Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
No. 173 — AUGUST 2011	Editor: Melanie Gendre (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 day 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.

Melanie Gendre

Abstracts of recently accepted papers

Near-Infrared Reverberation by Dusty Clumpy Tori in Active Galactic Nuclei

Toshihiro Kawaguchi and Masao Mori

Center for Computational Sciences, University of Tsukuba,Tsukuba, Ibaraki 305-8577, Japan

According to recent models, the accretion disk and black hole in active galactic nuclei are surrounded by a clumpy torus. We investigate the NIR flux variation of the torus in response to a UV flash for various geometries. Anisotropic illumination by the disk and the torus self-occultation contrast our study with earlier works. Both the waning effect of each clump and the torus self-occultation selectively reduce the emission from the region with a short delay. Therefore, the NIR delay depends on the viewing angle (where a more inclined angle leads to a longer delay) and the time response shows an asymmetric profile with a negative skewness, opposing to the results for optically thin tori. The range of the computed delay coincides with the observed one, suggesting that the viewing angle is primarily responsible for the scatter of the observed delay. We also propose that the red NIR-to-optical color of type-1.8/1.9 objects is caused by not only the dust extinction but also the intrinsically red color. Compared with the modest torus thickness, both a thick and a thin tori display the weaker NIR emission. A selection bias is thus expected such that NIR-selected AGNs tend to possess moderately thick tori. A thicker torus shows a narrower and more heavily skewed time profile, while a thin torus produces a rapid response. A super-Eddington accretion rate leads to a much weaker NIR emission due to the disk self-occultation and the disk truncation by the self-gravity. A long delay is expected from an optically thin and/or a largely misaligned torus. A very weak NIR emission, such as in hot-dust-poor active nuclei, can arise from a geometrically thin torus, a super-Eddington accretion rate or a slightly misaligned torus.

Accepted by The Astrophysical Journal

E-mail contact: kawaguti@ccs.tsukuba.ac.jp,
preprint available at http://arxiv.org/abs/1107.0678

Chandra Discovery of a Binary AGN in Mrk 739

Michael Koss[1,2,3], Richard Mushotzky[1], Ezequiel Treister[3,4,6], Sylvain Veilleux[1], Ranjan Vasudevan[1], Neal Miller[1], D. B. Sanders[3], Kevin Schawinski[5,6], and Margaret Trippe[1]

[1] Astronomy Department, University of Maryland, College Park, MD, USA
[2] Astrophysics Science Division, NASA Goddard Space Flight Center, Greenbelt, MD, USA
[3] Institute for Astronomy, University of Hawaii, Honolulu, HI, USA
[4] Departamento de Astronomía, Universidad de Concepción, Concepción, Chile
[5] Department of Physics, Yale University, New Haven, CT, USA
[6] Einstein Fellow

We have discovered a binary AGN in the galaxy Mrk 739 using *Chandra* and *Swift* BAT. We find two luminous ($L_{2-10\ \mathrm{keV}}$ $=1.1\times10^{43}$ and 1.0×10^{42} erg s^{-1}), unresolved nuclei with a projected separation of 3.4 kpc (5.8±0.1") coincident with two bulge components in the optical image. The western X-ray source (Mrk 739W) is highly variable (×2.5) during the 4-hour *Chandra* observation and has a very hard spectrum consistent with an AGN. While the eastern component was already known to be an AGN based on the presence of broad optical recombination lines, Mrk 739W shows no evidence of being an AGN in optical, UV, and radio observations, suggesting the critical importance of high spatial resolution hard X-ray observations (>2 keV) in finding these binary AGN. A high level of star formation combined with a very low $L_{[\mathrm{OIII}]}/L_{2-10\ \mathrm{keV}}$ ratio cause the AGN to be missed in optical observations. ^{12}CO observations of the (3–2) and (2–1) lines indicate large amounts of molecular gas in the system that could be driven towards the black holes during the violent galaxy collision and be key to fueling the binary AGN. Mrk 739E has a high Eddington ratio of 0.71 and a small black hole (log M_{BH}=7.05±0.3) consistent with an efficiently accreting AGN. Other than NGC 6240, this stands as the nearest case of a binary AGN discovered to date.

Accepted by Astrophysical Journal Letters

E-mail contact: Michael.J.Koss@nasa.gov,
preprint available at http://arxiv.org/abs/1106.2163

Host Galaxy Properties of the *Swift* BAT Ultra Hard X-ray Selected AGN

Michael Koss[1,2,3], Richard Mushotzky[1], Sylvain Veilleux[1], Lisa M. Winter[4,5], Wayne Baumgartner[2], Jack Tueller[2], Neil Gehrels[2], and Lynne Valencic[2]

[1] Astronomy Department, University of Maryland, College Park, MD, USA
[2] Astrophysics Science Division, NASA Goddard Space Flight Center, Greenbelt, MD, USA
[3] Institute for Astronomy, University of Hawaii, Honolulu, HI, USA
[4] Center for Astrophysics and Space Astronomy, University of Colorado, Boulder, CO, USA
[5] Hubble Fellow

We have assembled the largest sample of ultra hard X-ray selected (14-195 keV) AGN with host galaxy optical data to date, with 185 nearby (z<0.05), moderate luminosity AGN from the *Swift* BAT sample. The BAT AGN host galaxies have intermediate optical colors ($u-r$ and $g-r$) that are bluer than a comparison sample of inactive galaxies and optically selected AGN from the Sloan Digital Sky Survey (SDSS) which are chosen to have the same stellar mass. Based on morphological classifications from the RC3 and the Galaxy Zoo, the bluer colors of BAT AGN are mainly due to a higher fraction of mergers and massive spirals than in the comparison samples. BAT AGN in massive galaxies (log M_*>10.5) have a 5 to 10 times higher rate of spiral morphologies than in SDSS AGN or inactive galaxies. We also see enhanced far-IR emission in BAT AGN suggestive of higher levels of star formation compared to the comparison samples. BAT AGN are preferentially found in the most massive host galaxies with high concentration indexes indicative of large bulge-to-disk ratios and large supermassive black holes. The narrow-line (NL) BAT AGN have similar intrinsic luminosities as the SDSS NL Seyferts based on measurements of [O III]. There is also a correlation between the stellar mass and X-ray emission. The BAT AGN in mergers have bluer colors and greater ultra hard X-ray emission compared to the BAT sample as whole. In agreement with the Unified Model of AGN, and the relatively unbiased nature of the BAT sources, the host galaxy colors and morphologies are independent of measures of obscuration such as X-ray column density or Seyfert type. The high fraction of massive spiral galaxies and galaxy mergers in BAT AGN suggest that host galaxy morphology is related to the activation and fueling of local AGN.

Accepted by Astrophysical Journal

E-mail contact: Michael.J.Koss@nasa.gov,
preprint available at http://arxiv.org/abs/1107.1237

New Method for Exploring Super-Eddington AGNs by Near-infrared Observations

Nozomu Kawakatu[1] **and Ken Ohsuga**[2]

[1] Graduate School of Pure and Applied Sciences, University of Tsukuba, 1-1-1 Tennodai, Tsukuba 305-8571
[2] National Astronomical Observatory of Japan, 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan

We propose a new method to explore the candidate super-Eddington active galactic nuclei (AGNs). We examine the properties of infrared (IR) emission from the inner edge of the dusty torus in AGNs, which are powered by super- or sub-Eddington accretion flows around black holes, by considering the dependence of the polar angle on the radiation flux of accretion flows (Watarai et al. 2005). We find that for super-Eddington AGNs, of which the mass accretion rate is more than 10^2 times larger than the Eddington rate, the ratio of the AGN IR luminosity and the disc bolometric luminosity is less than 10^{-2}, unless the half opening angle of the torus ($\theta_{\rm torus}$) is small ($\theta_{\rm torus} < 65°$). This is due to the self-occultation effect, whereby the self-absorption at the outer region of the super-Eddington flow dilutes the illumination of the torus. Such a small luminosity ratio is not observed in sub-Eddington AGNs, whose mass accretion rate is comparable to or no more than 10 times larger than the Eddington mass accretion rate, except for extremely thin tori ($\theta_{\rm torus} > 85°$). We also consider the properties of the near-IR (NIR) emission radiated from hot dust > 1000 K. We find that super-Eddington AGNs have a ratio of the NIR luminosity to the bolometric luminosity, $L_{\rm NIR,AGN}/L_{\rm bol,disc}$, at least one order of magnitude smaller than for sub-Eddington AGNs for a wide range of half opening angle ($\theta_{\rm torus} > 65°$), for various types of dusty torus model. Thus, a relatively low $L_{\rm NIR,AGN}/L_{\rm bol,disc}$ is a property that allows identification of candidate super-Eddington AGNs. Lastly, we discuss the possibility that NIR-faint quasars at redshift $z \sim 6$ discovered by a recent deep SDSS survey may be young quasars whose black holes grow via super-Eddington accretion.

Accepted by MNRAS

E-mail contact: ,
preprint available at http://xxx.yukawa.kyoto-u.ac.jp/abs/1107.2185

Cold Accretion Disks and Lineless Quasars

Ari Laor[1] **and Shane Davis**[2]

[1] Physics Department, Technion, Haifa 32000, Israel
[2] Canadian Institute for Theoretical Astrophysics. Toronto, ON M5S3H4, Canada

The optical-UV continuum of quasars is broadly consistent with the emission from a geometrically thin optically thick accretion disk (AD). The AD produces the ionizing continuum which powers the broad and narrow emission lines. The maximum AD effective temperature is given by $T_{eff} = f_{\rm max}(\dot{M}/M^2)^{1/4}$, where M is the black hole mass, $\dot{M}$ the accretion rate, and $f_{\rm max}$ is set by the black hole spin a_*. For a low enough value of $\dot{M}/M^2$ the AD may become too cold to produce ionizing photons. Such an object will form a lineless quasar. This occurs for a local blackbody (BB) AD with a luminosity $L_{\rm opt} = 10^{46}$ erg s^{-1} for $M > 3.6 \times 10^9 M_\odot$, when $a_* = 0$, and for $M > 1.4 \times 10^{10} M_\odot$, when $a_* = 0.998$. Using the AD based $\dot{M}$, derived from M and $L_{\rm opt}$, and the reverberation based M, derived from $L_{\rm opt}$ and the Hβ FWHM, v, gives $T_{eff} \propto L_{\rm opt}^{-0.13} v^{-1.45}$. Thus, T_{eff} is mostly set by v. Quasars with a local BB AD become lineless for $v > 8,000$ km s^{-1}, when $a_* = 0$, and for $v > 16,000$ km s^{-1}, when $a_* = 0.998$. Higher values of v are required if the AD is hotter than a local BB. The AD becoming non-ionizing may explain why line emitting quasars with $v > 10,000$ km s^{-1} are rare. Weak low ionization lines may still be present if the X-ray continuum is luminous enough, and such objects may form a population of weak emission line quasars (WLQ). If correct, such WLQ should show a steeply falling SED at $\lambda < 1000$Å. Such an SED was observed by Hryniewicz et al. in SDSS J094533.99+100950.1, a WLQ observed down to 570Å, which is well modeled by a rather cold AD SED. UV spectroscopy of $z \sim 1-2$ quasars is required to eliminate potential intervening Lyman limit absorption by the intergalactic medium (IGM), and to explore if the SEDs of lineless quasars and some additional WLQ are also well fit by a cold AD SED.

Accepted by MNRAS

E-mail contact: laor@physics.technion.ac.il,
preprint available at http://arxiv.org/abs/1106.4969

Revealing a Population of Heavily Obscured Active Galactic Nuclei at $z \approx 0.5$–1 in the *Chandra* Deep Field-South

B. Luo[1,2,3], W. N. Brandt[1,2], Y. Q. Xue[1,2], D. M. Alexander[4], M. Brusa[5], F. E. Bauer[6], A. Comastri[7], A. C. Fabian[8], R. Gilli[7], B. D. Lehmer[9,10], D. A. Rafferty[11], D. P. Schneider[1], and C. Vignali[12]

[1] Department of Astronomy & Astrophysics, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[2] Institute for Gravitation and the Cosmos, The Pennsylvania State University, University Park, PA 16802, USA
[3] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street,Cambridge, MA 02138, USA
[4] Department of Physics, Durham University, Durham, DH1 3LE, UK
[5] Max-Planck-Institut für Extraterrestrische Physik, Giessenbachstrasse, D-85748 Garching b. München, Germany
[6] Pontificia Universidad Católica de Chile, Departamento de Astronomía y Astrofísica, Casilla 306, Santiago 22, Chile
[7] INAF—Osservatorio Astronomico di Bologna, Via Ranzani 1, Bologna, Italy
[8] Institute of Astronomy, Madingley Road, Cambridge, CB3 0HA, UK
[9] The Johns Hopkins University, Homewood Campus, Baltimore, MD 21218, USA
[10] NASA Goddard Space Flight Centre, Code 662, Greenbelt, MD 20771, USA
[11] Leiden Observatory, Leiden University, Oort Gebouw, P.O. Box 9513 RA, Leiden, The Netherlands
[12] Universitá di Bologna, Via Ranzani 1, Bologna, Italy

Heavily obscured ($N_{\rm H} > 3 \times 10^{23}$ cm^{-2}) Active Galactic Nuclei (AGNs) not detected in even the deepest X-ray surveys are often considered to be comparably numerous to the unobscured and moderately obscured AGNs. Such sources are required to fit the cosmic X-ray background (XRB) emission in the 10–30 keV band. We identify a numerically significant population of heavily obscured AGNs at $z \approx 0.5$–1 in the *Chandra* Deep Field-South (CDF-S) and Extended *Chandra* Deep Field-South by selecting 242 X-ray undetected objects with infrared-based star formation rates (SFRs) substantially higher (a factor of 3.2 or more) than their SFRs determined from the UV after correcting for dust extinction. An X-ray stacking analysis of 23 candidates in the central CDF-S region using the 4 Ms *Chandra* data reveals a hard X-ray signal with an effective power-law photon index of $\Gamma = 0.6^{+0.3}_{-0.4}$, indicating a significant contribution from obscured AGNs. Based on Monte Carlo simulations, we conclude that $74 \pm 25\%$ of the selected galaxies host obscured AGNs, within which $\approx 95\%$ are heavily obscured and $\approx 80\%$ are Compton-thick (CT; $N_{\rm H} > 1.5 \times 10^{24}$ cm^{-2}). The heavily obscured objects in our sample are of moderate intrinsic X-ray luminosity [$\approx (0.9$–$4) \times 10^{42}$ erg s^{-1} in the 2–10 keV band]. The space density of the CT AGNs is $(1.6 \pm 0.5) \times 10^{-4}$ Mpc^{-3}. The $z \approx 0.5$–1 CT objects studied here are expected to contribute $\approx 1\%$ of the total XRB flux in the 10–30 keV band, and they account for ≈ 5–15% of the emission in this energy band expected from all CT AGNs according to population-synthesis models. In the 6–8 keV band, the stacked signal of the 23 heavily obscured candidates accounts for $< 5\%$ of the unresolved XRB flux, while the unresolved $\approx 25\%$ of the XRB in this band can probably be explained by a stacking analysis of the X-ray undetected optical galaxies in the CDF-S (a 2.5 σ stacked signal). We discuss prospects to identify such heavily obscured objects using future hard X-ray observatories.

Accepted by ApJ

E-mail contact: bluo@cfa.harvard.edu,
preprint available at http://arxiv.org/abs/1107.3148

A view of the narrow-line region in the infrared: active galactic nuclei with resolved fine-structure lines in the Spitzer archive

K. M. Dasyra[1,2], L. C. Ho[3], H. Netzer[4], F. Combes[2], B. Trakhtenbrot[4], E. Sturm[5],L. Armus[6], and D. Elbaz[1]

[1]Laboratoire AIM, CEA/DSM-CNRS-Université Paris Diderot, Irfu/Service dAstrophysique, CEA Saclay, F-91191 Gif-sur-Yvette, France
[2]Observatoire de Paris, LERMA (CNRS:UMR8112), 61 Av. de l´ Observatoire, F-75014, Paris, France
[3]The Observatories of the Carnegie Institution for Science, 813 Santa Barbara St., Pasadena, CA 91101
[4]School of Physics and Astronomy and the Wise Observatory, Raymond and Beverly Sackler Faculty of Exact Sciences, Tel-Aviv University, Tel-Aviv, 69978, Israel
[5]Max-Planck-Institut für Extraterrestrische Physik, Postfach 1312, 85741 Garching, Germany
[6]Spitzer Science Center, California Institute of Technology, Mail Code 220-6, 1200 East California Blvd, Pasadena, CA 91125

We queried the Spitzer archive for high-resolution observations with the Infrared Spectrograph of optically selected active galactic nuclei (AGN) for the purpose of identifying sources with resolved fine-structure lines that would enable studies of the narrow-line region (NLR) at mid-infrared wavelengths. By combining 298 Spitzer spectra with 6 Infrared Space Observatory

spectra, we present kinematic information of the NLR for 81 z$\lesssim$0.3 AGNs. We used the [NeV], [OIV], [NeIII], and [SIV] lines, whose fluxes correlate well with each other, to probe gas photoionized by the AGN. We found that the widths of the lines are, on average, increasing with the ionization potential of the species that emit them. No correlation of the line width with the critical density of the corresponding transition was found. The velocity dispersion of the gas, sigma, is systematically higher than that of the stars, sigma$_*$, in the AGN host galaxy, and it scales with the mass of the central black hole, M_{BH}. Further correlations between the line widths and luminosities L, and between L and M_{BH} , are suggestive of a three dimensional plane connecting log(M_{BH}) to a linear combination of log(sigma) and log(L). Such a plane can be understood within the context of gas motions that are driven by AGN feedback mechanisms, or virialized gas motions with a power-law dependence of the NLR radius on the AGN luminosity. The M_{BH} estimates obtained for 35 type 2 AGN from this plane are consistent with those obtained from the M_{BH}-sigma$_*$ relation.

ApJ, in press

E-mail contact: kalliopi.dasyra@obspm.fr,
preprint available at http://arxiv.org/abs/1107.3397

Feeding and feedback in the active nucleus of Mrk 1157 probed with Gemini NIFS

Rogemar A. Riffel[1] and Thaisa Storchi-Bergmann[2]

[1] Universidade Federal de Santa Maria, Departamento de Física, Centro de Ciências Naturais e Exatas, 97105-900, Santa Maria, RS, Brazi
[2] Universidade Federal do Rio Grande do Sul, Departamento de Astronomia, Instituto de Física, CP 15051, 91501-970, Porto Alegre, RS, Brazi

We have mapped the stellar and gaseous kinematics, as well as the emission-line flux distributions and ratios, from the inner $\approx$450 pc radius of the Seyfert 2 galaxy Mrk 1157, using two-dimensional (2D) near-IR $J-$ and K_l-band spectra obtained with the Gemini NIFS instrument at a spatial resolution of $\approx$35 pc and velocity resolution of $\approx 40\,\mathrm{km\,s^{-1}}$. The stellar velocity field shows a rotation pattern, with a discrete S-shaped zero velocity curve – a signature of a nuclear bar. The presence of a bar is also supported by the residual map between the observed rotation field and a model of circular orbits in a Plummer potential. The stellar velocity dispersion (σ_*) map presents a partial ring of low-σ_* values ($50 - 60\,\mathrm{km\,s^{-1}}$) at 250 pc from the nucleus surrounded by higher σ_* values from the galaxy bulge. We propose that this ring has origin in kinematically colder regions with recent star formation. The velocity dispersion of the bulge ($100\,\mathrm{km\,s^{-1}}$) implies in a black hole mass of $M_{BH} = 8.3^{+3.2}_{-2.2} \times 10^6\,\mathrm{M_\odot}$. Emission-line flux distributions are most extended along PA= $27/153^\circ$, reaching at least 450 pc from the nucleus and following the orientation observed in previous optical emission-line [O III] imaging and radio jet. The molecular H_2 gas has an excitation temperature $T_{\rm exc} \approx 2300$ K and its emission is dominated by thermal processes, mainly due to X-ray heating by the active nucleus, with a possible small contribution from shocks produced by the radio jet. The [Fe II] excitation has a larger contribution from shocks produced by the radio jet, as evidenced by the line-ratio maps and velocity dispersion map, which show spatial correlation with the radio structures. The coronal lines are resolved, extending up to $\approx$150 pc and are also slightly more extended along PA= $27/153^\circ$. The gaseous kinematics shows two components, one due to gas located in the galaxy plane, in similar rotation to that of the stars and another in outflow, which is oriented close to the plane of the sky, thus extending to high latitudes, as the galaxy plane is inclined by $\approx 45^\circ$ relative to the plane of the sky. The gas rotating in the plane dominates the H_2 and Paβ emission, while the gas in outflow is observed predominantly in [Fe II] emission. The [Fe II] emission is originated in gas being pushed by the radio jet, which destroys dust grains releasing the Fe. From the outflow velocities and implied geometry, we estimate an outflow mass rate of $\dot{M}_{\rm out} \approx 6\,\mathrm{M_\odot\,yr^{-1}}$ for the ionised gas and a kinetic power for the outflow of $\dot{E} \approx 2.3 \times 10^{41}\,\mathrm{erg\,s^{-1}} \approx 0.15 \times L_{\rm bol}$. The distinct flux distributions and kinematics of the H_2 and [Fe II] emitting gas, with the former more restricted to the plane of the galaxy, and the later tracing the outflows related to radio jets is a common characteristic of the 6 Seyfert galaxies (ESO 428-G14, NGC 4051, NGC 7582, NGC 4151, Mrk 1066 and now Mrk 1157) we have studied so far using similar 2D observations, and other 2 (Circinus and NGC 2110) using long-slit observations. We conclude that the H_2 emission surrounding the nucleus in the galaxy plane is a tracer of the gas feeding to the active nucleus while the [Fe II] emission is a tracer of its feedback.

Accepted by MNRAS

E-mail contact: rogemar@ufsm.br,
preprint available at arXiv1107.2564R

The Compton-Thick Seyfert 2 Nucleus of NGC 3281: Torus Constraints from the 9.7μm Silicate Absorption

Sales, Dinalva A.[1], Pastoriza, M. G.[1,2], Riffel, R.[1], Winge, C.[3], Rodríguez-Ardila, A.[4] and Carciofi, A. C.[5]

[1] Departamento de Astronomia, Universidade Federal do Rio Grande do Sul. Av. Bento Gonçalves 9500, Porto Alegre, RS, Brazil
[2] Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brazil
[3] Gemini Observatory, c/o Aura, Inc., Casilla 603, La Serena, Chile
[4] Laboratório Nacional de Astrofísica/MCT, Rua dos Estados Unidos 154, Itajubá, MG, Brazil
[5] Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo, Rua do Matão 1226, Cidade Universitária, São Paulo, SP, Brazil

We present mid-infrared (mid-IR) spectra of the Compton-thick Seyfert 2 galaxy NGC 3281, obtained with the Thermal-Region Camera Spectrograph at the Gemini-South telescope. The spectra present a very deep silicate absorption at 9.7 μm, and [S IV] 10.5 μm and [Ne II] 12.7 μm ionic lines, but no evidence of polycyclic aromatic hydrocarbon emission. We find that the nuclear optical extinction is in the range 24 mag $\leq A_V \leq$ 83 mag. A temperature $T = 300$ K was found for the blackbody dust continuum component of the unresolved 65 pc nucleus and at 130 pc SE, while the region at 130 pc reveals a colder temperature (200 K). We describe the nuclear spectrum of NGC 3281 using a clumpy torus model that suggests that the nucleus of this galaxy hosts a dusty toroidal structure. According to this model, the ratio between the inner and outer radius of the torus in NGC 3281 is $R_0/R_d = 20$, with 14 clouds in the equatorial radius with optical depth of $\tau_V = 40$ mag. We would be looking in the direction of the torus equatorial radius ($i = 60^\circ$), which has outer radius of $R_0 \sim 11$ pc. The column density is $N_H \approx 1.2 \times 10^{24}$ cm^{-2} and iron Kα equivalent width ($\approx$0.5–1.2 keV) is used to check the torus geometry. Our findings indicate that the X-ray absorbing column density, which classifies NGC 3281 as a Compton-thick source, may also be responsible for the absorption at 9.7 μm providing strong evidence that the silicate dust responsible for this absorption can be located in the active galactic nucleus torus.

Accepted by ApJ 2011

E-mail contact: dinalva.aires@ufrgs.br,
DRAFT is available at http://arxiv.org/abs/1010.2170

The Role of Secular Evolution in the Black Hole Growth of Narrow-Line Seyfert 1 Galaxies

G. Orban de Xivry[1], R. Davies[1], M. Schartmann[1,2], S. Komossa[1,3,4,5], A. Marconi[6], E. Hicks[7], H. Engel[1], L. Tacconi[1]

[1]Max Planck Institut für extraterrestrische Physik, Giessenbachstrasse, D-85748 Garching, Germany
[2]Universitäts-Sternwarte München, Scheinerstrasse 1, D-81679 München, Germany
[3]Technische Universität München, Fakultät für Physik, James-Franck-Strasse, 85748 Garching, Germany
[4]Excellence Cluster Universe, TUM, Boltzmannstrasse 2, 85748 Garching, Germany
[5]Max Planck Institut für Plasmaphysik, Boltzmannstrasse 2, 85748 Garching, Germany
[6]Dipartimento di Fisica e Astronomia, Universitá degli Studi di Firenze, Largo E. Fermi 2, 50125 Firenze, Italy
[7]Department of Astronomy, University of Washington, Box 351580, Seattle, WA 98195, USA

Narrow-Line Seyfert 1 (NLS1) galaxies show extreme properties with respect to the other Seyfert galaxies. Indeed, they are thought to be accreting at Eddington rates and to possess low mass black holes. Therefore, they may represent a key class of objects for understanding the co-evolution of black holes and their host galaxies. We propose that NLS1s represent a class of AGN in which the black hole growth is, and has always been, dominated by secular evolution. Firstly, by looking at the NLS1 host galaxy properties in the literature, we show that the evolution of NLS1s is presently driven by secular processes, much more so than for Broad-Line Seyfert 1s (BLS1s). Secondly, we study the bulges of NLS1 and BLS1 galaxies. Our results demonstrate that NLS1 host bulges are pseudo-bulges and are statistically different from BLS1 bulges. This difference points to the particular importance of secular processes in the past evolution of their hosts. We build on this result to understand the implications on their evolution and the duration of their duty cycle. We show that NLS1s are not necessarily in a special phase of black hole growth and that several Gyr are required for their black hole masses to become similar to BLS1s. Finally, in the

light of our results, we discuss the location of NLS1 galaxies on the M_{BH}-σ plane and speculate about the connection between the NLS1 galaxy properties and their black hole spin.

Accepted by MNRAS

E-mail contact: xivry@mpe.mpg.de,
preprint available at http://arxiv.org/abs/1104.5023

Resolving the dynamical mass of a $z \sim 1.3$ QSO host galaxy using sinfoni and laser guide star assisited adaptive optics.

K. J. Inskip[1], K. Jahnke[1], H.-W. Rix[1] & G. van de Ven[1]

[1] Max Planck Institute for Astronomy, Konigstuhl 17, 69117 Heidelberg, Germany

Recent studies of the tight scaling relations between the masses of supermassive black holes and their host galaxies have suggested that in the past black holes constituted a larger fraction of their host galaxies mass. However, these arguments are limited by selection effects and difficulties in determining robust host galaxy masses at high redshifts. Here we report the first results of a new, complementary diagnostic route: we directly determine a dynamical host galaxy mass for the $z = 1.3$ luminous quasar J090543.56+043347.3 through high-spatial-resolution (0.47″, 4 kpc FWHM) observations of the host galaxy gas kinematics over 30×40 kpc using ESO/VLT/SINFONI with LGS/AO. Combining our result of $M_{dyn} = 2.05^{+1.68}_{-0.74} \times 10^{11} M_{\odot}$ (within a radius 5.25 ± 1.05kpc) with $M_{BH,MgII} = 9.02 \pm 1.43 \times 10^8 M_{\odot}$, $M_{BH,H\alpha} = 2.83^{+1.93}_{-1.13} \times 10^8 M_{\odot}$, we find that the ratio of black hole mass to host galaxy dynamical mass for J090543.56+043347.3 matches the present-day relation for M_{BH} vs. $_{Bulge,Dyn}$, well within the IR scatter, deviating at most a factor of two from the mean. J090543.56+043347.3 displays clear signs of an ongoing tidal interaction and of spatially extended star formation at a rate of 50 - 100$M_{\odot}yr^{-1}$, above the cosmic average for a galaxy of this mass and redshift. We argue that its subsequent evolution may move J090543.56+043347.3 even closer to the $z = 0$ relation for M_{BH} vs. $M_{Bulge,Dyn}$. Our results support the picture where any substantive evolution in these relations must occur prior to $z \sim 1.3$. Having demonstrated the power of this modelling approach we are currently analyzing similar data on seven further objects to better constrain such evolution.

Accepted by Ap. J.

E-mail contact: inskip@mpia-hd.mpg.de or jahnke@mpia-hd.mpg.de,
preprint available at http://arxiv.org/abs/1103.6026

Nonthermal Processes in Black-Hole-Jet Magnetospheres

Frank M. Rieger[1]

[1] Max-Planck-Institut für Kernphysik, 69117 Heidelberg, Germany,
and European Associated Laboratory for Gamma-Ray Astronomy, jointly supported by CNRS and MPG

The environs of supermassive black holes are among the universe's most extreme phenomena. Understanding the physical processes occurring in the vicinity of black holes may provide the key to answer a number of fundamental astrophysical questions including the detectability of strong gravity effects, the formation and propagation of relativistic jets, the origin of the highest energy gamma-rays and cosmic-rays, and the nature and evolution of the central engine in Active Galactic Nuclei (AGN). As a step towards this direction, this paper reviews some of the progress achieved in the field based on observations in the very high energy domain. It particularly focuses on non-thermal particle acceleration and emission processes that may occur in the rotating magnetospheres originating from accreting, supermassive black hole systems. Topics covered include direct electric field acceleration in the black hole's magnetosphere, ultra-high energy cosmic ray production, Blandford-Znajek mechanism, centrifugal acceleration and magnetic reconnection, along with the relevant efficiency constraints imposed by interactions with matter, radiation and fields. By way of application, a detailed discussion of well-known sources (Sgr A*; Cen A; M87; NGC 1399) is presented.

Invited Journal review paper for International Journal of Modern Physics D (IJMPD), in press

E-mail contact:frank.rieger@mpi-hd.mpg.de,
preprint available at http://arxiv.org/abs/1107.2119

A study of the near-ultraviolet emission in Seyfert nuclei

Victor M. Muñoz Marín

Thesis work conducted at: Instituto de Astrofísica de Andalucía (IAA-CSIC), Spain

Current address: Glorieta de la Astronomía, s/n, 18008, Granada, Spain

Electronic mail: manuel@iaa.es

Ph.D dissertation directed by: Rosa M. González Delgado

Ph.D degree awarded: July 2011

Based in a snapshot survey using the high resolution of the Advanced Camera for Surveys onboard HST, we have compiled a sample of 75 nearby Seyfert galaxies in the near-UV. These observations complete a reference multi-wavelength database for these AGN, which have also optical and near-IR images available in the HST archive. In this work we study the coexistence of a compact supermassive object in the galactic center and the circumnuclear star formation, as well as the reach and validity of the unified model in this respect.

We have studied the characteristics of the near-UV emission from different points of view. In the first place, we perform a general morphologic and photometric analysis of the whole sample, characterizing the size and luminosity of the emitting region, identifying the stellar cluster population and estimating the fraction of the total emission coming from these clusters. The results are compared among different Seyfert activity types. We then focus on the extended emission, trying to disentangle the different mechanisms contributing to the emission in the near-ultraviolet band with a combination of theoretical calculations and observational constrains. In order to do that, we scale [OIII]λ5007 images, creating a synthetic image of the ionized gas contribution. Finally, we present a methodology to study the star cluster population with multi-wavelength Hubble data. This poses a powerful complement to spectroscopic data, and with it we can derive cluster parameters, infer the star-formation history, observe spatial correlations, and determine their possible relation to different processes and components of the nuclear environment.

Our results respect to the unified model are not conclusive. On the one hand, from the photometric analysis we do not find any difference among the host galaxies of different Seyfert type nuclei, and neither in the luminosity of the detected starbursts. However, star formation does seem to be more frequent in Seyfert 2 galaxies than in other types. Moreover, the varied morphology of the Seyfert 2 galaxies suggests that they may be a heterogeneous group of objects. We also show in this work that star formation is frequent in Seyfert type nuclei, although the extended emission in the near-ultraviolet is dominated by the ionized gas emission in $\sim$50% of the objects. We studied in detail the star cluster population in one object, NGC 5135, finding clues of a discontinuous star-formation history. AGN activity and circumnuclear star formation are observed to coexist in this galaxy, although not causal connection between them could be inferred.

Jobs Adverts

ESA Postdoctoral Fellowships in Space Science

The European Space Agency awards several postdoctoral fellowships each year. The aim of these fellowships is to provide young scientists, holding a PhD or the equivalent degree, with the means of performing space science research in fields related to the ESA Science and Robotic Exploration Programmes. Areas of research include planetary science, astronomy and astrophysics, solar and solar-terrestrial science, plasma physics and fundamental physics. The fellowships have a duration of two years and are tenable at the European Space Research and Technology Centre (ESTEC) in Noordwijk, Netherlands, or at the European Space Astronomy Centre (ESAC) in Villafranca del Castillo, near Madrid, Spain.

Applications are now solicited for fellowships in space science to begin in the fall of 2012. Preference will be given to applications submitted by candidates within five years of receiving their PhD. Candidates not holding a PhD yet are encouraged to apply, but they must provide evidence of receiving their degree before starting the fellowship.

ESA fellows are enrolled in ESA's Social Security Scheme, which covers medical expenses, invalidity and death benefits. A monthly deduction covers these short-term and long-term risks.

The deadline for applications is 1 October 2011.

More information on the ESA Research Fellowship programme in Space Science, on the conditions and eligibility, as well as the application form can be found on the world-wide web at this address: http://www.rssd.esa.int/fellowship

Questions on the scientific aspects of the ESA Fellowship in Space Science not answered in the above pages can be sent by e-mail to the fellowship coordinator, Dr. Guido De Marchi, at the address fellowship@rssd.esa.int