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
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

Abstracts of recently accepted papers

The evolution of star formation in quasar host galaxies

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We have used far-infrared data from IRAS, ISO, SWIRE, SCUBA and MAMBO to constrain statistically the mean far-infrared luminosities of quasars. Our quasar compilation at redshifts $0 < z < 6.5$ and I-band luminosities $-20 < I_{\rm AB} < -32$ is the first to distinguish evolution from quasar luminosity dependence in such a study. We carefully cross-calibrate IRAS against Spitzer and ISO, finding evidence that IRAS $100\,\mu$m fluxes at < 1 Jy are overestimated by $\sim 30\%$. We find evidence for a correlation between star formation in quasar hosts and the quasar optical luminosities, varying as SFR $\propto L_{\rm opt}^{0.44\pm0.07}$ at any fixed redshift below $z = 2$. We also find evidence for evolution of the mean star formation rate in quasar host galaxies, scaling as $(1+z)^{1.6\pm0.3}$ at $z < 2$ for any fixed quasar I-band absolute magnitude fainter than -28. We find no evidence for any correlation between star formation rate and black hole mass at $0.5 < z < 4$. Our data are consistent with feedback from black hole accretion regulating stellar mass assembly at all redshifts.

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Preprint available at http://arxiv.org/abs/0901.0552

Chandra observations of the hybrid morphology radio sources 3C 433 and 4C 65.15: FR IIs with asymmetric environments

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We present *Chandra* observations of the hybrid morphology radio sources 3C 433 and 4C 65.15, two members of the rare class of objects possessing an FR I jet on one side of the core and an FR II lobe on the other. The X-ray spectrum of 3C 433 shows intrinsic absorption (with a column density of $N_{\rm H} \simeq 8 \times 10^{22}$ cm^{-2}), such as is typical of FR II narrow-line radio galaxies. There is excess X-ray emission below 2 keV containing contributions from diffuse soft X-ray emission (likely hot gas with $kT \sim$1.2 keV) as well as from the nucleus. The core of 3C 433 is extended in hard X-rays, presumably due to X-ray emission from the inner-jet knot on the FR I side that is apparent in the radio map. It is possible that the X-ray emission from this inner-jet knot is absorbed by the dust known to be present in the host galaxy. The spectrum of 4C 65.15 can be modeled with a simple power law with perhaps mild intrinsic absorption ($N_{\rm H} \simeq 1.3 \times 10^{21}$ cm^{-2}). X-ray emission is detected at the bend in the FR I jet. This X-ray jet emission lies above the extrapolation from the high-frequency radio synchrotron emission and has a spectral slope flatter than $\alpha_{\rm rx}$, indicating that the jet spectral energy distribution is concave as with other FR II quasar jets. Both 3C 433 and 4C 65.15 have unabsorbed X-ray luminosities, radio luminosities, and optical spectra typically seen in comparable sources with FR II morphologies. Presumably the FR I structure seen on one side in these hybrid sources is generated by a powerful jet interacting with a relatively dense environment.

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preprint available at http://arxiv.org/abs/0901.0925

Physical Conditions in the Narrow-Line Region of Markarian 3. II. Photoionization Modeling Results

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We have examined the physical conditions in the narrow-line region (NLR) of the Seyfert 2 galaxy Markarian 3, using long-slit spectra obtained with the *Hubble Space Telescope*/Space Telescope Imaging Spectrograph and photoionization models. We find three components of photoionized gas in the NLR. Two of these components, characterized by emission lines such as [Ne V] λ3426 and [O III] λ5007, lie within the envelope of the bi-conical region described in our previous kinematic study. A component of lower ionization gas, in which lines such as [O II] λ3727 arise, is found to lie outside the bi-cone. Each of these components is irradiated by a power-law continuum which is attenuated by intervening gas, presumably closer to the central source. The radiation incident upon the low ionization gas, external to the bi-cone, is much more heavily absorbed. These absorbers are similar to the intrinsic UV and X-ray absorbers detected in many Seyfert 1 galaxies, which suggests that the collimation of the ionizing radiation occurs in a circumnuclear wind, rather than a thick, molecular torus. We estimate the mass for the observed NLR emitting gas to be $2 \times 10^6\ M_\odot$. It is likely that Markarian 3 acquired this gas through an on-going interaction with the spiral galaxy UGC 3422.

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preprint available at http://xxx.lanl.gov/abs/0901.0972

Optical Variability of the Radio Source J 1128+5925 – II. Confirmation of Its Optical Quietness

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The source J 1128+5925 was found recently to show strong intraday variability at radio wavelengths and its radio variability may come from interstellar scintillation. In optical, the object was quiet in our 2007 monitoring session. Here we report the results of our new optical monitoring of this source in 2008. In addition to confirm our 2007 results, that the object did not display any clear variation on timescales from hour–day to month, we provide evidence that the object does not vary on timescale of

one year, and it is probably intrinsically quiet in optical domain. Its very different behaviors in optical and radio regimes can be naturally explained if its strong radio variability comes from interstellar scintillation.

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E-mail contact: jhwu@bao.ac.cn,
preprint available at http://arxiv.org/abs/0901.1184

Do Moderate-Luminosity Active Galactic Nuclei Suppress Star Formation?

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The growth of supermassive black holes and their host galaxies are thought to be linked, but the precise nature of this symbiotic relationship is still poorly understood. Both observations and simulations of galaxy formation suggest that the energy input from active galactic nuclei (AGNs), as the central supermassive black hole accretes material and grows, heats the interstellar material and suppresses star formation. In this Letter, we show that most host galaxies of moderate-luminosity supermassive black holes in the local universe have intermediate optical colors that imply the host galaxies are transitioning from star formation to quiescence, the first time this has been shown to be true for all AGNs independent of obscuration. The intermediate colors suggest that star formation in the host galaxies ceased roughly 100 Myr ago. This result indicates that either the AGNs are very long lived, accreting for more than 1 Gyr beyond the end of star formation, or there is a ∼100 Myr time delay between the shutdown of star formation and detectable black hole growth. The first explanation is unlikely given current estimates for AGN lifetimes, so low-luminosity AGNs must shut down star formation before substantial black hole accretion activity is detected. The scarcity of AGN host galaxies in the blue cloud reported here challenges scenarios where significant star formation and black hole growth are coeval. Lastly, these observations also strongly support the "Unified Model" of AGNs as the host galaxy colors are independent of obscuration toward the central engine.

Schawinski et al 2009, ApJ 692 L19-L23, doi: 10.1088/0004-637X/692/1/L19

E-mail contact: agnews@manchester.ac.uk,
preprint available at http://arxiv.org/abs/0901.1663

Discovery of the Most-Distant Double-Peaked Emitter at $z = 1.369$

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We report the discovery of the most-distant double-peaked emitter, CXOECDFS J033115.0−275518, at $z = 1.369$. A Keck/DEIMOS spectrum shows a clearly double-peaked broad Mg II $\lambda2799$ emission line, with FWHM $\approx 11\,000$ km s^{-1} for the line complex. The line profile can be well fit by an elliptical relativistic Keplerian disk model. This is one of a handful of double-peaked emitters known to be a luminous quasar, with excellent multiwavelength coverage and a high-quality X-ray spectrum. CXOECDFS J033115.0−275518 is a radio-loud quasar with two radio lobes (FR II morphology) and a radio loudness of $f_{5\ \mathrm{GHz}}/f_{4400\ \mathrm{\AA}} \approx 429$. The X-ray spectrum can be modeled by a power law with photon index 1.72 and no intrinsic absorption; the rest-frame 0.5–8.0 keV luminosity is 5.0×10^{44} erg s^{-1}. The spectral energy distribution (SED) of CXOECDFS J033115.0−275518 has a shape typical for radio-loud quasars and double-peaked emitters at lower redshift. The local viscous energy released from the

line-emitting region of the accretion disk is probably insufficient to power the observed line flux, and external illumination of the disk appears to be required. The presence of a big blue bump in the SED along with the unexceptional X-ray spectrum suggest that the illumination cannot arise from a radiatively inefficient accretion flow.

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Feeding versus Feedback in NGC 4151 probed with Gemini NIFS. I. Excitation

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We have used the Gemini Near-infrared Integral Field Spectrograph (NIFS) to map the emission-line intensity distributions and ratios in the Narrow-Line Region (NLR) of the Seyfert galaxy NGC 4151 in the Z, J, H and K bands at a resolving power ≥ 5000, covering the inner $\approx 200 \times 300$ pc of the galaxy at a spatial resolution of $\approx$8 pc. We present intensity distributions in 14 emission lines, which show three distinct behaviours. (1) Most of the ionized gas intensity distributions are extended to $\approx$100 pc from the nucleus along the region covered by the known biconical outflow (position angle PA=60/240°– NE–SW), consistent with an origin in the outflow; while the recombination lines show intensity profiles which decrease with distance r from the nucleus as $I \propto r^{-1}$, most of the forbidden lines present a flat intensity profile ($I \propto r^0$) or even increasing with distance from the nucleus towards the border of the NLR. (2) The H_2 emission lines show completely distinct intensity distributions, which avoid the region of the bicone, extending from $\approx$10 pc to $\approx$60 pc from the nucleus approximately along the large scale bar, almost perpendicular to the bicone axis. This morphology supports an origin for the H_2-emitting gas in the galaxy plane. (3) The coronal lines show a steep intensity profile, described by $I \propto r^{-2}$; the emission is clearly resolved only in the case of [Si VII], consistent with an origin in the inner NLR.

Using the line-ratio maps [Fe II] 1.644/1.257 and Pa β/Br γ we obtain an average reddening of E(B-V) $\approx$ 0.5 along the NLR and E(B-V) $\geq$ 1 at the nucleus. Our line-ratio map [Fe II] 1.257μm/[P II] 1.189μm of the NLR of NGC 4151 is the first such map of an extragalactic source. Together with the [Fe II]/Pa β map, these line ratios correlate with the radio intensity distribution, mapping the effects of shocks produced by the radio jet on the NLR. These shocks probably release the Fe locked in grains and produce an enhancement of the [Fe II] emission at $\approx 1''$ from the nucleus. At these regions, we obtain electron densities $N_e \approx 4000\,\mathrm{cm^{-3}}$ and temperatures $T_e \approx 15000$ K for the [Fe II]-emitting gas. For the H_2-emitting gas we obtain much lower temperatures of $T_{exc} \approx 2100$ K and conclude that the gas is in thermal equilibrium. The heating necessary to excite the molecule may be due to X-rays escaping perpendicular to the cone (through the nuclear torus, if there is one) or to shocks probably produced by the accretion flow previously observed along the large scale bar.

The distinct intensity distributions and physical properties of the ionized and molecular gas, as well as their locations, the former along the outflowing cone, and the latter in the galaxy plane surrounding the nucleus, suggest that the H_2-emitting gas traces the AGN *feeding*, while the ionized gas traces its *feedback*.

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preprint available at http://xxx.lanl.gov/abs/0812.2448

Rotation-Measures across Parsec-scale Jets of FRI radio galaxies

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We present the results of a parsec-scale polarization study of three FRI radio galaxies – 3C66B, 3C78 and 3C264 – obtained with the Very Long Baseline Array at 5, 8 and 15 GHz. Parsec-scale polarization has been detected in a large number of beamed radio-loud active galactic nuclei, but in only a handful of the relatively unbeamed radio galaxies. We report here the detection of parsec-scale polarization at one or more frequencies in all three FRI galaxies studied. We detect Faraday rotation measures of the order of a few hundred rad m^{-2} in the nuclear jet regions of 3C78 and 3C264. In 3C66B polarization was detected at

8 GHz only. A transverse rotation measure gradient is observed across the jet of 3C78. The inner-jet magnetic field, corrected for Faraday rotation, is found to be aligned along the jet in both 3C78 and 3C264, although the field becomes orthogonal further from the core in 3C78. The *RM* values in 3C78 and 3C264 are similar to those previously observed in nearby radio galaxies. The transverse *RM* gradient in 3C78, the increase in the degree of polarization at the jet edge, the large rotation in the polarization angles due to Faraday rotation and the low depolarization between frequencies, suggests that a layer surrounding the jet with a sufficient number of thermal electrons and threaded by a toroidal or helical magnetic field is a good candidate for the Faraday rotating medium. This suggestion is tentatively supported by *Hubble Space Telescope* optical polarimetry but needs to be examined in a greater number of sources.

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eprint arXiv:0901.0913

Radiation pressure force and black hole mass determination in low redshift type-I and type-II active galactic nuclei

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The distributions of L([O III] λ5007), black hole (BH) mass and $L/L_{\rm Edd}$ in two large samples of type-I and type-II active galactic nuclei (AGNs) are compared in order to test the suggestion that radiation pressure force is affecting the gas velocity in the broad line region and hence the BH mass determination. The samples are drawn from the SDSS archive and are modified to represent the same parent distribution at $0.1 \le z \le 0.2$. BH masses in type-I sources are calculated in two different ways, one using a simple virial mass assumption and the other by taking into account the effect of radiation pressure force on the gas. The simple virial mass estimate results in good agreement with the σ_*-based BH mass and $L/L_{\rm Edd}$ estimates in type-II sources. In contrast, there is a clear disagreement in the $L/L_{\rm Edd}$ distributions when radiation pressure-based estimates are used. This indicates that radiation pressure force is not important in $0.1 \le z \le 0.2$ AGNs with L_{5100}=$10^{42.8-44.8}$ ergs s^{-1}. This has important implications to the physics of the gas producing the broad emission lines in AGNs, in particular the existence of extremely large column density ($\sim 10^{24}$ cm^{-2}) clouds.

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The Many Faces of Centaurus A

Sydney, Australia
28 June - 3 July 2009

Webpage: `http://www.atnf.csiro.au/research/cena/`
Email: `cena@csiro.au`

First Announcement & Pre-registration

This conference aims to bring together a broad range of astronomers and high-energy physicists that traditionally form separate research communities but are all involved in some way in the detailed studies of the very nearby, active, massive galaxy Centaurus A/NGC 5128. Since its discovery as a radio source 60 years ago, the radio galaxy Centaurus A (NGC 5128) has attracted great interest from the international astrophysics and high energy physics communities, and yet this will be the first conference devoted to this intriguing source.

The conference will be held at 'The Mint' in Sydney's Central Business District, just a moment's walk to the Sydney Harbour Bridge and Opera House. We have negotiated a discounted rate for conference delegates and their families at The Sir Stamford Hotel at Circular Quay. Contact details for this hotel, plus links to the many other accommodation options nearby will be made available from the conference website.

Online pre-registration is now open. Registration will be limited to 100 people.

Webpage: `http://www.atnf.csiro.au/research/cena/`
Email: `cena@csiro.au`

We hope to welcome you to Sydney in 2009: The International Year of Astronomy!

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IAU Symposium 267
Evolution of Galaxies and Central Black Holes: Feeding and Feedback

Rio de Janeiro, Brazil
10–14 August 2009

Webpage: `http://www.stsci.edu/institute/conference/iau267`
Email: `peterson@astronomy.ohio-state.edu`

It is now widely recognized that nuclear activity is an important ingredient in the evolution of galaxies. With the advent of techniques for estimating AGN black hole masses, even at large redshifts, and the availability of large quasar samples at all redshifts from Chandra, XMM–Newton, the Sloan Digital Sky Survey, and other surveys, the field has undergone transformational change. A major focus has become observational and theoretical investigation of nuclear activity in the context of the galactic environment, which can be described in terms of "feeding" and "feedback." AGN feeding is tightly correlated with redshift-dependent star formation in the host galaxy. AGN feedback, in the form of relativistic jets, massive winds, and intense radiation, has been invoked to solve a broad range of problems that arise in Cold Dark Matter-based models of galaxy formation: setting the critical mass scale for galactic bulges, regulating cooling in clusters, and shutting down star formation. Such feedback, feeding, and their mutual interaction might possibly account for the tight relationship between galactic bulge mass and central black hole mass

The purpose of the proposed symposium is to bring together researchers from different specializations to better define the current global landscape and to motivate new lines of research. The timing of this symposium is propitious: HST is expected to be in its first full cycle after SM4 refurbishment, and ALMA, JWST and LSST, will be on the near-term horizon.

Abstracts for proposed contributions are now being accepted at the IAU GA abstract server. Go to `http://www.astronomy2009.com.br` and select Abstract Submission. Deadline for submission of abstracts is 1 March 2009.

T. Heckman will deliver the Symposium keynote address. Review talks will be presented by M. Elvis, A. Fabian, A. King, P. Madau, H. Netzer, B.M. Peterson, and R.S. Somerville.

Invited speakers include N. Arav, R. Cid Fernandes, S. Croom, R. Davies, T. Di Matteo, D. Elbaz, X. Fan, L. Ferrarese, P. Hopkins, G. Kauffmann, A. Marconi, R. Morganti, T. Nagao, C.-Y. Peng, D. Proga, G. Risaliti, T. Storchi-Bergmann, M. Vestergaard, M. Volonteri, and K. Wada.

Scientific Organizing Committee:
Chair: Bradley M. Peterson (USA), Roberto Cid Fernandes (Brazil), Suzy Collin (France), Horacio Dottori (Brazil), Martin Elvis (USA), Laura Ferrarese (Canada), Timothy M. Heckman (USA), Guinevere A.M. Kauffmann (Germany), Stefanie Komossa (Germany), Paulina Lira (Chile), Alessandro Marconi (Italy), Hagai Netzer (Israel), Elaine M. Sadler (Australia), Rachel S. Somerville (USA), Thaisa Storchi-Bergmann (Brazil), Keiichi Wada (Japan), and Martin Ward (UK)

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