.

In our sample, narrow Fe Kα 6.4 keV emission lines are detected in 50 objects. Although narrow Fe Kα exhibits a BEff similar to that of C IV, its equivalent width has almost no dependence on either $\alpha_{\rm ox}$ or EW(C IV). This suggests that the majority of narrow Fe Kα emission is unlikely to be produced in the broad emission-line region. We do find suggestive correlations between the emission-line luminosities of C IV and Fe Kα, which could be potentially used to estimate the detectability of the Fe Kα line of quasars from rest-frame UV spectroscopic observations.

Accepted by ApJ

E-mail contact: fanchyna [at] gmail.com,

preprint available at http://xxx.lanl.gov/abs/0907.2552

SSC radiation in BL Lac sources, the end of the tether

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Context. The synchrotron-self Compton (SSC) radiation process is widely held to provide a close representation of the double peaked spectral energy distributions from BL Lac Objects (BL Lacs). This subclass of Active Galactic Nuclei is marked by non-thermal beamed radiations, highly variable on timescales of days or less. Their outbursts in the γ ray relative to the optical/X rays might be surmised to be enhanced in BL Lacs as these photons are upscattered via the inverse Compton (IC) process.

Aims. From the observed correlations among the spectral parameters (peak frequencies, fluxes and curvature) during optical/X-ray variations we aim at predicting corresponding correlations in the γ-ray band, and the actual relations between the γ-ray and the X-ray variability consistent with the SSC emission process.

Methods. We start from the homogeneous single-zone SSC source model, with log-parabolic energies distributions of emitting electron as required by the X-ray data of many sources. We find relations among spectral parameters of the IC radiation in both the Thomson (for Low energy BL Lacs) and the Klein-Nishina regimes (mainly for High energy BL Lacs); whence we compute how variability is driven by a smooth increase of key source parameters, primarily the root mean square electron energy.

Results. In the Klein-Nishina regime the model predicts for HBLs lower inverse Compton fluxes relative to synchrotron, and milder γ-ray relative to X-ray variations. Stronger γ-ray flares observed in some HBLs like Mrk501 are understood in terms of additional, smooth increases also of the emitting electron density. However, episodes of rapid flares as recently reported at TeV energies are beyond the reach of the single component SSC model with one dominant varying parameter. Furthermore, spectral correlations at variance with our predictions, as well as TeV emissions in LBL objects (like BL Lacertae itself) cannot be explained in terms of the simple HSZ SSC model, and in these cases the source may require additional electron populations in more elaborate structures like decelerated relativistic outflows or sub-jet scenarios.

Conclusions. We provide a comprehensive benchmark to straightforwardly gauge the capabilities and effectiveness of the SSC radiation process. The single component SSC source model in the Thomson regime turns out to be adequate for many LBL sources. In the mild Klein-Nishina regime it covers HBL sources undergoing variations driven by smooth increase of a number of source parameters. However, the simple model meets its limits with the fast/strong flares recently reported for a few sources in the TeV range; these clearly require sudden accelerations of emitting electrons in a second source component.

Accepted by A&A

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preprint available at http://arxiv.org/abs/0907.2863

The nature of the near-IR core sources in 3C 433

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We report the analysis of near-infrared imaging, polarimetric and spectroscopic observations of the powerful radio galaxy 3C 433 ($z = 0.1016$), obtained with the *HST* and UKIRT telescopes. The high spatial resolution of *HST* allows us to study the near-nuclear regions of the galaxy (< 1 kpc). In line with previous observations, we find that 3C 433 has an unresolved core source that is detected in all near-IR bands, but dominates over the host galaxy emission at 2.05 μm.

Our analysis reveals: (1) the presence of a dust lane aligned close to perpendicular (PA$= 70 \pm 5°$) to the inner radio jet axis (PA$= -12 \pm 2°$); (2) a steep slope to the near-IR SED ($\alpha = 5.8 \pm 0.1$; $F_\nu \propto \nu^{-\alpha}$); (3) an apparent lack of broad permitted emission lines at near-IR wavelengths, in particular the absence of a broad Paα emission line; and (4) high intrinsic polarization for the unresolved core nuclear source (8.6 ± 1 per cent), with an E-vector perpendicular (PA$=83.0 \pm 2.3°$) to the inner radio jet. Using five independent techniques we determine an extinction to the compact core source in the range $3 < A_V < 67$ mag.

An analysis of the long wavelength SED rules out a synchrotron origin for the high near-IR polarization of the compact core source. Therefore, scattering and dichroic extinction are plausible polarizing mechanisms, although in both of these cases the broad permitted lines from the AGN are required to have a width $> 10^4$km s^{-1} (FWHM) to escape detection in our near-IR spectrum. Dichroic extinction is the most likely polarization mechanism because it is consistent with the various available

extinction estimates. In this case, a highly ordered, coherent toroidal magnetic field must be present in the obscuring structure close to the nucleus.

Accepted by MNRAS.

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Properties of dusty tori in active galactic nuclei - II. Type 2 AGN

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This paper is the second part of a work investigating the properties of dusty tori in active galactic nuclei (AGN) by means of multi-component spectral energy distribution (SED) fitting. It focuses on low luminosity, low redshift ($z \leq 0.25$) AGN selected among emission line galaxies in the overlapping regions between SWIRE and SDSS Data Release 4 as well as X-ray, radio and mid-infrared selected type 2 AGN samples from the literature. The available multi-band photometry covers the spectral range from the u-band up to 160mum. Using a standard χ^2 minimisation, the observed SED of each object is fit to a set of multi-component models comprising a stellar component, a high optical depth ($\tau_{9.7} \geq 1.0$) torus and cold emission from a starburst (SB). The torus components assigned to the majority of the objects were those of the highest optical depth of our grid of models ($\tau_{9.7} = 10.0$). The contribution of the various components (stars, torus, SB) is reflected in the position of the objects on the IRAC colour diagram, with star-, torus- and starburst-dominated objects occupying specific areas of the diagrams and composite objects lying in between. The comparison of type 1 (as derived from Paper 1, Hatziminaoglou et al. (2008)) and type 2 AGN properties is broadly consistent with the Unified Scheme. The estimated ratio between type 2 and type 1 objects is about 2-2.5:1. The AGN accretion-to-infrared luminosity ratio is an indicator of the obscuration of the AGN since it scales down with the covering factor. We find evidence supporting the receding torus paradigm, with the estimated fraction of obscured AGN, derived from the distribution of the covering factor, decreasing with increasing optical luminosity (λL_{5100}) over four orders of magnitude. The average star formation rates are of $\sim 10 M_{\odot}/yr$ for the low-z sample, $\sim 40 M_{\odot}/yr$ for the other type 2 AGN and $\sim 115 M_{\odot}/yr$ for the quasars; this result however, might simply reflect observational biases, as the quasars under study were one to two orders of magnitude more luminous than the various type 2 AGN. For the large majority of objects with 70 and/or 160 mumdetections an SB component was needed in order to reproduce the data points, implying that the far-infrared emission in AGN arises mostly from star formation; moreover, the starburst-to-AGN luminosity ratio shows a slight trend with increasing luminosity.

Accepted by MNRAS

E-mail contact: ehatzimi [at] eso.org,
preprint available at http://xxx.lanl.gov/abs/0907.2389

The Invariant Twist of Magnetic Fields in the Relativistic Jets of Active Galactic Nuclei

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The origin of cosmic magnetic (**B**) fields remains an open question. It is generally believed that very weak primordial **B** fields are amplified by dynamo processes, but it appears unlikely that the amplification proceeds fast enough to account for the fields presently observed in galaxies and galaxy clusters. In an alternative scenario, cosmic **B** fields are generated near the inner edges of accretion disks in Active Galactic Nuclei (AGNs) by azimuthal electric currents due to the difference between the plasma electron and ion velocities that arises when the electrons are retarded by interactions with photons. While dynamo processes show no preference for the polarity of the (presumably random) seed field that they amplify, this alternative mechanism uniquely relates the polarity of the poloidal **B** field to the angular velocity of the accretion disk, resulting in a unique direction for the toroidal **B** field induced by disk rotation. Observations of the toroidal fields of 29 AGN jets revealed by parsec-scale Faraday rotation measurements show a clear asymmetry that is consistent with this model, with the probability that this asymmetry came about by chance being less than 1%. This lends support to the hypothesis that the Universe is seeded by **B** fields that are generated in AGN via this mechanism and subsequently injected into intergalactic space by the jet outflows.

Accepted by Astrophys. J. Letters

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preprint available at `http://arxiv.org/PS_cache/arxiv/pdf/0907/0907.3619v1.pdf`

X-ray narrow line region variability as a geometry probe: The case of NGC 5548

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We study the long time scale variability of the gas responsible for the X-ray narrow emission lines in the Seyfert 1 galaxy NGC 5548, in order to constrain the location and geometry of the emitting gas. Using X-ray spectra taken with the *Chandra*−LETGS and HETGS instruments and with XMM−*Newton* RGS and combining them with long-term monitoring observations of the *Rossi X-ray Timing Explorer* (RXTE), we perform a correlation analysis in order to try constrain the time scale on which the narrow line emitting gas responds to variations of the continuum flux. With the inclusion of the 2007 *Chandra*−LETGS observation we have an additional observation at an historically low flux level. We conclude that the NLR in NGC 5548 is in the form of an ionization cone, compact in size, and located between 1 and 15 pc from the central source, depending on the exact geometry of the NLR.

Accepted by A&A.

E-mail contact: robd [at] sron.nl,
preprint available at http://arxiv.org/abs/0907.2930

The absorption-dominated model for the X-ray spectra of type I active galaxies: MCG–6-30-15

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MCG–6-30-15 is the archetypal example of a type I active galaxy showing broad "red-wing" emission in its X-ray spectrum at energies below the 6.4 keV Fe Kα emission line and a continuum excess above 20 keV. Miller et al (2008) showed that these spectral features could be caused by clumpy absorbing material, but Reynolds et.al. (2009) have argued that the observed Fe Kα line luminosity is inconsistent with this explanation unless the global covering factor of the absorber(s) is very low. However, the Reynolds et.al. calculation effectively considers the only source of opacity to be the Fe K bound-free transition and neglects the opacity at the line energy: correction to realistic opacity decreases the predicted line flux by a large factor. We also discuss the interpretation of the covering factor and the possible effect of occultation by the accretion disk. Finally, we consider a model for MCG–6-30-15 dominated by clumpy absorption, which is consistent with global covering factor 0.45, although models that include the effects of Compton scattering are required to reach a full understanding. Variations in covering fraction may dominate the observed X-ray spectral variability.

Accepted by MNRAS

HST/ACS Emission Line Imaging of Low Redshift 3CR Radio Galaxies I: The Data

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We present 19 nearby (z¡0.3) 3CR radio galaxies imaged at low- and high-excitation as part of a Cycle 15 Hubble Space Telescope snapshot survey with the Advanced Camera for Surveys. These images consist of exposures of the H-alpha (6563 Å, plus [NII] contamination) and [OIII] 5007 Åemission lines using narrow-band linear ramp filters adjusted according to the redshift of the target. To facilitate continuum subtraction, a single-pointing 60 s line-free exposure was taken with a medium-band filter appropriate for the target's redshift. We discuss the steps taken to reduce these images independently of the automated recalibration pipeline so as to use more recent ACS flat-field data as well as to better reject cosmic rays. We describe the method used to produce continuum-free (pure line-emission) images, and present these images along with qualitative descriptions of the narrow-line region morphologies we observe. We present H-alpha+[NII] and [OIII] line fluxes from aperture photometry, finding the values to fall expectedly on the redshift-luminosity trend from a past HST/WFPC2 emission line study of a larger, generally higher redshift subset of the 3CR. We also find expected trends between emission line luminosity and total radio power, as well as a positive correlation between the size of the emission line region and redshift. We discuss the associated interpretation of these results, and conclude with a summary of future work enabled by this dataset.

Accepted by the Astrophysical Journal Supplement Series

E-mail contact: grant [at] astro.rit.edu,
preprint available at http://arxiv.org/abs/0906.4776

Spitzer Quasar and ULIRG Evolution Study (QUEST). IV. Comparison of 1-Jy Ultraluminous Infrared Galaxies with Palomar-Green Quasars

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We report the results from a comprehensive study of 74 ultraluminous infrared galaxies (ULIRGs) and 34 Palomar-Green (PG) quasars within $z \sim 0.3$ observed with the *Spitzer* Infrared Spectrograph (IRS). The contribution of nuclear activity to the bolometric luminosity in these systems is quantified using six independent methods that span a range in wavelength and give consistent results within $\sim \pm 10-15\%$ on average. This agreement suggests that deeply buried AGN invisible to *Spitzer* IRS but bright in the far-infrared are not common in this sample. The average derived AGN contribution in ULIRGs is $\sim$35$-$40%, ranging from $\sim 15 - 35\%$ among "cool" ($f_{25}/f_{60} \leq 0.2$) optically classified HII-like and LINER ULIRGs to $\sim$50 and $\sim$75% among warm Seyfert 2 and Seyfert 1 ULIRGs, respectively. This number exceeds $\sim$80% in PG QSOs. ULIRGs fall in one of three distinct AGN classes: (1) objects with small extinctions and large PAH equivalent widths are highly starburst-dominated; (2) systems with large extinctions and modest PAH equivalent widths have larger AGN contributions, but still tend to be starburst-dominated; and (3) ULIRGs with both small extinctions and small PAH equivalent widths host AGN that are at least as powerful as the starbursts. The AGN contributions in class 2 ULIRGs are more uncertain than in the other objects, and we cannot formally rule out the possibility that these objects represent a physically distinct type of ULIRGs. A morphological trend is seen along the sequence (1) $-$ (2) $-$ (3), in general agreement with the standard ULIRG $-$ QSO evolution scenario and suggestive of a broad peak in extinction during the intermediate stages of merger evolution. However, the scatter in this sequence, including the presence of a significant number of AGN-dominated systems prior to coalesence and starburst-dominated but fully merged systems, implies that black hole accretion, in addition to depending on the merger phase, also has a strong chaotic/random component, as in local AGN.

Published as ApJS, 182, 628

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A Deep *Hubble Space Telescope* H-Band Imaging Survey of Massive Gas-Rich Mergers. II. The QUEST QSOs.

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We report the results from a deep *HST* NICMOS H-band imaging survey of 28 $z < 0.3$ QSOs from the Palomar-Green (PG) sample. This program is part of *QUEST* (*Q*uasar / *U*LIRG *E*volution *ST*udy) and complements a similar set of data on 26 highly-nucleated ULIRGs presented in Paper I. Our analysis indicates that the fraction of QSOs with elliptical hosts is higher among QSOs with undetected far-infrared (FIR) emission, small infrared excess ($L_{\rm IR}/L_{\rm B} < 10$), and luminous hosts. The hosts of FIR-faint QSOs show a tendency to have less pronounced merger-induced morphological anomalies and larger QSO-to-host luminosity ratios on average than the hosts of FIR-bright QSOs, consistent with late-merger evolution from FIR-bright to FIR-faint QSOs. The spheroid sizes ($\sim$0.3 – 5.5 kpc) and total host luminosities ($\sim$0.6 – 7.2 L^*_H) of the radio-quiet PG QSOs in our sample are statistically indistinguishable from the ULIRG hosts presented in Paper I, while those of radio-loud PG QSOs are systematically larger and more luminous. ULIRGs and PG QSOs with elliptical hosts fall near, but not exactly on, the fundamental plane of inactive spheroids. We confirm the systematic trend noted in Paper I for objects with small (< 2 kpc) spheroids to be up to ~ 1 mag. brighter than inactive spheroids. The host colors and wavelength dependence of their sizes support the idea that these deviations are due at least in part to non-nuclear star formation. However, the amplitudes of these deviations depend mainly on host sizes, and possibly on infrared excess, but not on merger phase, QSO-to-host luminosity ratio, optical spectral type, AGN fractional contribution to the bolometric luminosity, or host R$-$H color. Taken at face value (i.e., no correction for extinction or the presence of a young stellar population), the H-band spheroid-host luminosities imply black hole masses $\sim 5 - 200 \times 10^7$ $M_\odot$ and sub-Eddington mass accretion rates for both QSOs and ULIRGs. These results are compared with published black hole mass estimates derived from other methods.

Accepted for ApJ, 701, August 20 issue.

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preprint available at http://www.astro.umd.edu/~veilleux/pubs/nicmos2.pdf

Warm Molecular Hydrogen in the Galactic Wind of M82

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We report the detection of a complex of extraplanar warm-H_2 knots and filaments extending more than $\sim$3 kpc above and below the galactic plane of M82, roughly coincident with the well-known galactic wind in this system. Comparisons of these data with published results at other wavelengths provide quantitative constraints on the topology, excitation, heating, and stability against disruption of the wind-entrained molecular ISM in this prototypical galactic wind. Deep H_2 2.12 μm observations such as these represent a promising new method to study the elusive but potentially important molecular component of galactic winds.

Published as ApJ Letters, 700, L149

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preprint available at http://www.astro.umd.edu/~veilleux/pubs/m82.pdf

On the disappearance of the broad-line region in low-luminosity AGNs

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The disk-wind scenario for the broad-line region (BLR) and toroidal obscuration in active galactic nuclei predicts the disappearance of the BLR at low luminosities. In accordance with the model predictions, data from a nearly complete sample of nearby AGNs show that the BLR disappears at luminosities lower than $5 \times 10^{39}\,(M/10^7 M_\odot)^{2/3}\,\mathrm{erg\,s^{-1}}$, where M is the black hole mass. The radiative efficiency of accretion onto the black hole is $\lesssim 10^{-3}$ for these sources, indicating that their accretion is advection-dominated.

Accepted by ApJ Letters

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preprint available at http://adsabs.harvard.edu/abs/2009arXiv0907.3752E

A Revised Broad-Line Region Radius and Black Hole Mass for the Narrow-Line Seyfert 1 NGC 4051

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We present the first results from a high sampling rate, multi-month reverberation mapping campaign undertaken primarily at MDM Observatory with supporting observations from telescopes around the world. The primary goal of this campaign was to obtain either new or improved Hβ reverberation lag measurements for several relatively low luminosity AGNs. We feature results for NGC 4051 here because, until now, this object has been a significant outlier from AGN scaling relationships, e.g., it was previously a $\sim$2–3σ outlier on the relationship between the broad-line region (BLR) radius and the optical continuum luminosity — the $R_{\rm BLR}$–L relationship. Our new measurements of the lag time between variations in the continuum and Hβ emission line made from spectroscopic monitoring of NGC 4051 lead to a measured BLR radius of $R_{\rm BLR} = 1.87^{+0.54}_{-0.50}$ light days and black hole mass of $M_{\rm BH} = (1.73^{+0.55}_{-0.52}) \times 10^6 M_\odot$. This radius is consistent with that expected from the $R_{\rm BLR}$–L relationship, based on the present luminosity of NGC 4051 and the most current calibration of the relation by Bentz et al. (2009, ApJ 697, 160). We also present a preliminary look at velocity-resolved Hβ light curves and time delay measurements, although we are unable to reconstruct an unambiguous velocity-resolved reverberation signal.

Accepted by ApJ

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preprint available at http://arxiv.org/abs/0904.0251

Dusty Structure Around Type-I Active Galactic Nuclei: Clumpy Torus Narrow Line Region and Near-Nucleus Hot Dust

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We fitted *Spitzer*/IRS $\sim 2 - 35\mu m$ spectra of 26 luminous QSOs in attempt to define the main emission components. Our model has three major components: a clumpy torus, dusty narrow line region (NLR) clouds and a blackbody-like dust. The models utilize the clumpy torus of Nenkova et al. (2008) and are the first to allow its consistent check in type-I AGNs. Single torus models and combined torus-NLR models fail to fit the spectra of most sources but three component models adequately fit the spectra of all sources. We present torus inclination, cloud distribution, covering factor and torus mass for all sources and compare them with bolometric luminosity, black hole mass and accretion rate. The torus covering factor and mass are found to be correlated with the bolometric luminosity of the sources. We find that a substantial amount of the $\sim 2 - 7\mu m$ radiation originates from a hot dust component, which likely situated in the innermost part of the torus. The luminosity radiated by this component and its covering factor are comparable to those of the torus. We quantify the emission by the NLR clouds and estimate their distance from the center. The distances are $\sim$ 700 times larger than the dust sublimation radius and the NLR covering factor is about 0.07. The total covering factor by all components is in good agreement with the known AGN type-I:type-II ratio.

SUBMITTED to ApJ. on May 1st 2009

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DRAFT is available at http://arxiv.org/abs/0907.1654

Second version, revised following the referee's report

Variation of Inner Radius of Dust Torus in NGC4151

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The long-term optical and near infrared monitoring observations for a type 1 active galactic nucleus NGC 4151 were carried out for six years from 2001 to 2006 by using the MAGNUM telescope, and delayed response of flux variations in the $K(2.2\mu m)$ band to those in the $V(0.55\mu m)$ band was clearly detected. Based on cross correlation analysis, we precisely measured a lag time Δt for eight separate periods, and we found that Δt is not constant changing between 30 and 70 days during the monitoring period. Since Δt is the light travel time from the central energy source out to the surrounding dust torus, this is the first convincing evidence that the inner radius of dust torus did change in an individual AGN. In order to relate such a change of Δt with a change of AGN luminosity L, we presented a method of taking an average of the observed V-band fluxes that corresponds to the measured value of Δt, and we found that the time-changing track of NGC 4151 in the Δt versus L diagram during the monitoring period deviates from the relation of $\Delta t \propto L^{0.5}$ expected from dust reverberation. This result, combined with t he elapsed time from period to period for which Δt was measured, indicates that the timescale of dust formation is about one year, which should be taken into account as a new constraint in future studies of dust evolution in AGNs.

Accepted by Astrophysical Journal

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Discovery of strongly blue shifted mid-infrared [Ne III] and [Ne V] emission in ULIRGs

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We report the discovery of blue shifted (Δv>200 km s^{-1}) mid-infrared [NeIII] and/or [NeV] emission in 25 out of 82 ULIRGs (30% of our sample). The incidence of blue shifted [NeV] emission is even higher (59%) among the sources with a [NeV] detection — the tell-tale signature of an active galactic nucleus (AGN). Sixteen ULIRGs in our sample, eleven of which are optically classified as AGN, have [NeIII] blue shifts above 200 km s^{-1}. A comparison of the line profiles of their 12.81 μm [NeII], 15.56 μm [NeIII] and 14.32 μm [NeV] lines reveals the ionization of the blue shifted gas to increase with blue shift, implying decelerating outflows in a stratified medium, photo-ionized by the AGN. The strong correlation of the line width of the [NeIII] line with the radio luminosity indicates that interaction of expanding radio jets with the dense ISM surrounding the AGN may explain the observed neon line kinematics for the strongest radio sources in this sample.

Accepted by Astrophysical Journal Letters

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preprint available at http://isc.astro.cornell.edu/~spoon/pub/neonletter.pdf

Accretion and star formation rates in low redshift type-II active galactic nuclei

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Accretion and star formation (SF) rates in low redshift SDSS type-II active galactic nuclei (AGN) are critically evaluated. Comparison with photoionization models indicates that bolometric luminosity (L_{bol}) estimates based on L([O III] λ5007) severely underestimate L_{bol} in low ionization sources such as LINERs. An alternative method based on L(Hβ) is less sensitive to ionization level and a novel method, based on a combination of L([O III] λ5007) and L([O I] λ6300), is perhaps the best. Using this method I show that low ionization AGN are accreting faster than assumed until now. Significant related other findings are: 1. Any type-II AGN property related to the black hole (BH) mass is more reliably obtained by removing blue galaxies from the sample. 2. Seyfert 2s and LINER 2s form a continuous sequence of L/L_{Edd} with no indication for a change in accretion mechanism, or mode of mass supply. There are very few, if any, LINERs in all type-I samples which results in a much narrower L/L_{Edd} distribution compared with type-II samples. 3. There is a strong correlation between SF luminosity, L_{SF}, and L_{bol} over more than five orders of magnitude in luminosity. This leads to a simple relationship between bulge and BH growth rates, $g(bulge)/g(BH) \propto L_{bol}^{-0.2}$, where $g(bulge)/g(BH) \simeq 115$ for L_{bol}=10^{42} ergs s^{-1}. Seyfert 2s and LINER 2s follow the same L_{SF}-L_{bol} correlation for all sources with a stellar age indicator, D_n4000, smaller than 1.8. This suggests that a similar fraction of SF gas finds its way to the center in all AGN. 4. L_{bol}, L_{SF}, L/L_{Edd} and the specific SF rate follow D_n4000 in a similar way.

Accepted by MNRAS

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Multiband Comparative Study of Optical Microvariability in RL vs. RQ Quasars

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We present the results of an optical multi-band (BVR) photometric monitoring program of 22 core-dominated radio-loud quasars (CRLQs) and 22 radio-quiet quasars (RQQs). The aim was to compare the properties of microvariability in both types of quasars. We detected optical microvariability in 5 RQQs and 4 CRLQs. Our results confirm that microvariability in RQQs may be as frequent as in CRLQs. In addition we compare microvariability duty cycles in different bands. Finally, the implications for the origin of the microvariations are briefly discussed.

Accepted by the Astronomical Journal

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preprint available at http://arxiv.org/abs/0907.2405

The *Chandra* Deep Protocluster Survey: Point-Source Catalogs for a 400 ks Observation of the $z = 3.09$ Protocluster in SSA22.

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We present X-ray point-source catalogs for a deep ≈400 ks *Chandra* ACIS-I exposure of the SSA22 field. The observations are centred on a $z = 3.09$ protocluster, which is populated by Lyman break galaxies (LBGs), Lyα emitters (LAEs), and extended Lyα-emitting blobs (LABs). The survey reaches ultimate (3 count) sensitivity limits of ≈5.7 $\times 10^{-17}$ and ≈3.0 $\times 10^{-16}$ ergs cm^{-2} s^{-1} for the 0.5–2 keV and 2–8 keV bands, respectively (corresponding to $L_{2-10\ \mathrm{keV}} \approx 5.7 \times 10^{42}$ and $L_{10-30\ \mathrm{keV}} \approx 2.0 \times 10^{43}$ ergs s^{-1} at $z = 3.09$, respectively, for an assumed photon index of $\Gamma = 1.4$). These limits make SSA22 the fourth deepest extragalactic *Chandra* survey yet conducted, and the only one focused on a known high redshift structure. In total, we detect 297 X-ray point sources and identify one obvious bright extended X-ray source over a ≈330 arcmin^2

region. In addition to our X-ray catalogs, we provide all available optical spectroscopic redshifts and near-infrared and mid-infrared photometry available for our sources. The basic X-ray and infrared properties of our *Chandra* sources indicate a variety of source types, although absorbed active galactic nuclei (AGNs) appear to dominate. In total, we have identified 12 X-ray sources (either via optical spectroscopic redshifts or LAE selection) at $z = 3.06$–3.12 that are likely to be associated with the SSA22 protocluster. These sources have X-ray and multiwavelength properties that suggest they are powered by AGN with 0.5–8 keV luminosities in the range of $\approx 10^{43}$–10^{45} ergs s^{-1}. We have analysed the AGN fraction of sources in the protocluster as a function of local LAE source density and find suggestive evidence for a correlation between AGN fraction and local LAE source density (at the $\approx$96 per cent confidence level), implying that supermassive black hole growth at $z \approx 3$ is strongest in the highest density regions.

Accepted by MNRAS

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preprint available at http://arxiv.org/abs/0907.4369v1.
Catalogs and data products available at http://astro.dur.ac.uk/∼dma/SSA22/

A *Chandra* Survey of the X-ray Properties of Broad Absorption Line Radio-Loud Quasars

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This work presents the results of a *Chandra* study of 21 broad absorption line (BAL) radio-loud quasars (RLQs). We conducted a *Chandra* snapshot survey of 12 bright BAL RLQs selected from SDSS/FIRST data and possessing a wide range of radio and C IV absorption properties. Optical spectra were obtained nearly contemporaneously with the Hobby-Eberly Telescope; no strong flux or BAL variability was seen between epochs. In addition to the snapshot targets, we include in our sample 9 additional BAL RLQs possessing archival *Chandra* coverage. We compare the properties of (predominantly high-ionization) BAL RLQs to those of non-BAL RLQs as well as to BAL radio-quiet quasars (RQQs) and non-BAL RQQs for context.

All 12 snapshot and 8/9 archival BAL RLQs are detected, with observed X-ray luminosities less than those of non-BAL RLQs having comparable optical/UV luminosities by typical factors of 4.1–8.5. (BAL RLQs are also X-ray weak by typical factors of 2.0–4.5 relative to non-BAL RLQs having both comparable optical/UV and radio luminosities.) However, BAL RLQs are not as X-ray weak relative to non-BAL RLQs as are BAL RQQs relative to non-BAL RQQs. While some BAL RLQs have harder X-ray spectra than typical non-BAL RLQs, some have hardness ratios consistent with those of non-BAL RLQs, and there does not appear to be a correlation between X-ray weakness and spectral hardness, in contrast to the situation for BAL RQQs. RLQs are expected to have X-ray continuum contributions from both accretion-disk corona and small-scale jet emission. While the entire X-ray continuum in BAL RLQs cannot be obscured to the same degree as in BAL RQQs, we calculate that the jet is likely partially covered in many BAL RLQs. We comment briefly on implications for geometries and source ages in BAL RLQs.

Accepted by ApJ

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Meetings

Probing strong gravity near black holes

Prague, Czech Republic
15–18 February 2010

Webpage: `http://astro.cas.cz/bh2010`
Email: `bh2010@astro.cas.cz`

The conference will discuss and compare different methods of studying strong gravity effects around astrophysical black holes of all masses. Both theoretical and, when available, observational points of view will be discussed in the context of present and future approaches: line and continuum spectroscopy, timing, polarimetry, imaging.

The Conference program will consist of Invited lectures, Contributed talks, and Posters. We plan ample time for discussions. More information is available from the conference web site.

Scientific Organizing Committee

Hisamitsu Awaki, Bozena Czerny, Andreas Eckart, Andy Fabian, Matteo Guainazzi, Vladimir Karas, Fukun Liu, Giorgio Matt, Jon Miller, Ranjeev Misra, Kirpal Nandra, Ramesh Narayan, Delphine Porquet, Luigi Stella, Ladislav Subr.

Venue

The conference will take place in Prague, Czech Republic, in the historical part of the town.

Registration

We have now opened a pre-registration. By pre-registering you will help us to set-up the most effective conference program and select the most appropriate conference room. Also, this way you can be kept informed about new developments.

Dates:

Pre-registration ... is now open
On-line registration ... fall 2009
Abstract submission ... fall 2009
On-site registration ... 14-18 February, 2010
Conference ... 15-18 February, 2010

Contact:
Conference email: bh2010@astro.cas.cz

Program issues: Vladimir Karas (Prague), Giorgio Matt (Rome), Matteo Guainazzi (Madrid)

Local Organizing Committee: Michal Bursa (chairman), Astronomical Institute of the Academy of Sciences, Bocni II 1401/1a, CZ-141 31 Praha 4, Czech Republic

Conference secretariat: Congress Business Travel, Lidicka 43/66, CZ-150 00 Praha 5, Czech Republic

Jobs

Postdoctoral Position Offer

July 2009

A two years Postdoctoral position is offered at the **Instituto de Astrofísica de Andalucía - CSIC (Granada, Spain)**, financially supported by the Regional Council through the Research Excellence Project "Nuclear Activity in Galaxies" (PI: Isabel Marquez).

Applicants should send to isabel [at] iaa.es:

- a short CV
- a complete publication list
- a description of research experience and plans to work within the framework of the project below (up to 3 pages).

The closing date for applications is **30 September 2009**. The selected applicant will be start working about January 2010. The amount of the grant is around 25000 euros/year net. Further information on this opportunity can be sought from the PI.

Abstract of the project:

One of the main issues concerning Nuclear Activity in Galaxies (AGNs) is to understand the triggering mechanisms for the onset of non-thermal nuclear activity in their nuclei. Both the origin of the gas accretted onto the black hole and the physical mechanisms for the loose of angular momentum required for this funneling to be effective, have to be elucidated. In this scheme, low level AGNs and in particular LINERs are interesting objects because they trace the AGN low luminosity end and also they constitute the largest population among the nuclei of local galaxies. The main goal of this project is to understand the triggering mechanism for switching on nuclear activity in galaxies. Therefore the relevance of the host galaxies and their environment will be investigated by means of survey data. On the other hand, we plan to continue our multiwavelength study of the nuclear properties of a sample of LINER galaxies, that will provide further clues on the eventual relationship between LINER nuclei and other higher power AGN (in particular, Seyfert galaxies); archival observations together with new proprietary X-ray (Suzaku) and MIR (VISIR/VLT) data will be used.

E-mail contact: **isabel [at] iaa.es**

The Active Galaxies Newsletter is available on the World Wide Web. You can access it via the University of Manchester home page :- http://www.manchester.ac.uk/jodrellbank/∼agnews
If you move or your e-mail address changes, please send the editor your new address. If the Newsletter repeatedly bounces back from an address then that address is deleted from the mailing list.