Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
No. 148 — July 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

Resolved Dust Emission in a Quasar at z=3.65

D.L. Clements[1], G. Petitpas[2], D. Farrah[3], E. Hatziminaoglou[4,5], T. Babbedge[1], M. Rowan-Robinson[1], I. Pérez-Fournon[5], A. Hernán-Caballero[5], N. Castro-Rodriguez[5], C. Lonsdale[6], J. Surace[7], A. Franceschini [8], B.J. Wilkes[9], H. Smith[10]

[1] Physics Department, Imperial Col lege, Prince Consort Road, London SW7 2AZ, UK
[2] Submillimetre Array, Hilo, Hawaii, USA
[3] Astronomy Centre, University of Sussex, Brighton, BN1 9QH, United Kingdom
[4] European Southern Observatory, Garching, Munich, Germany
[5] IAC, Tenerife, Spain
[6] IPAC, Caltech, Passadena, CA, USA
[7] Spitzer Science Centre, Caltech, Pasadena, CA, USA
[8] Universita di Padova, Padova, Italy
[9] Harvard-Smithsonian Centre for Astrophysics, Cambridge, MASS, USA
[10] UCSD, San Diego, CA, USA

We present submillimetre observations of the z=3.653 quasar SDSS160705+533558 together with data in the optical and infrared. The object is unusually bright in the far-IR and submm with an IR luminosity of $\sim 10^{14}$ $L_\odot$. We ascribe this luminosity to a combination of AGN and starburst emission, with the starburst forming stars at a rate of a few thousand solar masses per year. Submillimetre Array (SMA) imaging observations with a resolution ∼1? @] show that the submm (850μm) emission is extended on scales of 10? @ T35 kpc and is o?? @set from the optical position by ∼10 kpc. This morphology is dissimilar to that found in submm galaxies, which are generally un- or marginally resolved on arcsecond scales, or submm-luminous AGN where the AGN lies at the peak of the submm or molecular emission. The simplest explanation is that the object is in the early stages of a merger between a gas rich galaxy, which hosts the starburst, and a gas-poor AGN-host galaxy, which is responsible for the quasar emission. It is also possible that jet induced star formation might contribute to the unusual morphology.

Accepted by ApJL

E-mail contact: d.clements@imperial.ac.uk,

preprint available at http://arxiv.org/abs/0905.2518

The QSO HE 0450–2958: Scantily dressed or heavily robed? A normal quasar as part of an unusual ULIRG.

Knud Jahnke[1], David Elbaz[2], Eric Pantin[2], Asmus Böhm[3],[4], Lutz Wisotzki[3], Geraldine Letawe[5], Virginie Chantry[5], Pierre-Olivier Lagage[3]

[1] Max-Planck-Institut für Astronomie, Königstuhl 17, D-69117 Heidelberg, German

[2] CEA Saclay/Service d'Astrophysique, Laboratoire AIM, CEA/DSM/IRFU-CNRS-Université Paris Diderot, F-91191 Gif-sur-Yvette Cédex, France

[3] Astrophysikalisches Institut Potsdam, An der Sternwarte 16, D-14482 Potsdam, Germany

[4] Institut für Astro- und Teilchenphysik, Universität Innsbruck, Technikerstraße 25/8, A-6020 Innsbruck, Austria

[5] Institut d'Astrophysique et Géophysique, Université de Liège, Allée du 6 Août, 17 Sart Tilman (Bat. B5C), B-4000 Liège, Belgium

The luminous $z = 0.286$ quasar HE 0450–2958 is interacting with a companion galaxy at 6.5 kpc distance and the whole system radiates in the infrared at the level of an ultraluminous infrared galaxy (ULIRG). A so far undetected host galaxy triggered the hypothesis of a mostly "naked" black hole (BH) ejected from the companion by three-body interaction. We present new HST/NICMOS 1.6μm imaging data at $0.1''$ resolution and VLT/VISIR 11.3μm images at $0.35''$ resolution that are for the first time resolving the system in the near- and mid-infrared. We combine these data with existing optical HST and CO maps. (i) At 1.6μm we find an extension N-E of the quasar nucleus that is likely a part of the host galaxy, though not its main body. If true, a combination with upper limits on a main body co-centered with the quasar brackets the host galaxy luminosity to within a factor of $\sim$4 and places HE 0450–2958 directly onto the $M_{\rm BH} - M_{\rm bulge}$-relation for nearby galaxies. (ii) A dust-free line of sight to the quasar suggests a low dust obscuration of the host galaxy, but the formal upper limit for star formation lies at 60 $M_\odot$/yr. HE 0450–2958 is consistent with lying at the high-luminosity end of Narrow-Line Seyfert 1 Galaxies, and more exotic explanations like a "naked quasar" are unlikely.

(iii) All 11.3μm radiation in the system is emitted by the quasar nucleus. It has warm ULIRG-strength IR emission powered by black hole accretion and is radiating at super-Eddington rate, $L/L_{\rm Edd} = 6.2^{+3.8}_{-1.8}$, or 12 $M_\odot$/year.

(iv) The companion galaxy is covered in optically thick dust and is not a collisional ring galaxy. It emits in the far infrared at ULIRG strength, powered by Arp220-like star formation (strong starburst-like). An M82-like SED is ruled out. (v) With its black hole accretion rate HE 0450–2958 produces not enough new stars to maintain its position on the $M_{\rm BH} - M_{\rm bulge}$-relation, and star formation and black hole accretion are spatially disjoint. This relation can either only be maintained averaging over a longer timescale ($<\sim$500 Myr) and/or the bulge has to grow by redistribution of preexisting stars. (vi) Systems similar to HE 0450–2958 with spatially disjoint ULIRG-strength star formation and quasar activity might be common at high redshifts but at $z < 0.43$ we only find <4% (3/77) candidates for a similar configuration.

Accepted by ApJ

E-mail contact: jahnke@mpia.de,
preprint available at http://arxiv.org/abs/0906.0365

The Evolution of Active Galactic Nuclei in Clusters of Galaxies to Redshift 1.3

Paul Martini[1], Gregory R. Sivakoff[1,2] and John S. Mulchaey[3]

[1] Department of Astronomy and Center for Cosmology and Astroparticle Physics, The Ohio State University, 140 West 18th Avenue, Columbus, OH 43210

[2] Department of Astronomy, University of Virginia, P.O. Box 400325, Charlottesville, VA 22904-4325

[3] Carnegie Observatories, 813 Santa Barbara St., Pasadena, CA 91101-1292

We have measured the luminous AGN population in a large sample of clusters of galaxies and find evidence for a substantial increase in the cluster AGN population from $z \sim 0.05$ to $z \sim 1.3$. The present sample now includes 32 clusters of galaxies, including 15 clusters above $z = 0.4$, which corresponds to a three-fold increase compared to our previous work at high redshift. At $z < 0.4$ we have obtained new observations of AGN candidates in six additional clusters and found no new luminous AGN in cluster members. Our total sample of 17 low-redshift clusters contains only two luminous AGN, while at high redshifts there are 18 such AGN, or an average of more than one per cluster. We have characterized the evolution of luminous X-ray AGN as the fraction of galaxies with $M_R < M_R^*(z) + 1$ that host AGN with rest-frame, hard X-ray [2–10 keV] luminosities $L_{X,H} \geq 10^{43}\,{\rm erg\,s^{-1}}$. The AGN fraction increases from $f_A = 0.134^{+0.18}_{-0.087}\%$ at a median $z = 0.19$ to $f_A = 1.00^{+0.29}_{-0.23}\%$ at a median $z = 0.72$. Our best estimate of the evolution is a factor of eight increase to $z = 1$ and the statistical significance of the increase is 3.8σ. This dramatic evolution is qualitatively similar to the evolution of the star-forming galaxy population in clusters known as the Butcher-Oemler effect. We discuss the implications of this result for the coevolution of black holes and galaxies in clusters, the evolution of AGN feedback, searches for clusters with the Sunyaev-Zel'dovich effect, and the possible detection of environment-dependent downsizing. which accepted your paper, for example:

Accepted by ApJ

E-mail contact: martini@astronomy.ohio-state.edu,
preprint available at http://lanl.arxiv.org/abs/0906.1843

Bayesian inference of jet bulk-flow speeds in FRII radio sources

L.M. Mullin[1] and M.J. Hardcastle[2]

[1] Astrophysics Group, Cavendish Laboratory, University of Cambridge, J J Thomson Avenue, Cambridge CB3 0HE, UK
[2] School of Physics, Astronomy and Mathematics, University of Hertfordshire, College Lane, Hatfield AL10 9AB, UK

Radio jet and core data for a complete sample of 98 FRII sources with $z < 1$ are analysed with a Markov-Chain Monte Carlo (MCMC) model fitting method to obtain constraints on bulk-flow speeds in the beam. The Bayesian parameter-inference method is described and demonstrated to be capable of providing meaningful constraints on the Lorentz factor at both kiloparsec and parsec scales. For both jets and cores we show that models in which some intrinsic dispersion is present in the features' intrinsic prominence, bulk-flow speeds or both provide the best fit to the data. The constraints on the Lorentz factor on parsec scales are found to be consistent with the expected values given VLBI observations and other evidence, with $\bar{\gamma} \approx 10$–14. On kiloparsec scales, the Lorentz factor is found to be ≈ 1.18 –1.49, in agreement with the results of previous analyses of radio jet data. These values are clearly not consistent with the $\gamma \approx 10$ speeds required by beamed inverse-Compton models of X-ray emission from quasar jets; our results therefore support models that require velocity structure in powerful jets.

Accepted by MNRAS

E-mail contact: m.j.hardcastle@herts.ac.uk,
preprint available at http://arxiv.org/abs/0906.2088

On the Prospect of Constraining Black-Hole Spin Through X-ray Spectroscopy of Hotspots

Kendrah D. Murphy[1,2], Tahir Yaqoob[2,3], Vladimir Karas[4], and Michal Dovčiak[4]

[1] MIT Kavli Institute for Astrophysics and Space Research, 77 Massachusetts Avenue, NE 80, Cambridge, MA 02139
[2] Department of Physics and Astronomy, Johns Hopkins University, Baltimore, MD 21218
[3] Astrophysics Science Division, NASA/Goddard Space Flight Center, Greenbelt, MD 20771
[4] Astronomical Institute, Academy of Sciences, Boční II, CZ-141 31 Prague, Czech Republic

Future X-ray instrumentation is expected to allow us to significantly improve the constraints derived from the Fe K lines in AGN, such as the black-hole angular momentum (spin) and the inclination angle of the putative accretion disk. We consider the possibility that measurements of the persistent, time-averaged Fe K line emission from the disk could be supplemented by the observation of a localized flare, or "hotspot", orbiting close to the black hole. Although observationally challenging, such measurements would recover some of the information loss that is inherent to the radially-integrated line profiles. We present calculations for this scenario to assess the extent to which, in principle, black-hole spin may be measured. We quantify the feasibility of this approach using realistic assumptions about likely measurement uncertainties.

Accepted by ApJ

E-mail contact: kdmurphy@space.mit.edu,
preprint available at http://arxiv.org/abs/0906.4713

Galaxy Zoo : 'Hanny's Voorwerp : A quasar light echo?

Chris J. Lintott[1], Kevin Schawinski[1,2,3], William Keel[4,5,16], Hanny van Ark el[6], Nicola Bennert[7,8], Edward Edmondson[9], Daniel Thomas[9], Daniel J.B. Smith[10], Peter D. Herbert[11], Matt J. Jarvis[11], Shani l Virani[3],Dan Andreescu[12], Steven P. Bamford[8], Kate Land[1], P hil Murray[13], Robert C. Nichol[8], M. Jordan Raddick[14], Anže Sl osar[15], Alex Szalay[14], Jan Vandenberg[14]

[1] Department of Physics, University of Oxford, Oxford OX1 3RH, UK.
[2] Department of Physics, Yale University, New Haven, CT 06511, USA
[3] Yale Center for Astronomy and Astrophysics, Yale University, P.O. Box 208 121, New Haven, CT 06520, USA
[4] Dept. of Physics and Astronomy, University of Alabama, Box 870324, Tuscaloosa, AL 35487, USA.
[5] SARA Observatory
[6] Netherlands School System
[7] Institute of Geophysics and Planetary Physics, University of California, Riverside, CA 92521
[8] Physics Department, University of California, Santa Barbara, CA 93106, USA.
[9] Institute of Cosmology & Gravitation, University of Portsmouth, UK.
[10] Astrophysics Research Institute, Liverpool John Moores University, Twelve Quays House Egerton Wharf, Birkenhead, CH41 1LD, UK.
[11] Centre for Astrophysics, Science & Technology Research Institute, University of Hertfordshire, Hatfield, UK.
[12] LinkLab, 4506 Graystone Ave., Bronx, NY 10471, USA.
[13] Fingerprint Digital Media, 9 Victoria Close, Newtownards, Co. Down, Northern Ireland, BT23 7GY, UK.
[14] Department of Physics and Astronomy, Johns Hopkins University, 3400 N. Charles St., Baltimore, MD 21218, USA.
[15] Berkeley Centre for Cosmological Physics, Lawrence Berkeley National Laboratory and Physics Department, Berkeley, CA 94720, USA.
[16] Visiting Astronomer, Kitt Peak National Observatory, National Optical Astronomy Observatory, which is operated by the Association of Universities for Research in Astronomy (AURA) under cooperative agreement with the National Science Foundation.

We report the discovery of an unusual object near the spiral galaxy IC 2497, discovered by visual inspection of the Sloan Digital Sky Survey (SDSS) as part of t he Galaxy Zoo project. The object, known as Hanny's Voorwerp, is bright in the S DSS *g* band due to unusually strong [OIII] 4959, 5007 emission lines. We present the results of the first targeted observations of the object in the o ptical, UV and X-ray, which show that the object contains highly ionized gas. Al though the line ratios are similar to extended emission-line regions near lumino us AGN, the source of this ionization is not apparent. The emission-line propert ies, and lack of x-ray emission from IC 2497, suggest either a highly obscured AGN with a novel geometry arranged to allow photoionization of the object but no t the galaxy's own circumnuclear gas, or, as we argue, the first detection of a quasar light echo. In this case, either the luminosity of the central source has decreased dramatically or else the obscuration in the system has increased with in 10^5 years. This object may thus represent the first direct probe of quasar history on these timescales.

Accepted by MNRAS

E-mail contact: cjl@astro.ox.ac.uk,
preprint available at http://www.arxiv.org/abs/0906.5304

Gemini/GMOS IFU gas velocity 'tomography' of the narrow line region of nearby active galaxies

Fausto K. B. Barbosa[1], T. Storchi-Bergmann[1], R. Cid Fernandes[2], C. Winge[3] and H. R. Schmitt[4]

[1] Instituto de Fsica - UFRGS, Caixa Postal 15051, CEP 91501-970, Porto Alegre, RS, Brazil
[2] Departamento de Fsica, CFM - UFSC, Campus Universitrio - Trindade, CP 476, CEP 88040-900, Florianpolis, SC, Brazil
[3] Gemini Observatory, Casilla 603, La Serena, Chile
[4] Remote Sensing Division, Code 7210, Naval Research Laboratory, 4555 Overlook Avenue, SW, Washington D.C. 20375, USA; Interferometric Inc., 13454 Sunrise Valley, Suite 240, Herndon, VA 20171, USA

We present two-dimensional (2D) mapping of the gas velocity field of the inner few hundred parsecs of six nearby active galaxies, using spectra obtained with the integral field unit of the Gemini Multi-Object Spectrograph instrument at the Gemini North telescope. In our previous paper, we reported the 2D mapping of the stellar kinematics extracted from the calcium triplet absorption lines. In this paper, we use the [SIII] 9069 emission line to obtain the flux distribution and kinematics of the gas in the narrow-line region (NLR). The gas emission is extended by a few hundred parsecs and its kinematics are dominated by rotation in the galaxy plane. Subtraction of the rotation component reveals outflows along the NLR which show spatial correlation with radio structures seen in Very Large Array radio 3.6 and 20 cm flux images, suggesting that the radio jet is pushing the circumnuclear interstellar medium. This interpretation is also supported by the observation of high-velocity dispersion ($\gtrsim$500 km s^{-1}) structures in association with the outflowing gas. The gas outflows and radio jets are oriented at random

angles relative to the galaxy major axis, indicating that they are not launched perpendicularly to the galaxy plane. Slicing the emission-line profiles into velocity channels, we create maps of the NLR gas distribution at different radial velocities. In at least half of our sample, the highest velocities are observed close to the nucleus suggesting that the emitting gas is decelerating outwards, from projected blueshifts exceeding 400km s^{-1} to values of 100-200 km s^{-1} at 100-200pc from the nucleus. We have estimated mass outflow rates in the NLR of $\sim$1 to 50 10^{-3} $M_{\odot}$ yr^{-1} , which are $\sim$10-20 times the accretion rate necessary to feed the active nucleus. The kinetic energy of the ouflow is estimated to be 4-5 orders of magnitude smaller than the bolometric luminosity. Assuming kinetic energy transfer between the radio jet and the NLR outflows, the mass ejection rate in the radio jet is 5-6 orders of magnitude smaller than the mass accretion rate necessary to feed the nuclear supermassive black hole.

MNRAS, Vol. 396, page 2

E-mail contact: djfaustus@gmail.com

Meetings

5 Years of Swift

State College, Pennsylvania, USA,
2009-November 18-20

Webpage: `http://www.outreach.psu.edu/programs/swift-2009/index.html`
Email: `L-LOC-Swift2009@lists.psu.edu`

We will have the "5 Years of Swift" meeting in State College, PA, USA, November 18th - 20th, 2009. The conference fee will be $300 including breakfast each morning, conference reception on November 17th, and the conference dinner on November 19th. We have now set up a webpage on which you can find more information about this meeting:

`http://www.outreach.psu.edu/programs/swift-2009/index.html`

The idea of this meeting is to bring together scientists who have worked with Swift data in the last 5 years to talk about science results and discuss strategies for the future. Swift is a highly successful NASA mission. Although Swift's primary task still is to observe gamma-ray bursts, it is one of the most versatile missions ever flown. With its multiwavelength and fast scheduling capacity it is ideal for multiwavelength and/or monitoring programs. Because of this it has been used for AGN, supernovae, variable stars, transients, comets, and some of the most distant objects (GRB 050904, GRB 080913B, GRB 090423) in the Universe. In 2009 we also have new opportunities for Swift with increasing capacities in the GeV and TeV energy ranges with FERMI, AGILE VERITAS, MAGIC and HESS, by gravitational wave detectors such as LIGO, VIRGO and GEO, and neutrino detectors such as ICECUBE and ANTARES.

We will have a mixture of invited talks and contributed talks and posters aiming for roughly 100-120 participants. The meeting will take place at The Atherton Hotel downtown State College, PA. The cost per night will be $82. Reservations should be done by each participiant with the Atherton directly (+1-814-231-2100, www.athertonhotel.net) For more information, please refer to the webpage or contact the Local Organizing Committee at: mailto:L-LOC-Swift2009@lists.psu.edu The webpage will be open for registration and abstract submission by mid-July.

E-mail contact: grupe@astro.psu.edu

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.