Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
No. 101 — August 2005	Editor: Rob Beswick (rb@ast.man.ac.uk)

Abstracts - Thesis Abstracts - Jobs - Meetings

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.
Rob Beswick

Abstracts of recently accepted papers

Galactic Winds **S. Veilleux[1], G. Cecil[2], and J. Bland-Hawthorn[3]**

[1] Department of Astronomy, University of Maryland, College Park, MD 20742
[2] Department of Physics & Astronomy, University of North Carolina, Chapel Hill, NC 27599-3255
[3] Anglo-Australian Observatory, Epping, NSW, Australia

Galactic winds are the primary mechanism by which energy and metals are recycled in galaxies and are deposited into the intergalactic medium. New observations are revealing the ubiquity of this process, particularly at high redshift. We describe the physics behind these winds, discuss the observational evidence for them in nearby star-forming and active galaxies and in the high-redshift universe, and consider the implications of energetic winds for the formation and evolution of galaxies and the intergalactic medium. To inspire future research, we conclude with a set of observational and theoretical challenges.

Accepted by Annual Reviews of Astronomy & Astrophysics, Vol. 43, September 2005

E-mail contact: veilleux@astro.umd.edu,
preprint available at http://arxiv.org/abs/astro-ph/0504435; A PDF file containing both text and figures is available at http://www.astro.umd.edu/∼veilleux/pubs/araa.pdf

The Extended *Chandra* Deep Field-South Survey. *Chandra* Point-Source Catalogs

B. D. Lehmer[1], W. N. Brandt[1], D. M. Alexander[2], F. E. Bauer[3], D. P. Schneider[1], P. Tozzi[4], J. Bergeron[5], G. P. Garmire[1], R. Giacconi[6], R. Gilli[7], G. Hasinger[8], A. E. Hornschemeier[9,6], A. M. Koekemoer[10], V. Mainieri[8], T. Miyaji[11], M. Nonino[4], P. Rosati[12], J. D. Silverman,[8] G. Szokoly,[8] & C. Vignali[13]

[1]Department of Astronomy & Astrophysics, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[2]Institute of Astronomy, Madingley Road, Cambridge, CB3 0HA, United Kingdom
[3]Columbia Astrophysics Laboratory, Columbia University, Pupin Labortories, 550 W. 120th St., Rm 1418, New York, NY 10027, USA
[4]INAF - Osservatorio Astronomico di Trieste, via G. B. Tiepolo 11, 34131 Trieste, Italy
[5]Institut d'Astrophysique de Paris, 98bis Boulevard, F-75014 Paris, France
[6]Department of Physics and Astronomy, Johns Hopkins University, 3400 North Charles Street, Baltimore, MD 21218, USA

[7]Istituto Nazionale di Astrofisica (INAF) - Osservatorio Astrofisico di Arcetri, Largo E. Fermi 5, 50125 Firenze, Italy
[8]Max-Planck-Institut für extraterrestrische Physik, Giessenbachstrasse, D-85748 Garching b. München, Germany
[9]Laboratory for X-ray Astrophysics, NASA Goddard Space Flight Center, Code 662, Greenbelt, MD 20771, USA
[10]Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, USA
[11]Department of Physics, Carnegie Mellon University, Pittsburgh, PA 15213, USA
[12]European Southern Observatory, Karl-Schwarzschild-Strasse 2, Garching, D-85748, Germany
[13]Dipartimento di Astronomia, Universitá degli Studi di Bologna, Via Ranzani 1, 40127 Bologna, Italy

We present *Chandra* point-source catalogs for the Extended *Chandra* Deep Field-South (E-CDF-S) survey. The E-CDF-S consists of four contiguous 250 ks *Chandra* observations covering an approximately square region of total solid angle $\approx$0.3 deg^2, which flank the existing $\approx$1 Ms *Chandra* Deep Field-South (CDF-S). The survey reaches sensitivity limits of $\approx 1.1 \times 10^{-16}$ erg cm^{-2} s^{-1} and $\approx 6.7 \times 10^{-16}$ erg cm^{-2} s^{-1} for the 0.5–2.0 keV and 2–8 keV bands, respectively. We detect 762 distinct X-ray point sources within the E-CDF-S exposure; 589 of these sources are new (i.e., not previously detected in the $\approx$1 Ms CDF-S). This brings the total number of X-ray point sources detected in the E-CDF-S region to 915 (via the E-CDF-S and $\approx$1 Ms CDF-S observations). Source positions are determined using matched-filter and centroiding techniques; the median positional uncertainty is $\approx 0.35''$. The basic X-ray and optical properties of these sources indicate a variety of source types, although absorbed active galactic nuclei (AGNs) seem to dominate. In addition to our main *Chandra* catalog, we constructed a supplementary source catalog containing 33 lower significance X-ray point sources that have bright optical counterparts ($R < 23$). These sources generally have X-ray-to-optical flux ratios expected for normal and starburst galaxies, which lack a strong AGN component. We present basic number-count results for our main *Chandra* catalog and find good agreement with the $\approx$1 Ms CDF-S for sources with 0.5–2.0 keV and 2–8 keV fluxes greater than 3×10^{-16} erg cm^{-2} s^{-1} and 1×10^{-15} erg cm^{-2} s^{-1}, respectively. Furthermore, three extended sources are detected in the 0.5–2.0 keV band, which are found to be likely associated with galaxy groups or poor clusters at $z \approx 0.1 - 0.7$; these have typical rest-frame 0.5–2.0 keV luminosities of (1–5) $\times$ 10^{42} erg s^{-1}.

Accepted for publication by the Astrophysical Journal Supplements

E-mail contact: blehmer@astro.psu.edu (Bret Lehmer) & niel@astro.psu.edu (Niel Brandt),
preprint available at http://arxiv.org/abs/astro-ph/0506607,
catalogs and data products available at http://www.astro.psu.edu/users/niel/ecdfs/ecdfs-chandra.html

A search for changing-look AGN in the Grossan catalog

S. Bianchi[1], M. Guainazzi[1], G. Matt[2], M. Chiaberge[3], 4, K. Iwasawa[5], F. Fiore[6], R. Maiolino[7]

[1] XMM-Newton Science Operations Center, European Space Astronomy Center, ESA, Apartado 50727, E-28080 Madrid, Spain
[2] Dipartimento di Fisica, Università degli Studi Roma Tre, Via della Vasca Navale 84, I-00146, Roma, Italy
[3] Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218
[4] INAF-Istituto di Radioastronomia, Via P. Gobetti 101, 40129 Bologna, Italy
[5] Institute of Astronomy, Madingley Road, Cambridge, CB3 0HA
[6] INAF - Osservatorio Astronomico di Roma, via di Frascati 33, I-00040 Monteporzio, Italy
[7] INAF - Osservatorio Astrofisico di Arcetri, Largo Fermi 5, I-50125 Firenze, Italy

We observed with XMM-*Newton* 4 objects selected from the Grossan (1992) catalog, with the aim to search for new 'changing-look' AGN. The sample includes all the sources which showed in subsequent observations a flux much lower than the one measu red with HEAO A-1: NGC 7674, NGC 4968, IRAS 13218+0552 and NGC 1667. None of the sources was caught in a high flux state during the XMM-*Newton* observations, whose analysis reveal they are all likely Compton-thick objects. We suggest that, for al l the sources, potential problems with the HEAO A-1 source identification and flux measurement prevent us from being certain that the HEAO A-1 data represent a putative 'high' state for these objects. Nonetheless, based on the high flux state and Compton -thin spectrum of its *GINGA* observation, NGC 7674 represents probably the sixth known case of a 'changing-look' Seyfert 2 galaxy. From the X-ray variability pattern, we can estimate a likely lower limit of a few parsec to the distance of the inn er walls of the torus in this object. Remarkably, IRAS 13218+0552 was not detected by XMM-*Newton*, despite being currently classified as a Seyfert 1 with a large [OIII] flux. However, the original classification was likely to be affected by an ex treme velocity outflow component in the emission lines. The object likely harbors an highly obscured AGN and should be re-classified as a Type 2 source.

Accepted by A&A

E-mail contact: Stefano.Bianchi@sciops.esa.int,

preprint available at http://es.arxiv.org/abs/astro-ph/0507323

Investigation of flat spectrum radio sources by the interplanetary scintillation method at 111 MHz

S.A.Tyul'bashev[1,2] & P.Augusto[3]

[1] Pushchino Radio Astronomy Observatory, Pushchino, Moscow region, 142290 Russia
[2] Isaac Newton Institute, Chile, Pushchino Branch, Russia
[3] Universidade da Madeira, Centro de Ciências Matemáticas, Caminho da Penteada, 9000-390 Funchal, Portugal

Interplanetary scintillation observations of 48 of the 55 Augusto et al. (1998) flat spectrum radio sources were carried out at 111 MHz using the interplanetary scintillation method on the Large Phased Array (LPA) in Russia. Due to the large size of the LPA beam ($1^{o}\times 0.5^{o}$) a careful inspection of all possible confusion sources was made using extant large radio surveys: 37 of the 48 sources are not confused. We were able to estimate the scintillating flux densities of 13 sources, getting upper limits for the remaining 35. Gathering more or improving extant VLBI data on these sources might significantly improve our results. This proof-of-concept project tells us that compact ($< 1''$) flat spectrum radio sources show strong enough scintillations at 111 MHz to establish/constrain their spectra (low-frequency end).

Accepted by Astron. & Astroph.

Preprint available at http://arxiv.org/abs/astro-ph/0507279

Simultaneous Ultraviolet and X-ray Observations of the Seyfert Galaxy NGC 4151. I. Physical Conditions in the X-ray Absorbers

S. B. Kraemer[1,2], I.M. George[3,4], D.M. Crenshaw[5], J.R. Gabel[6], T.J. Turner[3,4], T.R. Gull[2], J.B. Hutchings[7], G.A. Kriss[8], R.F. Mushotzky[4], H. Netzer[9], B.M. Peterson[10], and Ehud Behar[11]

[1] Institute for Astrophysics and Computational Sciences, Department of Physics , The Catholic University of America, Washington, DC 20064
[2] Exploration of the Universe Division, Code 667, NASA's Goddard Space Flight Center, Greenbelt, MD 20771
[3] Physics Department, University of Maryland, Baltimore County, Baltimore, MD 21250
[4] Exploration of the Universe Division, Code 662, NASA Goddard Space Flight Center, Greenbelt, MD 20771
[5] Department of Physics and Astronomy, Georgia State University, Atlanta, GA 30303
[6] University of Colorado, CASA, UCB 389, Boulder, CO 80309-0389
[7] Dominion Astrophysical Observatory, National Research Council of Canada, Victoria, BC V8X4M6, Canada
[8] Space Telescope Science Institute, 3800 San Martin Dr. Baltimore, Md 21218
[9] School of Physics and Astronomy, Raymond and Beverly Sackler Faculty of Exact Sciences, Tel-Aviv University, Tel-Aviv 69978, Israel
[10] Department of Astronomy, The Ohio State University, 140 W. 18th Ave., Columbus, OH 43210-106
[11] Department of Physics, Technion, Haifa, 32000, Israel

We present a detailed analysis of the intrinsic X-ray absorption in the Seyfert 1 galaxy NGC 4151 using *Chandra*/High Energy Transmission Grating Spectrometer data obtained 2002 May as part of a program which included simultaneous ultraviolet (UV) spectra using the *Hubble Space Telescope*/Space Telescope Imaging Spectrograph and the *Far Ultraviolet Spectrographic Explorer*. Previous studies, most recently using *ASCA* spectra, revealed a large ($> 10^{22}$ cm^{-2}) column of intervening gas, which has varied both in ionization state and total column density. NGC 4151 was in a relatively low flux state during the observations reported here ($\sim 25\%$ of its historic maximum), although roughly 2.5 times as bright in the 2 –10 keV band as during a *Chandra* observation in 2000. At both epochs, the soft X-ray band was dominated by emission lines, which show no discernible variation in flux between the two observations. The 2002 *Chandra* data show the presence of a very highly ionized absorber, in the form of H-like and He-like Mg, Si, and S lines, as well as lower ionization gas via the presence of inner-shell absorption lines from lower-ionization species of these elements. The latter accounts for both the bulk of the soft X-ray absorption and the high covering factor UV absorption lines of O VI, C IV, and N V with outflow velocities ≈ 500 km s^{-1}. The presence of high ionization gas, which is not easily detected at low resolution (e.g., with *ASCA*), appears common among Seyfert galaxies. Since this gas is too highly ionized to be radiatively accelerated in sources such as NGC 4151, which is radiating at a small fraction of its Eddington Luminosity, it may be key to understanding the dynamics of mass outflow. We find that the deeper broad-band absorption detected in the 2000 *Chandra* data is the result of both 1) lower ionization of the intervening gas due to the lower ionizing flux and 2) a factor of ~ 3 higher column density of the lower ionization component. To account for this bulk motion, we estimate that this component must have a velocity ~ 1250 km s^{-1} transverse to our line-of-sight. This is consistent with the rotational velocity of gas arising from the putative accretion disk. While both thermal wind and magneto-hydrodynamic models predict large non-radial motions, we suggest that the latter mechanism is more consistent with the results of the photoionization

models of the absorbers

Accepted by Astrophysical Journal

E-mail contact: kraemer@yancey.gsfc.nasa.gov,
preprint available at http://arxiv.org/abs/astro-ph/0507354

The ISO–2MASS AGN survey: On the type–1 sources

C. Leipski[1], M. Haas[1], H. Meusinger[2], R. Siebenmorgen[3], R. Chini[1], C. M. Scheyda[1], M. Albrecht[4], B. J. Wilkes[5], J. P. Huchra[5], S. Ott[6], C. Cesarsky[3] and R. Cutri[7]

[1] Astronomisches Institut Ruhr–Universität Bochum (AIRUB), Universitätsstraße 150, 44780 Bochum, Germany
[2] Thüringer Landessternwarte Tautenburg (TLS), Sternwarte 5, 07778 Tautenburg, Germany
[3] European Southern Observatory (ESO), Karl–Schwarzschild–Str. 2, 85748 Garching, Germany
[2] Instituto de Astronomía, Universidad Católica del Norte (UCN), Avenida Angamos 0610, Antofagasta, Chile
[2] Harvard–Smithsonian Center for Astrophysics (CfA), 60 Garden Street, Cambridge, MA 02138, USA
[2] HERSCHEL Science Centre, ESA, Noordwijk, PO Box 299, 2200 AG Noordwijk, The Netherlands
[2] IPAC, California Institute of Technology (Caltech), 770 South Wilson Avenue, Pasadena, CA 91125, USA

We combined the *ISOCAM Parallel Mode Survey* at 6.7 μm ($LW2$ filter) with the *Two Micron All Sky Survey* in order to obtain a powerful tool to search for AGN independent of dust extinction. Using moderate colour criteria $H - K > 0.5$ and $K - LW2 > 2.7$ we have selected a sample of 77 AGN candidates in an effective area of ∼10 square degrees. By means of optical spectroscopy we find 24 ($\sim 30\,\%$) type–1 QSOs at redshifts $0.1 < z < 2.3$; nine of them have $z > 0.8$. About one third of the ISO–2MASS QSOs show so red optical colours, that they are missed in optical and UV AGN surveys like SDSS, 2DF, or HES. With a surface density of about 2 deg^{-2} down to $R < 18$ mag the ISO–2MASS QSOs outnumber the 1.35 deg^{-2} of the SDSS quasar survey by 50%; we find a combined optical–IR QSO surface density of 2.7 deg^{-2}. Since only two of the ISO–2MASS QSOs have also $J - K > 2$, the inclusion of the ISO mid–infrared photometry significantly extends the capabilities of the pure 2MASS red AGN survey. We suggest that the newly found red AGN resemble young members of the quasar population, and that quasars spend much of their lifetime in a dust enshrouded phase.

Accepted by A&A

E-mail contact: leipski@astro.rub.de, haas@astro.rub.de

Variation in the Scattering Shroud Surrounding Markarian 231

S. C. Gallagher,[1] G. D. Schmidt,[2] P. S. Smith,[2] W. N. Brandt,[3] G. Chartas,[3] S. Hylton,[4] D. C. Hines,[5] and M. S. Brotherton[6]

[1] Department of Physics & Astronomy, University of California – Los Angeles, Los Angeles CA, 90095–4705, USA
[2] Steward Observatory, The University of Arizona, Tucson AZ 85721, USA
[3] Department of Astronomy & Astrophysics, The Pennsylvania State University, University Park, PA 16802, USA
[4] Center for Space Research, Massachusetts Institute of Technology, Cambridge, MA 02139, USA
[5] Space Science Institute, Boulder, CO 80301, USA
[6] Department of Physics & Astronomy, University of Wyoming, Laramie, WY 82071, USA

We present a detailed study of the nuclear structure of the highly polarized broad absorption line quasar, Mrk 231, through a multiwavelength campaign of *Chandra* observations, optical spectroscopy, optical spectropolarimetry, and imaging polarimetry. This campaign was designed to extend the 40 ks *Chandra* study of Gallagher et al. and the optical and UV spectropolarimetric study of Smith et al. to probe variability on multiple timescales. As direct emission from the nucleus is heavily obscured at optical through X-ray wavelengths, the detailed study of scattered emission has lead to insights into the stratified and complex central region of this active galaxy. Though significant continuum variability is not detected in any of the three new 40 ks *Chandra* observations, we investigate Fe Kα emission features in the individual and combined spectra. Comparing echelle spectra of the Na I D absorption lines with the literature, we show that one system disappeared in 2000 only to reappear in later epochs. Notably, we detect a large decrease in polarization across the entire optical spectrum of Mrk 231 from 1995 to 2003. Though the polarization fraction fell, e.g., from 4% to 3% at $\lambda_{\rm obs} \sim 6000$Å, the polarization position angle spectrum remained unchanged. The optical polarization behavior is consistent with a decrease in the flux scattered by circumnuclear material on spatial scales where the broad-line region is resolved by the scattering material. Ultraviolet imaging polarimetry of Mrk 231 by the *Hubble Space Telescope* sets an upper limit on the distance between the active nucleus and the scattering regions of <20 pc.

Accepted by Astrophys. J.

E-mail contact: sgall@astro.ucla.edu,

preprint available at http://arxiv.org/abs/astro-ph/0506616

Studying the Variation of the Fine Structure Constant Using Emission Line Multiplets

Dirk Grupe[1], Anil K. Pradhan[2] and Stephan Frank[2]

[1] Astronony Department, Pennsylvania State University, 525 Davey Lab, University Park, PA 16802, U.S.A
[2] Department of Astronomy, The Ohio State University, 140 W. 18th Ave., Columbus, OH-43210, U.S.A.

As an extension of the method by Bahcall et al. (2004) to investigate the time dependence of the fine structure constant, we describe an approach based on new observations of forbidden line multiplets from different ionic species. We obtain optical spectra of fine structure transitions in [Ne III], [Ne V], [O III], [OI], and [SII] multiplets from a sample of 14 Seyfert 1.5 galaxies in the low-z range $0.035 < z < 0.281$. Each source and each multiplet is independently analyzed to ascertain possible errors. Averaging over our sample, we obtain a conservative value $\alpha^2(t)/\alpha^2(0) = 1.0030\pm0.0014$. However, our sample is limited in size and our fitting technique simplistic as we primarily intend to illustrate the scope and strengths of emission line studies of the time variation of the fine structure constant. The approach can be further extended and generalized to a "many-multiplet emission line method" analogous in principle to the corresponding method using absorption lines. With that aim, we note that the theoretical limits on emission line ratios of selected ions are precisely known, and provide well constrained selection criteria. We also discuss several other forbidden and allowed lines that may constitute the basis for a more rigorous study using high-resolution instruments on the next generation of 8 m class telescopes.

Published in AJ 130, 355

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

The Active Galaxies Newsletter is available on the World Wide Web. You can access it via the University of Manchester home page :- http://www.ast.man.ac.uk/∼rb/agn/
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.