Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
No. 136 — July 2008	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

Abstracts of recently accepted papers

Nuclear Activity in Nearby Galaxies

Luis C. Ho[1]

[1] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA

A significant fraction of nearby galaxies show evidence of weak nuclear activity unrelated to normal stellar processes. Recent high-resolution, multiwavelength observations indicate that the bulk of this activity derives from black hole accretion with a wide range of accretion rates. The low accretion rates that typify most low-luminosity active galactic nuclei induce significant modifications to their central engine. The broad-line region and obscuring torus disappear in some of the faintest sources, and the optically thick accretion disk transforms into a three-component structure consisting of an inner radiatively inefficient accretion flow, a truncated outer thin disk, and a jet or outflow. The local census of nuclear activity supports the notion that most, perhaps all, bulges host a central supermassive black hole, although the existence of active nuclei in at least some late-type galaxies suggests that a classical bulge is not a prerequisite to seed a nuclear black hole.

Accepted by Annu. Rev. Astron. Astrophys. (2008, Vol. 46)

E-mail contact: lho@ociw.edu,
preprint available at http://xxx.lanl.gov/abs/0803.2268

A Supermassive Binary Black Hole with Triple Disks

Kimitake Hayasaki[1], Shin Mineshige[1], and Luis C. Ho[2]

[1] Yukawa Institute for Theoretical Physics, Oiwake-cho, Kitashirakawa, Sakyo-ku, Kyoto 606-8502, Japan
[2] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA

Hierarchical structure formation inevitably leads to the formation of supermassive binary black holes (BBHs) with a sub-parsec separation in galactic nuclei. However, to date there has been no unambiguous detection of such systems. In an effort to search for potential observational signatures of supermassive BBHs, we performed high-resolution smoothed particle hydrodynamics (SPH) simulations of two black holes in a binary of moderate eccentricity surrounded by a circumbinary disk. Building on our previous work, which has shown that gas can periodically transfer from the circumbinary disk to the black holes when the binary is on an eccentric orbit, the current set of simulations focuses on the formation of the individual accretion disks, their evolution and mutual interaction, and the predicted radiative signature. The variation in mass transfer with orbital phase from the circumbinary disk induces periodic variations in the light curve of the two accretion disks at ultraviolet wavelengths, but not in the optical or near-infrared. Searches for this signal offer a promising method to detect supermassive BBHs.

Accepted by ApJ Letters

E-mail contact: lho@ociw.edu,
preprint available at http://xxx.lanl.gov/abs/0708.2555

Candidate Active Nuclei in Late-type Spiral Galaxies

Louis-Benoit Desroches[1] **and Luis C. Ho**[2]

[1] Department of Astronomy, University of California, Berkeley, CA 94720-3411
[2] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA

We have assembled a sample of 53 late-type spiral galaxies (T types 6.0–9.0, corresponding to Hubble types Scd–Sm) with archival *Chandra* data. We find 17 objects with X-ray point-source detections coincident with the optical or near-infrared position of the nucleus (median offset $\delta = 1.6''$), suggestive of possible low-luminosity active galactic nuclei (AGNs). These X-ray sources range in luminosity from $L_{\rm X}$(2–10 keV) = $10^{37.1}$ to $10^{39.5}$ ergs s^{-1}. Considering possible contamination from low-mass X-ray binaries (LMXBs), we estimate that ∼4 detections are possible LMXBs instead of true AGNs, based on the probability of observing a LMXB in a nuclear star cluster typically found in these late-type spiral galaxies. This AGN fraction is significantly higher than that observed in optical surveys, indicating that active nuclei, and hence central black holes, are more common than previously suggested. The incidence of AGN activity in such late-type spiral galaxies also suggests that nuclear massive black holes can form and grow in galaxies with little or no evidence for bulges. Follow-up multiwavelength observations will be necessary to confirm the true nature of these sources.

Submitted to ApJ

E-mail contact: lho@ociw.edu,
preprint available at http://users.ociw.edu/lho/preprints.html

Black Holes in Pseudobulges and Spheroidals: A Change in the Black Hole-Bulge Scaling Relations at Low Mass

Jenny E. Greene[1]**, Luis C. Ho**[2]**, and Aaron J. Barth**[3]

[1] Department of Astrophysical Sciences, Princeton University, Princeton, NJ
[2] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA
[3] Department of Physics and Astronomy, University of California at Irvine, 4129 Frederick Reines Hall, Irvine, CA 92697

We investigate the relationship between black hole mass and host galaxy properties for active galaxies with the lowest black hole masses currently known in galaxy nuclei. *Hubble Space Telescope* imaging confirms that the host galaxies have correspondingly low luminosity; they are ~ 1 mag below L^*. In terms of morphology, $\sim 60\%$ of the sample are disk-dominated, and all of these are consistent with containing a bulge or (more likely) pseudobulge, while the remainder are compact systems with no discernible disk component. In general the compact components of the galaxies do not obey the fundamental plane of giant elliptical galaxies and classical bulges, but rather are less centrally concentrated at a given luminosity, much like spheroidal galaxies. Our results strongly confirm that a classical bulge is not a requirement for a nuclear black hole. At the same time, the observed ratio of black hole to bulge mass is nearly an order of magnitude lower in this sample than that seen for classical bulges. While the $M_{\rm BH} - \sigma_\star$ relation appears to continue to low mass, it seems that black hole-galaxy scaling relations do depend on galaxy structure.

Accepted by ApJ

E-mail contact: lho@ociw.edu,
preprint available at http://users.ociw.edu/lho/preprints.html

Stellar and Dust Properties of Local Elliptical Galaxies: Clues to the Onset of Nuclear Activity

Y. Zhang[1], Q.-S. Gu[1], and Luis C. Ho[2]

[1] Department of Astronomy, Nanjing University, Nanjing 210093, China
[2] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA

We study the stellar and dust properties of a well-defined sample of local elliptical galaxies to investigate the relationship between host galaxy properties and nuclear activity. We select a complete sample of 45 ellipticals from the Palomar spectroscopic survey of nearby galaxies, which includes 20 low-luminosity active galactic nuclei classified as LINERs and 25 inactive galaxies. Using a stellar population synthesis method, we compare the derived stellar population properties of the LINER versus the inactive subsamples. We also study the dust and stellar surface brightness distributions of the central regions of these galaxies using high-resolution images obtained with the *Hubble Space Telescope*. Relative to the inactive subsample, ellipticals hosting LINERs share similar total optical and near-infrared luminosity, central stellar velocity dispersions, and nuclear stellar populations as judged from their luminosity-weighted ages and metallicities. LINERs, on the other hand, have a larger fraction of core-type central surface brightness profiles and a much higher frequency of circumnuclear dust structures. Our results support the suggestion that LINERs are powered by low-luminosity AGNs rather than by young or intermediate-age stars. Nuclear activity in nearby elliptical galaxies seems to occur preferentially in those systems where sufficient cold interstellar material has managed to accumulate, perhaps via cooling condensations from hot gas.

Accepted by A&A

E-mail contact: lho@ociw.edu,
preprint available at http://users.ociw.edu/lho/preprints.html

A New H I Survey of Active Galaxies

Luis C. Ho[1], Jeremy Darling[2], and Jenny E. Greene[3]

[1] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA
[2] Center for Astrophysics and Space Astronomy, Department of Astrophysical and Planetary Sciences, University of Colorado, 389 UCB, Boulder, CO 80309-0389
[3] Princeton Observatory, Peyton Hall, Princeton University, Princeton, NJ 08544-1001

We have conducted a new Arecibo survey for H I emission for 113 galaxies with broad-line (type 1) active galactic nuclei (AGNs) out to recession velocities as high as $\sim 35,000$ km s^{-1}. The primary aim of the study is to obtain sensitive H I spectra for a well-defined, uniformly selected sample of active galaxies that have estimates of their black hole masses in order to investigate correlations between H I properties and the characteristics of the AGNs. H I emission was detected in 66 out of the 101 (65%) objects with spectra uncorrupted by radio frequency interference, among which 45 (68%) have line profiles with adequate signal-to-noise ratio and sufficiently reliable inclination corrections to yield robust deprojected rotational velocities. This paper presents the basic survey products, including an atlas of H I spectra, measurements of H I flux, line width, profile asymmetry, optical images, optical spectroscopic parameters, as well as a summary of a number of derived properties pertaining to the host galaxies. To enlarge our primary sample, we also assemble all previously published H I measurements of type 1 AGNs for which can can estimate black hole masses, which total an additional 53 objects. The final comprehensive compilation of 154 broad-line active galaxies, by far the largest sample ever studied, forms the basis of our companion paper, which uses the H I database to explore a number of properties of the AGN host galaxies.

Accepted by ApJS

E-mail contact: lho@ociw.edu,
preprint available at http://xxx.lanl.gov/abs/0803.2023

Decomposition of the Host Galaxies of Active Galactic Nuclei Using *Hubble Space Telescope* Images

Minjin Kim[1,2], Luis C. Ho[1], Chien Y. Peng[3],, Aaron J. Barth[4], and Myungshin Im[2]

[1] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA
[2] Department of Physics and Astronomy, Frontier Physics Research Division (FPRD), Seoul National University, Seoul, Korea
[3] NRC Herzberg Institute of Astrophysics, 5071 West Saanich Road, Victoria, British Columbia, Canada V9E2E7
[4] Department of Physics and Astronomy, University of California at Irvine, 4129 Frederick Reines Hall, Irvine, CA 92697-4575

Investigating the link between supermassive black hole and galaxy evolution requires careful measurements of the properties of the host galaxies. We perform simulations to test the reliability of a two-dimensional image-fitting technique to decompose the host galaxy and the active galactic nucleus (AGN), especially on images obtained using cameras onboard the *Hubble Space Telescope (HST)*, such as the Wide-Field Planetary Camera 2, the Advanced Camera for Surveys, and the Near-Infrared Camera and Multi-Object Spectrometer. We quantify the relative importance of spatial, temporal, and color variations of the point-spread function (PSF). To estimate uncertainties in AGN-to-host decompositions, we perform extensive simulations that span a wide range in AGN-to-host galaxy luminosity contrast, signal-to-noise ratio, and host galaxy properties (size, luminosity, central concentration). We find that realistic PSF mismatches that typically afflict actual observations systematically lead to an overestimate of the flux of the host galaxy. Part of the problem is caused by the fact that the *HST* PSFs are undersampled. We demonstrate that this problem can be mitigated by broadening both the science and the PSF images to critical sampling without loss of information. Other practical suggestions are given for optimal analysis of *HST* images of AGN host galaxies.

Submitted to ApJS

E-mail contact: lho@ociw.edu,
preprint available at http://users.ociw.edu/lho/preprints.html

The Origin of the Intrinsic Scatter in the Relation Between Black Hole Mass and Bulge Luminosity for Nearby Active Galaxies

Minjin Kim[1,2], Luis C. Ho[1], Chien Y. Peng[3],, Aaron J. Barth[4], Myungshin Im[2], Paul Martini[5], and Charles H. Nelson[6]

[1] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA
[2] Department of Physics and Astronomy, Frontier Physics Research Division (FPRD), Seoul National University, Seoul, Korea
[3] NRC Herzberg Institute of Astrophysics, 5071 West Saanich Road, Victoria, British Columbia, Canada V9E2E7
[4] Department of Physics and Astronomy, University of California at Irvine, 4129 Frederick Reines Hall, Irvine, CA 92697-4575
[5] Center for Cosmology and AstroParticle Physics, The Ohio State University, 191 West Woodruff Avenue, OH 43210
[6] Physics and Astronomy Department, Drake University, 2507 University Avenue, Des Moines, IA 50311

We investigate the origin of the intrinsic scatter in the correlation between black hole mass ($M_{\rm BH}$) and bulge luminosity ($L_{\rm bul}$) in a sample of 45 massive, local ($z \lesssim 0.35$) type 1 active galactic nuclei (AGNs). We derive $M_{\rm BH}$ from published optical spectra assuming a spherical broad-line region, and $L_{\rm bul}$ from detailed two-dimensional decomposition of archival optical *Hubble Space Telescope* images. AGNs follow the $M_{\rm BH} - L_{\rm bul}$ relation of inactive galaxies, but the zero point is shifted by an average of $\Delta \log M_{\rm BH} \approx -0.3$ dex. We show that the magnitude of the zero point offset, which is responsible for the intrinsic scatter in the $M_{\rm BH} - L_{\rm bul}$ relation, is correlated with several AGN and host galaxy properties, all of which are ultimately related to, or directly impact, the BH mass accretion rate. At a given bulge luminosity, sources with higher Eddington ratios have lower $M_{\rm BH}$. The zero point offset can be explained by a change in the normalization of the virial product used to estimate $M_{\rm BH}$, in conjunction with modest BH growth (∼10%–40%) during the AGN phase. Galaxy mergers and tidal interactions appear to play an important role in regulating AGN fueling in low-redshift AGNs.

Submitted to ApJ

E-mail contact: lho@ociw.edu,
preprint available at http://users.ociw.edu/lho/preprints.html

Properties of Active Galaxies Deduced from H I Observations

Luis C. Ho[1], Jeremy Darling[2], and Jenny E. Greene[3]

[1] The Observatories of the Carnegie Institution of Washington, 813 Santa Barbara St., Pasadena, CA 91101, USA
[2] Center for Astrophysics and Space Astronomy, Department of Astrophysical and Planetary Sciences, University of Colorado, 389 UCB, Boulder, CO 80309-0389
[3] Princeton Observatory, Peyton Hall, Princeton University, Princeton, NJ 08544-1001

We have completed a new survey for H I emission for a large, well-defined sample of 154 nearby ($z \lesssim 0.1$) galaxies with type 1 (broad-line) active galactic nuclei (AGNs). We make use of the extensive database of H I and optical parameters, presented in a companion paper, to perform a comprehensive appraisal of the cold gas content in active galaxies and to seek new strategies to investigate the global properties of the host galaxies and their relationship to their central black holes. After excluding objects with kinematically anomalous line profiles, which occur with high frequency in the sample, we show that the black hole mass obeys a strong, roughly linear relation with the host galaxy's dynamical mass, calculated by combining the H I line width and the optical size of the galaxy. Black hole mass follows a looser, though still highly significant, correlation with the maximum rotation velocity of the galaxy, as expected from the known scaling between rotation velocity and central velocity dispersion. Neither of these H I-based correlations is as tight as the more familiar relations between black hole mass and bulge luminosity or velocity dispersion, but they offer the advantage of being insensitive to the glare of the nucleus and therefore are promising new tools for probing the host galaxies of both nearby and distant AGNs. We present evidence for substantial ongoing black hole growth in the most actively accreting AGNs. In these nearby systems, black hole growth appears to be delayed with respect to the assembly of the host galaxy but otherwise has left no detectable perturbation to its mass-to-light ratio, as judged from the Tully-Fisher relation, or its global gas content. The host galaxies of type 1 AGNs, including those luminous enough to qualify as quasars, are generally gas-rich systems, possessing a cold interstellar medium reservoir at least as abundant as that in inactive galaxies of the same morphological type. This calls into question current implementations of AGN feedback in models of galaxy formation that predict strong cold gas depletion in unobscured AGNs.

Accepted by ApJ

E-mail contact: lho@ociw.edu,
preprint available at http://xxx.lanl.gov/abs/0803.1952

AGN Dusty Tori: I. Handling of Clumpy Media

Maia Nenkova[1], Matthew M. Sirocky[2], Željko Ivezić[3] and Moshe Elitzur[2]

[1] Seneca College, Toronto, ON M2J 2X5, Canada
[2] Department of Physics and Astronomy, University of Kentucky, Lexington, KY 40506-0055
[3] Department of Astronomy, University of Washington, Seattle, WA 98105

According to unified schemes of Active Galactic Nuclei (AGN), the central engine is surrounded by dusty, optically thick clouds in a toroidal structure. We have recently developed a formalism that for the first time takes proper account of the clumpy nature of the AGN torus. We now provide a detailed report of our findings in a two-paper series. Here we present our general formalism for radiative transfer in clumpy media and construct its building blocks for the AGN problem — the source functions of individual dusty clouds heated by the AGN radiation field. We show that a fundamental difference from smooth density distributions is that in a clumpy medium, a large range of dust temperatures coexist at the same distance from the radiation central source. This distinct property explains the low dust temperatures found close to the nucleus of NGC1068 in 10 μm interferometric observations. We find that irrespective of the overall geometry, a clumpy dust distribution shows only moderate variation in its spectral energy distribution, and the 10μm absorption feature is never deep. Furthermore, the X-ray attenuating column density is widely scattered around the column density that characterizes the IR emission. All of these properties are characteristic of AGN observations. The assembly of clouds into AGN tori and comparison with observations is presented in the companion paper.

Accepted by ApJ (September 20, 2008)

E-mail contact: moshe@pa.uky.edu,
preprint available at http://lanl.arxiv.org/abs/0806.0511

AGN Dusty Tori: II. Observational Implications of Clumpiness

Maia Nenkova[1], Matthew M. Sirocky[2], Robert Nikutta[2], Željko Ivezić[3] and Moshe Elitzur[2]

[1] Seneca College, Toronto, ON M2J 2X5, Canada
[2] Department of Physics and Astronomy, University of Kentucky, Lexington, KY 40506-0055
[3] Department of Astronomy, University of Washington, Seattle, WA 98105

From extensive radiative transfer calculations we find that clumpy torus models with $\mathcal{N}_0 \sim$ 5–15 dusty clouds along radial equatorial rays successfully explain AGN infrared observations. The dust has standard Galactic composition, with individual cloud optical depth $\tau_V \sim$ 30–100 at visual. The models naturally explain the observed behavior of the 10μm silicate feature, in particular the lack of deep absorption features in AGN of any type. The weak 10μm emission feature tentatively detected in type 2 QSO can be reproduced if in these sources $\mathcal{N}_0$ drops to $\sim$2 or τ_V exceeds $\sim$100. The clouds angular distribution must have a soft-edge, e.g., Gaussian profile, the radial distribution should decrease as $1/r$ or $1/r^2$. Compact tori can explain all observations, in agreement with the recent interferometric evidence that the ratio of the torus outer to inner radius is perhaps as small as $\sim$5–10. Clumpy torus models can produce nearly isotropic IR emission together with highly anisotropic obscuration, as required by observations. In contrast with strict variants of unification schemes where the viewing-angle uniquely determines the classification of an AGN into type 1 or 2, clumpiness implies that it is only a probabilistic effect; a source can display type 1 properties even from directions close to the equatorial plane. The fraction of obscured sources depends not only on the torus angular thickness but also on the cloud number $\mathcal{N}_0$. The observed decrease of this fraction at increasing luminosity can be explained with a decrease of either torus angular thickness or cloud number, but only the latter option explains also the possible emergence of a 10μm emission feature in QSO2. X-ray obscuration, too, has a probabilistic nature. Resulting from both dusty and dust-free clouds, X-ray attenuation might be dominated by the dust-free clouds, giving rise to the observed type 1 QSO that are X-ray obscured. Observations indicate that the obscuring torus and the broad line region form a seamless distribution of clouds, with the transition between the two regimes caused by dust sublimation. Torus clouds may have been detected in the outflow component of H_2O maser emission from two AGN. Proper motion measurements of the outflow masers, especially

in Circinus, are a promising method for probing the morphology and kinematics of torus clouds.

Accepted by ApJ (September 20, 2008)

E-mail contact: moshe@pa.uky.edu,
preprint available at http://lanl.arxiv.org/abs/0806.0512

Radio spectra and polarisation properties of radio-loud Broad Absorption Line Quasars

F. M. Montenegro-Montes[1,2], K.-H. Mack[1], M. Vigotti[1], C. R. Benn[3], R. Carballo[4], J. I. González-Serrano[5], J. Holt[6] and F. Jiménez-Luján[5,7]

[1] Istituto di Radioastronomia, INAF. Via Gobetti, 101, I-40129 Bologna, Italy
[2] Departamento de Astrofísica, Universidad de La Laguna. Avda Astrofísico Fco. Sánchez s/n, E-38200 La Laguna, Spain
[3] Isaac Newton Group. Apartado 321, E-38700 Santa Cruz de La Palma, Spain
[4] Dpto. de Matemática Aplicada y Ciencias de la Computación. Univ. de Cantabria, ETS Ingenieros de Caminos Canales y Puertos. Avda. de los Castros s/n, E-39005 Santander, Spain
[5] Instituto de Física de Cantabria (CSIC-Universidad de Cantabria), Avda. de los Castros s/n, E-39005 Santander, Spain
[6] Leiden Observatory, Leiden University. P O Box 9513, NL-2300 RA Leiden, The Netherlands
[7] Dpto. de Física Moderna, Univ. de Cantabria. Avda de los Castros s/n, E-39005 Santander, Spain

We present multi-frequency observations of a sample of 15 radio-emitting Broad Absorption Line Quasars (BAL QSOs), covering a spectral range between 74 MHz and 43 GHz. They display mostly convex radio spectra which typically peak at about 1-5 GHz (in the observer's rest-frame), flatten at MHz frequencies, probably due to synchrotron self-absorption, and become steeper at high frequencies, i.e., $\nu \gtrsim 20$ GHz. VLA 22-GHz maps (HPBW $\sim$ 80 mas) show unresolved or very compact sources, with linear projected sizes of ≤ 1 kpc. About 2/3 of the sample look unpolarised or weakly polarised at 8.4 GHz, frequency in which reasonable upper limits could be obtained for polarised intensity. Statistical comparisons have been made between the spectral index distributions of samples of BAL and non-BAL QSOs, both in the observed and the rest-frame, finding steeper spectra among non-BAL QSOs. However constraining this comparison to compact sources results in no significant differences between both distributions. This comparison is consistent with BAL QSOs not being oriented along a particular line of sight. In addition, our analysis of the spectral shape, variability and polarisation properties shows that radio BAL QSOs share several properties common to young radio sources like Compact Steep Spectrum (CSS) or Gigahertz-Peaked Spectrum (GPS) sources.

Accepted by Montly Notices of the Royal Astronomical Society (MNRAS)

E-mail contact: fmm@ira.inaf.it,
preprint available at http://lanl.arxiv.org/abs/0805.4746

The Stellar Populations of Starburst Galaxies Through near infrared spectroscopy

R. Riffel[1], M. G. Pastoriza[1], A. Rodríguez-Ardila[2] and C. Maraston[3]

[1] Departamento de Astronomia, Universidade Federal do Rio Grande do Sul. Av. Bento Gonçalves 9500, Porto Alegre, RS, Brazil.
[2] Laboratório Nacional de Astrofísica/MCT - Rua dos Estados Unidos 154, Bairro das Nacões.
[3] Institute of Cosmology and Gravitation, University of Portsmouth, Mercantile House, Hampshire Terrace, PO1 2EG, Portsmouth, United Kingdom.

We study the central (inner few hundred parsecs) stellar populations of four starburst galaxies (NGC34, NGC1614, NGC3310 and NGC7714) in the near-infrared (NIR), from 0.8 to 2.4μm, by fitting combinations of stellar population models of various ages and metallicities. The NIR spectra of these galaxies feature many absorption lines. For the first time, we fit simultaneously as much as 15 absorption features in the NIR. The observed spectra are best explained by stellar populations containing a sizable amount (20 to 56 % by mass) of $\sim$ 1 Gyr old stellar population with Thermally Pulsing-Asymptotic Giant Branch stars. We found that the metallicity of the stars which dominates the light is solar. Metallicities substantially different from solar give a worse fit. Though the ages and metallicities we estimate using the NIR spectroscopy are in agreement with values from the literature based on the UV/optical, we find older ages and a larger age spread. This may be due to the fact that the optical is mostly sensitive to the last episode of star formation, while the NIR better maintains the record of previous stellar generations. Another interesting result is that the reddening estimated from the whole NIR spectrum is considerably lower than that based on emission lines. Finally, we find a good agreement of the free emission line spectrum with photoionization models, using as input spectral energy distribution the synthetic composite template we derived as best-fit.

Accepted by MNRAS

E-mail contact: riffel@ufrgss.br,

preprint available at http://arxiv.org/abs/0805.1167

Discovery of a strong Baldwin effect in mid-infrared AGN lines

S. F. Hönig[1], A. Smette[2], T. Beckert[1], H. Horst[3,4], W. Duschl[3], P. Gandhi[5], M. Kishimoto[1], G. Weigelt[1]

[1] Max-Planck-Institut für Radioastronomie, Auf dem Hügel 69, 53121 Bonn, Germany
[2] European Southern Observatory, Casilla 19001, Santiago 19, Chile
[3] Institut für Theoretische Physik und Astrophysik, Christian-Albrechts-Universität zu Kiel, Leibnizstr. 15, 24098 Kiel, Germany
[4] Zentrum für Astronomie, ITA, Universität Heidelberg, Albert-Ueberle-Str. 2, 69120 Heidelberg, Germany
[5] RIKEN Cosmic Radiation Lab, 2-1 Hirosawa, Wakoshi Saitama 351-0198, Japan

We present the discovery of a Baldwin effect in 8 nearby Seyfert galaxies for the three most prominent mid-infrared forbidden emission lines observable from the ground that are commonly found in AGN, [Ar III]($\lambda 8.99\,\mu$m), [S IV]($\lambda 10.51\,\mu$m), and [Ne II]($\lambda 12.81\,\mu$m). The observations were carried out using the VLT/VISIR imager and spectrograph at the ESO/Paranal observatory. The bulk of the observed line emission originates in the innermost region within a diameter of $0\farcs4$, which corresponds to spatial scales of less than 100 pc within the targeted galaxies. The correlation index is approximately -0.6 and does not vary significantly for all lines studied. To date, this is the strongest anticorrelation that has been measured between line equivalent width and continuum luminosity. In the case of Circinus, we show that, despite using mid-infrared lines, obscuration by either the host galaxy or the circumnuclear dust torus might affect the measurement. Given the small observed spatial scales from which most of the line emission emanates, it is unclear how well these observations agree with the favored "disappearing NLR" scenario for the narrow-line Baldwin effect.

Accepted 14 May 2008; Published by A&A, 485, L13 (2008)

E-mail contact: shoenig@mpifr-bonn.mpg.de,
preprint available at http://arxiv.org/abs/0805.2151

First Stellar Velocity Dispersion Measurement of a Luminous Quasar Host with Gemini North Laser Guide Star Adaptive Optics

Linda C. Watson[1], Paul Martini[1,2], Kalliopi M. Dasyra[3], Misty C. Bentz[4], Laura Ferrarese[5], Bradley M. Peterson[1,2], Richard W. Pogge[1] and Linda J. Tacconi[6]

[1] Department of Astronomy, The Ohio State University, 140 West 18th Avenue, Columbus, OH 43210
[2] Center for Cosmology and AstroParticle Physics, The Ohio State University, 191 West Woodruff Avenue, Columbus, OH 43210
[3] Spitzer Science Center, California Institute of Technology, Mail Code 2206, 1200 East California Boulevard, Pasadena, CA 91125
[4] Department of Physics and Astronomy, University of California at Irvine, 4129 Frederick Reines Hall, Irvine, CA 92697
[5] Herzberg Institute of Astrophysics, National Research Council of Canada, 5071 West Saanich Road, Victoria, BC V9E 2E7, Canada
[6] Max Planck Institut für extraterrestrische Physik, D-85741 Garching, Germany

We present the first use of the Gemini North laser guide star adaptive optics (LGS AO) system and an integral field unit (IFU) to measure the stellar velocity dispersion of the host of a luminous quasar. The quasar PG1426+015 ($z = 0.086$) was observed with the Near-Infrared Integral Field Spectrometer (NIFS) on the 8m Gemini North telescope in the H-band as part of the Science Verification phase of the new ALTAIR LGS AO system. The NIFS IFU and LGS AO are well suited for host studies of luminous quasars because one can achieve a large ratio of host to quasar light. We have measured the stellar velocity dispersion of PG1426+015 from $0.1''$ to $1''$ (0.16 kpc to 1.6 kpc) to be $217 \pm 15\,\mathrm{km\,s^{-1}}$ based on high signal-to-noise ratio measurements of Si I, Mg I, and several CO bandheads. This new measurement is a factor of four more precise than a previous measurement obtained with long-slit spectroscopy and good, natural seeing, yet was obtained with a shorter net integration time. We find that PG1426+015 has a velocity dispersion that places it significantly above the $M_{\rm BH}$-σ_* relation of quiescent galaxies and lower-luminosity active galactic nuclei with black hole masses estimated from reverberation mapping. We discuss several possible explanations for this discrepancy that could be addressed with similar observations of a larger sample of luminous quasars.

Accepted by the Astrophysical Journal Letters

E-mail contact: watson@astronomy.ohio-state.edu,
preprint available at http://arxiv.org/abs/0806.3271

A BLR origin for the iron Kα line in NGC 7213

Stefano Bianchi[1], Fabio La Franca[1], Giorgio Matt[1], Matteo Guainazzi[2], Elena Jimenez Bailón[3,4], Anna Lia Longinotti[2], Fabrizio Nicastro[5], Laura Pentericci[5]

[1] Dipartimento di Fisica, Università degli Studi Roma Tre, via della Vasca Navale 84, 00146 Roma, Italy
[2] XMM-Newton Science Operations Center, European Space Astronomy Center, ESA, Apartado 50727, E-28080 Madrid, Spain
[3] Instituto de Astronomía, Universidad Nacional Autónoma de México, Apartado Postal 70-264, 04510 Mexico DF, Mexico
[4] LAEFF Apd. 78 Villanueva de la Cañada - 28691-Madrid, Spain
[5] Osservatorio Astronomico di Roma (INAF), Via Frascati 33, I-00040 Monte Porzio Catone, Italy

The X-ray spectrum of NGC 7213 is known to present no evidence for Compton reflection, a unique result among bright Seyfert 1s. The observed neutral iron Kα line, therefore, cannot be associated with a Compton-thick material, like the disc or the torus, but is due to Compton-thin gas, with the Broad Line Region (BLR) as the most likely candidate. To check this hypothesis, a long *Chandra* HETG observation, together with a quasi-simultaneous optical spectroscopic observation at the *ESO* NTT EMMI were performed. We found that the iron line is resolved with a FWHM=$2\,400^{+1\,100}_{-600}$ km s^{-1}, in perfect agreement with the value measured for the broad component of the Hα, 2640^{+110}_{-90} km s^{-1}. Therefore, NGC 7213 is the only Seyfert 1 galaxy whose iron Kα line is unambiguously produced in the BLR. We also confirmed the presence of two ionised iron lines and studied them in greater detail than before. The resonant line is the dominant component in the Fe XXV triplet, therefore suggesting an origin in collisionally ionised gas. If this is the case, the blueshift of around 1 000 km s^{-1} of the two ionised iron lines could be the first measure of the velocity of a starburst wind from its X-ray emission.

Accepted by MNRAS Letters

E-mail contact: bianchi@fis.uniroma3.it,
preprint available at http://arxiv.org/abs/0806.3876

The *Chandra* Deep Field-South Survey: 2 Ms Source Catalogs

B. Luo[1], F. E. Bauer[2], W. N. Brandt[1], D. M. Alexander[3], B. D. Lehmer[3], D. P. Schneider[1], M. Brusa[4], 5, A. Comastri[6], A. C. Fabian[6], A. Finoguenov[4], 5, R. Gilli[6], G. Hasinger[4], A. E. Hornschemeier[8], A. Koekemoer[9], V. Mainieri[10], M. Paolillo[11], P. Rosati[10], O. Shemmer[1], J. D. Silverman[12], I. Smail[13], A. T. Steffen[14], and C. Vignali[15]

[1] Department of Astronomy & Astrophysics, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[2] Columbia Astrophysics Laboratory, Columbia University, Pupin Laboratories, 550 W. 120th St., New York, NY 10027, USA
[3] Department of Physics, Durham University, Durham, DH1 3LE, UK
[4] Max-Planck-Institut für Extraterrestrische Physik, Giessenbachstrasse, D-85748 Garching b. München, Germany
[5] University of Maryland, Baltimore County, 1000 Hilltop Circle, Baltimore, MD 21250, USA
[6]INAF—Osservatorio Astronomico di Bologna, Via Ranzani 1, Bologna, Italy
[7] Institute of Astronomy, Madingley Road, Cambridge, CB3 0HA, UK
[8] Laboratory for X-ray Astrophysics, NASA Goddard Space Flight Center, Code 662, Greenbelt, MD 20771, USA
[9] Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, USA
[10] European Southern Observatory, Karl-Schwarzschild-Strasse 2, Garching, D-85748, Germany
[11] Dipartimento de Scienze Fisiche, Università di Napoli, Via Cinthia, 80126 Napoli, Italy
[12] ETH Zurich, Institute of Astronomy, Department of Physics, Wolfgang-Pauli-Strasse 16, 8093 Zurich, Switzerland
[13] Institute of Computational Cosmology, Durham University, Durham, DH1 3LE, UK
[14] Spitzer Science Center, California Institute of Technology, Mail Code 220-6, 1200 East California Boulevard, Pasadena, CA 91125, USA
[15] Universitá di Bologna, Via Ranzani 1, Bologna, Italy

We present point-source catalogs for the $\approx$ 2 Ms exposure of the *Chandra* Deep Field-South (CDF-S); this is one of the two most-sensitive X-ray surveys ever performed. The survey covers an area of $\approx$ 436 arcmin^2 and reaches on-axis sensitivity limits of $\approx 1.9 \times 10^{-17}$ and $\approx 1.3 \times 10^{-16}$ ergs cm^{-2} s^{-1} for the 0.5–2.0 and 2–8 keV bands, respectively. Four hundred and sixty-two X-ray point sources are detected in at least one of three X-ray bands that were searched; 135 of these sources are new compared to the previous $\approx$ 1 Ms CDF-S detections. Source positions are determined using centroid and matched-filter techniques; the median positional uncertainty is $\approx 0\farcs36$. The X-ray–to–optical flux ratios of the newly detected sources indicate a variety of source types; $\approx$55% of them appear to be active galactic nuclei while $\approx$45% appear to be starburst and normal galaxies. In addition to the main *Chandra* catalog, we provide a supplementary catalog of 86 X-ray sources in the $\approx$ 2 Ms CDF-S footprint that was created by merging the $\approx$ 250 ks Extended *Chandra* Deep Field-South with the CDF-S; this approach provides additional sensitivity in the outer portions of the CDF-S. A second supplementary catalog that contains 30 X-ray sources was constructed by matching lower significance X-ray sources to bright optical counterparts ($R < 23.8$); the majority of these sources appear to be starburst and normal galaxies. The total number of sources in the main and supplementary catalogs is 578. R-band optical counterparts and basic optical and infrared photometry are provided for the X-ray sources in the main and supplementary catalogs. We also include existing spectroscopic redshifts for 224 of the X-ray sources. The average backgrounds in the 0.5–2.0 and 2–8 keV bands are 0.066 and 0.167 counts Ms^{-1} pixel^{-1}, respectively, and the background counts follow Poisson distributions. The effective exposure times and sensitivity limits of the CDF-S are now comparable to those of the ≈ 2 Ms *Chandra* Deep Field-North (CDF-N). We also present cumulative number counts for the main catalog and compare the results to those for the CDF-N. The soft-band number counts for these two fields agree well with each other at fluxes higher than $\approx 2 \times 10^{-16}$ ergs cm^{-2} s^{-1}, while the CDF-S number counts are up to $\approx 25\%$ smaller than those for the CDF-N at fluxes below $\approx 2 \times 10^{-16}$ ergs cm^{-2} s^{-1} in the soft band and $\approx 2 \times 10^{-15}$ ergs cm^{-2} s^{-1} in the hard band, suggesting small field-to-field variations.

Accepted by ApJS

E-mail contact: lbin@astro.psu.edu.
Data and images available at http://www.astro.psu.edu/users/niel/cdfs/cdfs-chandra.html

Are Optically-Selected Quasars Universally X-Ray Luminous? X-Ray/UV Relations in Sloan Digital Sky Survey Quasars

Robert R. Gibson[1], W. N. Brandt[1], and Donald P. Schneider[1]

[1] Department of Astronomy and Astrophysics, Pennsylvania State University, 525 Davey Laboratory, University Park, PA, 16802

We analyze archived *Chandra* and *XMM-Newton* X-ray observations of 536 Sloan Digital Sky Survey (SDSS) Data Release 5 (DR5) quasars (QSOs) at $1.7 \leq z \leq 2.7$ in order to characterize the relative UV and X-ray spectral properties of QSOs that do not have broad UV absorption lines (BALs). We constrain the fraction of X-ray weak, non-BAL QSOs and find that such objects are rare; for example, sources underluminous by a factor of 10 comprise $\lesssim$2% of optically-selected SDSS QSOs. X-ray luminosities vary with respect to UV emission by a factor of $\lesssim$2 over several years for most sources. UV continuum reddening and the presence of narrow-line absorbing systems are not strongly associated with X-ray weakness in our sample. X-ray brightness is significantly correlated with UV emission line properties, so that relatively X-ray weak, non-BAL QSOs generally have weaker, blueshifted CIV λ1549 emission and broader CIII] λ1909 lines. The CIV emission line strength depends on both UV and X-ray luminosity, suggesting that the physical mechanism driving the global Baldwin effect is also associated with X-ray emission.

Accepted by ApJ

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

Variability-selected active galactic nuclei from supernova search in the Chandra deep field south

D. Trevese [1], K. Boutsia [1,2], F. Vagnetti [3], E. Cappellaro [4], S. Puccetti [5]

[1] Dipartimento di Fisica, Università di Roma “La Sapienza”, P.le A. Moro 2, I-00185 Roma, Italy
[2] European Southern Observatory, Karl-Schwarzschild-Strasse 2, Garching D-85748, Germany
[3] Dipartimento di Fisica, Università di Roma ”Tor Vergata”, via delle Ricerca Scientifica, 1, I-00133, Roma, Italy
[4] INAF - Osservatorio Astronomico di Padova, Vicolo dell’Osservatorio 5, I- 35122 Padova, Italy
[5] ASI Science Data Centre, c/o ESRIN, via G. Galilei, I00044 Frascati Italy

Context. Variability is a property shared by virtually all active galactic nuclei (AGNs), and was adopted as a criterion for their selection using data from multi epoch surveys. Low Luminosity AGNs (LLAGNs) are contaminated by the light of their host galaxies, and cannot therefore be detected by the usual colour techniques. For this reason, their evolution in cosmic time is poorly known. Consistency with the evolution derived from X-ray detected samples has not been clearly established so far, also because the low luminosity population consists of a mixture of different object types. LLAGNs can be detected by the nuclear optical variability of extended objects.
Aims. Several variability surveys have been, or are being, conducted for the detection of supernovae (SNe). We propose to re-analyse these SNe data using a variability criterion optimised for AGN detection, to select a new AGN sample and study its properties.
Methods. We analysed images acquired with the wide field imager at the 2.2 m ESO/MPI telescope, in the framework of the STRESS supernova survey. We selected the AXAF field centred on the Chandra Deep Field South where, besides the deep X-ray survey, various optical data exist, originating in the EIS and COMBO-17 photometric surveys and the spectroscopic

database of GOODS.
Results. We obtained a catalogue of 132 variable AGN candidates. Several of the candidates are X-ray sources. We compare our results with an HST variability study of X-ray and IR detected AGNs, finding consistent results. The relatively high fraction of confirmed AGNs in our sample (60%) allowed us to extract a list of reliable AGN candidates for spectroscopic follow-up observations.

Accepted by A&A

E-mail contact: dario.trevese@roma1.infn.it,
preprint available at http://www.arxiv.org/abs/0805.2948

A Community Workshop on High-Dynamic Range Continuum Imaging with the Square Kilometre Array

The University of Stellenbosch.
South Africa
February 18 - 20, 2009

Webpage: www.ska.ac.za/SKAcont2009g
Email: SKAcont2009@ska.ac.za

CONFERENCE GOALS

The Square Kilometer Array (SKA) will be one of a suite of new, large astrophysics facilities for the 21st century, probing fundamental physics, the origin and evolution of the Universe, the structure of the Milky Way Galaxy, and the formation and distribution of planets. As the SKA moves into a more intensive design phase, its intended scientific observations need to be specified in more detail. Key aspects for the design are the scientific drivers and the technical implications of obtaining extremely high-dynamic range images in the continuum.

The aim of this workshop is to examine the range of possible science drivers and the potential hardware and software for high-dynamic imaging. Topics include:

First Galaxies and Black Holes: The role of the SKA in a multi-wavelength program of finding and characterizing the first stellar systems and black holes.

Star Formation over Cosmic History: The radio-infrared correlation and the growth of stellar populations over cosmic time.

Cosmic Magnetism: Tracking the origin and evolution of magnetic fields in galaxies, clusters of galaxies, and the intergalactic medium over cosmic time.

Instrumental Polarization: The design of systems that enable the precise calibration of antennas and arrays for

from the pointing center are likely to impact the dynamic range and calibration taking into account multiple directions.

INVITED SPEAKERS (accepted*)

Paul Alexander* (Aperture arrays and Polarization), James Anderson* (Polarisation measurements with LOFAR and their calibration), Roger Brissendon (Chandra synergies), Jim Condon* (Continuum dynamic range), Ilana Feain* (High-z galaxies), Simon Garrington (Polarization calibration), George Helou* (IR-radio correlation), Mike Jones (Antennas for high dynamic range), Karl Menten* (ALMA and the first galaxies), Huub Rottgering (Continuum surveys with LOFAR)

SCIENTIFIC ORGANISING COMMITTEE

Roy Booth (Chair), Jim Cordes, Peter Dewdney, Brian Gaensler, Mike Garrett, Justin Jonas, Ken Kellerman, Michael Kramer, Joseph Lazio, Richard Schilizzi.

CONFERENCE VENUE

'Stellenbosch is a beautiful town in the heart of South Africa's wine growing area. It is a place of great beauty and culture, steeped in South African tradition'. 'Stellenbosch University is recognised as one of the four top research universities in South Africa and has the country's highest proportion of postgraduate students among which there are many international students'.

REGISTRATION

If you are interested in receiving further announcements, please send an email to SKAcont2009@ska.ac.za. Registration and abstract submission will be available in the next month or so and will be announced via a second email.

PROGRAMME

In addition to invited talks, contributed papers (oral or poster) can be presented. The SOC will select a limited number of contributions for oral presentation on the basis of the submitted abstracts. The details of the full program will be published in December 2009

PROCEEDINGS

We anticipate that ppt contributions will be compiled to a CD which will be distributed.

TRAVEL

February is a popular holiday time in South Africa and so it is advisable to make your travel arrangements early. Fly direct to Cape Town and we will meet flights and provide transport to Stellenbosch.

IMPORTANT DATES:

- June 2008: First announcement
- Late July 2008: Second announcement; Registration open
- October 2008: Third and Final announcement
- November 15 2008: Registration and Abstract submission deadline
- December 15 2008: Final Conference Programme
- February 18 2009: Conference Starts

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.