| Active Galaxies Newsletter | *An electronic publication dedicated to the observation and theory of active galaxies* |
| --- | --- |
| No. 8 — November 1997 | Editor: Matt Redman (mpr@ast.man.ac.uk) |

*Abstracts - Thesis Abstracts - Jobs - Meetings*

# From the Editor

Anthony Holloway has changed jobs to site computer manager for the Astronomy group at Manchester. The Active Galaxies Newsletter resumes from this month and, as before, 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. I look forward to receiving your contributions.
Matt Redman

# Abstracts of recently accepted papers

## Spectropolarimetry of FIRST 0840+3633

**M. S. Brotherton[1], Wil van Breugel[1], Arjun Dey[2] and Robert Antonucci[3]**

[1] Institute of Geophysics and Planetary Physics, Lawrence Livermore National Laboratory, 7000 East Avenue, P.O. Box 808, L413, Livermore, CA 94550
[2] Kitt Peak National Observatory, National Optical Astronomy Observatory, 950 N. Cherry Avenue, P.O. Box 26732, Tuscon, AZ 85726
[3] Physics Department, University of California at Santa Barbara, Santa Barbara, CA 93106

We present Keck spectropolarimetry of a rare "Iron Lo-BALQSO," FIRST 0840+3633. The continuum is 4% polarized near 2000 angstroms rest-frame, but falls to 2% at longer wavelengths, and maintains a relatively constant position angle of 50 degrees. The emission lines are unpolarized. The polarization increases up to 8% in the low-ionization absorption troughs of Mg II $\lambda$2800 and Al III $\lambda$1860. The polarization and its position angle vary in a complicated manner across the metastable Fe II absorption lines, suggesting that more than one mechanism is at work or that the system geometry is complex.

To appear in the proceedings of the workshop on "Mass Ejection from AGN", Pasadena, 1997 Feb

E-mail contact: mbrother@igpp.llnl.gov, preprint available at http://xxx.lanl.gov/archive/astro-ph/9705053

## ASCA observations of type-2 Seyfert Galaxies: I Data Analysis Results

**T.J.Turner [1,2], I.M. George[1,2], K. Nandra[1,3], R.F. Mushotzky[1]**

[1] Laboratory for High Energy Astrophysics, Code 660, NASA/Goddard Space Flight Center, Greenbelt, MD 20771;
turner, george, nandra, mushotzky@lheavx.gsfc.nasa.gov
[2] Universities Space Research Association
[3] NAS/NRC Research Associate

We present *ASCA* spatial, temporal and spectral data for a sample of 26 observations of 25 type-2 active galactic nuclei (AGN), composed of 17 Seyfert 2 galaxies and 8 Narrow-Emission-Line-Galaxies (NELGs). 24 out of the 25 sources were detected.

The *ASCA* images are generally consistent with emission from point-sources at energies above $\sim 3$ keV. We use archival *ROSAT* data to examine each field at high spatial resolution and check for the presence of sources which would contaminate the *ASCA* data.

Of the five sources bright enough for 128 s temporal analysis, three are variable at $> 99\%$ confidence, with characteristics consistent with those observed in Seyfert 1 galaxies. Analysis on a timescale of 5760 s reveals six sources variable at $> 99\%$ confidence and comparison with previous X-ray results shows most of the sample to be variable in hard X-ray flux on timescales of years.

Simple continuum models are fit to the sample spectra to characterize the variety of spectral forms and hence determine the fundamental nature of the X-ray spectrum of each source. No single spectral model provides an adequate fit to all the sample sources. 36% of the sample cannot be adequately fit by any of our test models (all rejected at $> 95\%$ confidence). Approximately half of the sample have an iron K$\alpha$ line with an equivalent width consistent with an origin in the line-of-sight absorber, the remaining lines must be produced in material out of the line-of-sight. Absorbing columns up to $10^{24}$atom cm$^{-2}$ are detected and even larger columns are inferred for some sources. The mean underlying hard X-ray power-law index is $\Gamma \sim 2$.

Many X-ray emission lines were detected at high levels of confidence. The iron K-shell regime is dominated by emission from 'neutral' material. Many datasets also show evidence for complexity in the iron K$\alpha$ profile, which may be interpreted as evidence for broad line profiles, including flux both red-ward and blue-ward of the line peak, and/or for the existence of hydrogen-like and helium-like iron K lines.

Hydrogen-like and helium-like lines are detected from Fe, Ne, Si, S and Ar in addition to Mg lines. While almost half of the sample have an estimated starburst contribution of $> 30\%$ in the 0.5-4.5 keV bandpass, the soft X-ray emission lines are not solely associated with a strong starburst component.

Accepted by Ap. J. Supplement

E-mail contact: turner@lheavx.gsfc.nasa.gov,
preprint available at http://lheawww.gsfc.nasa.gov/~george/papers/gnt_s2p1/abstract.html

## ASCA observations of type-2 Seyfert Galaxies: II The Importance of X-ray Scattering and Reflection

**T.J.Turner [1,2], I.M. George[1,2], K. Nandra[1,3], R.F. Mushotzky[1]**

[1] Laboratory for High Energy Astrophysics, Code 660, NASA/Goddard Space Flight Center, Greenbelt, MD 20771;
turner, george, nandra, mushotzky@lheavx.gsfc.nasa.gov
[2] Universities Space Research Association
[3] NAS/NRC Research Associate

We discuss the importance of X-ray scattering and Compton reflection in type-2 Seyfert Galaxies, based upon the analysis of *ASCA* observations of 25 such sources. Consideration of the iron K$\alpha$, [OIII] line and X- ray variability suggest that NGC 1068, NGC 4945, NGC 2992, Mrk 3, Mrk 463E and Mrk 273 are dominated by reprocessed X-rays. We examine the properties of these sources in more detail.

We find that the iron K$\alpha$ complex contains significant contributions from neutral and high-ionization species of iron. Compton reflection, hot gas and starburst emission all appear to make significant contributions to the observed X-ray spectra.

Mrk 3 is the only source in this subsample which does not have a significant starburst contamination. The *ASCA* spectrum below 3 keV is dominated by hot scattering gas with $U_X \sim 5$, $N_H \sim 4 \times 10^{23}$cm$^{-2}$. This material is more highly ionized than the zone of material comprising the warm absorber seen in Seyfert 1 galaxies, but may contain a contribution from shock-heated gas associated with the jet. Estimates of the X-ray scattering fraction cover $0.25 - 5\%$. The spectrum above 3 keV appears to be dominated by a Compton reflection component although there is evidence that the primary continuum component becomes visible close to $\sim 10$ keV.

Accepted by Ap. J.

E-mail contact: turner@lheavx.gsfc.nasa.gov,
preprint available at http://lheawww.gsfc.nasa.gov/~george/papers/gnt_s2p2/abstract.html

## ASCA Observations of Seyfert 1 galaxies: III. The Evidence for Absorption & Emission due to Photoionized Gas

**I.M. George[1,2], T.J. Turner[1,2], Hagai Netzer[3], K. Nandra[1,4], R.F. Mushotzky[1], T. Yaqoob[1,2]**

[1] Laboratory for High Energy Astrophysics, Code 660, NASA/Goddard Space Flight Center, Greenbelt, MD 20771
[2] Universities Space Research Association
[3] School of Physics and Astronomy and the Wise Observatory, The Beverly and Ramond Sackler Faculty of Exact Sciences, Tel Aviv University, Tel Aviv 69978, Israel. [4] NAS/NRC Research Associate

We present the results from a detailed analysis of the 0.6 - 10 keV spectra of 23 *ASCA* observations of 18 objects. We find that in most cases the underlying continuum can be well-represented by a powerlaw with a photon index $\Gamma \sim 2$. However we find strong evidence for photoionized gas in the line-of-sight to 13/18 objects. We present detailed modelling of this gas based upon the `ION` photoionization code. Other studies have been made of the 'warm absorber' phenomenon but this paper contains the first consideration of the importance of the covering-fraction of the ionized gas and a direct comparison between models of attenuation by ionized versus neutral material.

We find the X-ray ionization parameter for the ionized material is strongly peaked at $U_X \sim 0.1$. The column densities of ionized material are typically in the range $N_{H,z} \sim 10^{21}$–$10^{23}\mathrm{cm}^{-2}$, although highly ionized (and hence psuedo-transparent) column densities up to $10^{24}\mathrm{cm}^{-2}$ cannot be excluded in some cases. We also investigate the importance of the emission-spectrum from the ionized gas, finding that it significantly improves the fit to many sources with an intensity consistent with material subtending a large solid angle at the central source. Allowing a fraction of the continuum to be observed without attenuation also improves the fit to many sources, and is definitely required in the case of NGC 4151. A deficit of counts is observed at $\sim 1$ keV in the sources exhibiting the strongest absorption features. We suggest this is likely to be the signature of a second zone of (more highly) ionized gas, which might have been seen previously in the deep Fe $K$-shell edges observed in some *Ginga* observations. We find evidence that the ionized material in NGC 3227 and MCG-6-30-15 contains embedded dust, whilst there is no such evidence in the other sources

We discuss these results in the context of previous studies and briefly explore the implications in other wavebands.

To be published in ApJS

E-mail contact: ian.george@gsfc.nasa.gov,
preprint available via http://lheawww.gsfc.nasa.gov/~george/papers/gnt_paper3/abstract.html

## The Spectral Energy Distribution of Normal, Starburst and Active Galaxies

**Henrique R. Schmitt[1,2,3], Anne L. Kinney[1,4], Daniela Calzetti[2] & Thaisa Storchi-Bergmann[1]**

[1]Departamento de Astronomia, IF-UFRGS, CP15051, Porto Alegre-RS, CEP91501-970, Brazil
[2]Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218
[3]CNPq Fellow
[4]Department of Physics and Astronomy, Johns Hopkins University, Baltimore, MD21218

We present the results of an extensive literature search of multiwavelength data for a sample of 59 galaxies, consisting of 26 Starbursts, 15 Seyfert 2's, 5 LINER's, 6 normal spirals and 7 normal elliptical galaxies. The data include soft X-ray fluxes, ultraviolet and optical spectra, near, mid/far infrared photometry and radio measurements, selected to match as closely as possible the IUE aperture ($10'' \times 20''$). The galaxies are separated into 6 groups with similar characteristics, namely, Ellipticals, Spirals, LINER's, Seyfert 2's, Starbursts of Low and High reddening, for which we create average spectral energy distributions (SED).

The individual groups SED's are normalized to the $\lambda$7000Å flux and compared, looking for similarities and differences among them. We find that the SED's of Normal Spirals and Ellipticals are very similar over the entire energy range, and fainter than those of all other groups. LINER's SED's are similar to those of Seyfert 2's and Starbursts only in the visual to near-IR waveband, being fainter in the remaining wavebands. Seyfert 2's are similar to Starbursts in the radio to near-IR waveband, fainter in the visual to ultraviolet, but stronger in the X-rays. Low and High reddening Starbursts are similar along the entire SED, differing in the ultraviolet, where Low reddening Starbursts are stronger, and in the mid/far IR where they are fainter.

We have also collected multiwavelength data for 4 HII regions, a thermal supernova remnant, and a non-thermal supernova remnant (SNR), which are compared with the Starburst SED's. The HII regions and thermal SNR's have similar SED's, differing only in the X-ray and far infrared. The non-thermal SNR SED is a flat continuum, different from all the other SED's. Comparing the SED's of Starbursts and HII regions we find that they are similar in the mid/far IR parts of the spectrum, but HII regions are fainter in the radio and X-rays. Starbursts are also stronger than HII regions in the visual and near-IR parts of the spectrum, due to the contribution from old stars to Starbursts.

The bolometric fluxes of the different types of galaxies are calculated integrating their SED's. These values are compared with

individual waveband flux densities, in order to determine the wavebands which contribute most to the bolometric flux. In Seyfert 2's, LINER's and Starbursts, the mid/far IR emission are the most important contributers to the bolometric flux, while in normal Spirals and Ellipticals this flux is dominated by the near-IR and visual wavebands. Linear regressions were performed between the bolometric and individual band fluxes for each kind of galaxy. These fits can be used ine the calculation of the bolometric flux for other objects of similar activity type, but with reduced waveband information.

E-mail contact: schmitt@if1.if.ufrgs.br

To appear in the Astronomical Journal, August 1997 issue

## Clues on the nature of Compact Steep Spectrum radio sources from optical spectroscopy

**R.Morganti[1,2], C.N.Tadhunter[3], R.Dickson[3] and M.Shaw[3]**

[1] Australia Telescope National Facility, CSIRO, PO Box 76, Epping, NSW 2121, Australia [2] Istituto di Radioastronomia, CNR, via Gobetti 101, I-40129 Bologna, Italy [3] Department of Physics, University of Sheffield, Sheffield S3, UK

New long-slit spectra are presented for a group of Compact-Steep-Spectrum (CSS) sources (i.e. powerful radio sources with sub-galactic size and steep spectral index at high radio frequencies) selected from the southern ($\delta < 10°$) 2-Jy sample of radio sources with redshift limit of $z = 0.7$. Their spectra are strong in emission lines (e.g. [O III]$\lambda$5007 and [O II]$\lambda$3727), as expected for such powerful radio sources. The line luminosities and ratios obtained for these compact sources are compared with those for the other sources of the southern 2-Jy sample. We find that the optical spectra for the CSS sources show characteristics very similar to the extended sources of similar radio power and redshift. In particular, we find that the CSS sources follow the correlation between the radio power and [O III]$\lambda$5007 and [O II]$\lambda$3727 luminosities found for the extended sources, although there is tentative evidence that they have lower [O III]$\lambda$5007 luminosities. Also, the optical continuum spectral energy distribution (SED) and polarization properties of the CSS sources show the same variety of characteristics observed among the extended sources. The first-order similarity that we find between the spectra of CSS sources and the extended sources of similar radio power is consistent with the idea that the CSS sources are young radio sources in which the radio jets have yet to emerge from the central regions of the host galaxies.

Accepted by A&A

E-mail contact: rmorgant@atnf.csiro.au,
preprint available at http://wwwatnf.atnf.csiro.au/Preprints/1997may/1997may0001.ps.gz

## Asymmetric depolarization in double low-luminosity radio galaxies

**R.Morganti[1,2], P. Parma[1], A. Capetti[3], R. Fanti[1,4], H.R. de Ruiter[1,5]**

[1] Australia Telescope National Facility, CSIRO, PO Box 76, Epping, NSW 2121, Australia
[2] Istituto di Radioastronomia, CNR, via Gobetti 101, I-40129 Bologna, Italy
[3] Scuola Internazionale Superiore di Studi Avanzati, Via Beirut 2-4, I-34014 Trieste, Italy
[4] Dipartimento di Fisica, Università di Bologna, Via Irnerio 46, I-40126, Bologna, Italy
[5] Osservatorio Astronomico di Bologna, via Zamboni 33, I-40126, Bologna, Italy

To investigate the presence of the Laing-Garrington effect (i.e. the lobe containing the jet more depolarized than that containing the counter-jet), we analyse polarization data at 6 and 20 cm for a sample of double low-luminosity radio galaxies. The effect is well visible, although not very strong. We therefore confirm what was inferred in a previous paper based on data at one frequency (20 cm) only. Furthermore, we find that radio galaxies with strong radio cores show a more pronounced asymmetry in depolarization. We conclude that the presence of the Laing-Garrington effect in our sample is a indication that relativistic motions do occur on the kpc scale of low-luminosity radio galaxies as recently suggested by theoretical arguments and observational evidence.

Accepted by A&A

E-mail contact: rmorgant@atnf.csiro.au,
preprint available at http://wwwatnf.atnf.csiro.au/Preprints/1997may/1997may0003.ps.gz

## Polarization of low-luminosity radio galaxies: the 6 cm data

**R.Morganti[1,2], P. Parma[1], A. Capetti[3], R. Fanti[1,4], H.R. de Ruiter[1,5], I. Prandoni[1,4]**

[1] Australia Telescope National Facility, CSIRO, PO Box 76, Epping, NSW 2121, Australia
[2] Istituto di Radioastronomia, CNR, via Gobetti 101, I-40129 Bologna, Italy
[3] Scuola Internazionale Superiore di Studi Avanzati, Via Beirut 2-4, I-34014 Trieste, Italy
[4] Dipartimento di Fisica, Università di Bologna, Via Irnerio 46, I-40126, Bologna, Italy
[5] Osservatorio Astronomico di Bologna, via Zamboni 33, I-40126, Bologna, Italy

Polarization data are presented for 62 B2 radio galaxies. The sources were observed at 6 cm in different configurations of the VLA. The results are given as integrated and mean component parameters. We also present maps of total intensity with superimposed vectors representing the fractional polarization and position angle. We compare these new data with older data at 20 cm and discuss briefly depolarization, rotation of polarization angle and geometry of the magnetic field.

Accepted by A&A Suppl.

E-mail contact: rmorgant@atnf.csiro.au,
preprint available at http://wwwatnf.atnf.csiro.au/Preprints/1997may/1997may0002.ps.gz

## Steps Toward Determination of the Size and Structure of the Broad-Line Region in Active Galactic Nuclei. XII. Ground-Based Monitoring of 3C 390.3

**Matthias Dietrich[1], et al.**

[1]Landessternwarte Heidelberg, Königstuhl, D-69117 Heidelberg, Germany

Results of a ground-based optical monitoring campaign on 3C 390.3 in 1994–95 are presented. The broad-band fluxes ($B$, $V$, $R$, and $I$), the spectrophotometric optical continuum flux $F_\lambda(5177\,\text{Å})$, and the integrated emission-line fluxes of H$\alpha$, H$\beta$, H$\gamma$, He I, and He II all show a nearly monotonic increase with episodes of milder short-term variations superposed. The amplitude of the continuum variations increases with decreasing wavelength (4400 — 9000 Å). The optical continuum variations follow the variations in the ultraviolet and X-ray with time delays, measured from the centroids of the cross-correlation functions, typically around 5 days, but with uncertainties also typically around 5 days; zero time delay between the high-energy and low-energy continuum variations cannot be ruled out. The strong optical emission lines H$\alpha$ , H$\beta$ , H$\gamma$ , and He I respond to the high-energy continuum variations with time delays typically about 20 days, with uncertainties of about 8 days. There is some evidence that He II responds somewhat more rapidly, with a time delay of around 10 days, but again, the uncertainties are quite large ($\sim$8 days). The mean and rms spectra of the H$\alpha$ and H$\beta$ line profiles provide indications for the existence of at least three distinct components located at $\pm$4000 and 0 km s$^{-1}$ relative to the line peak. The emission-line profile variations are largest near line center.

Accepted by Astrophys. Journ. Suppl.

E-mail contact: mdietric@lsw.uni-heidelberg.de, preprint available at http://www.astronomy.ohio-state.edu/~agnwatch

## Evidence for Absorption due to Highly-Ionized Gas in the Radio-Quiet Quasar PG 1114+445

**I.M. George[1,2], K. Nandra[1,3], A. Laor[4], T.J. Turner[1,2], F. Fiore[5,6], H. Netzer[7], R.F. Mushotzky[1]**

[1] Laboratory for High Energy Astrophysics, Code 660, NASA/Goddard Space Flight Center, Greenbelt, MD 20771
[2] Universities Space Research Association
[3] NAS/NRC Research Associate
[4] Physics Department, Technion, Haifa 32000, Israel
[5] Osservatorio Astronomico di Roma, via dell'Osservatorio 5, Monteporzio-Catone (RM), I-00040, Roma, Italy
[6] SAX Scientific Data Centre, via corcolle 19, I-00131, Roma, Italy
[7] School of Physics and Astronomy and the Wise Observatory, The Beverly and Ramond Sackler Faculty of Exact Sciences, Tel Aviv University, Tel Aviv 69978, Israel.

We present results on the X-ray spectrum of the quasar PG 1114+445 from an *ASCA* observation performed in 1996 June, and a *ROSAT* observation performed 3 years earlier. We show good agreement between all the datasets can be obtained if the underlying continuum in the 0.2–10 keV band is assumed to be a powerlaw (photon index $\Gamma \simeq 1.8$) absorbed by photoionized material. The ionized gas imprints deep absorption edges in the observed spectrum $\lesssim 2$ keV due to O VII and O VIII, from which we determine its column density ($\sim 2 \times 10^{22}$ cm$^{-2}$) and ionization parameter ($U_X \sim 0.1$) to be similar to that observed in Seyfert-I galaxies. Unfortunately these data do not allow any strong constraints to be placed on the location, or solid angle subtended by the material at the ionizing source. We also find evidence for absorption in the Fe $K$-shell band in excess of that

predicted from the lower energy features. This implies an Fe/O abundance ratio $\sim 10$ times the cosmic value, or an additional screen of more-highly ionized gas, possibly out-flowing from the nucleus. We briefly compare our results with those obtained from other active galaxies.

To be published in ApJ (currently scheduled for 1997 Dec 20 issue)

E-mail contact: ian.george@gsfc.nasa.gov,
preprint available via http://lheawww.gsfc.nasa.gov/ george/papers/pg1114/abstract.html

## Soft X-ray properties of the Seyfert 1.8 galaxy NGC 3786

**Stefanie Komossa**[1] **and Henner Fink**[1]

[1] Max-Planck-Institut für extraterrestrische Physik, 85740 Garching, Germany

An analysis of survey and pointed ROSAT PSPC observations of the Seyfert 1.8 galaxy NGC 3786 has revealed interesting spectral and temporal behaviour. The spectrum is found to show clear signs of excess absorption, and there is evidence that part (or all) of it is caused by the presence of a warm absorber. The soft X-ray spectral properties are discussed in the context of the Sy 1.8 classification of NGC 3786, and are combined with published optical data in an effort to discriminate between several possible absorption models. The one involving a warm absorber *with internal dust*, located between BLR and NLR, is favoured and shown to account successfully for the high observed broad line reddening as well as for the strong X-ray variability between the 1990 and 1992 observation.

To appear in Astronomy & Astrophysics

E-mail contact: skomossa@rosat.mpe-garching.mpg.de

## Evidence for a *dusty* warm absorber in NGC 3227

**Stefanie Komossa**[1] **and Henner Fink**[1,†]

[1] Max-Planck-Institut für extraterrestrische Physik, 85740 Garching, Germany
[†] deceased in Dec. 1996

We have analyzed survey and pointed ROSAT PSPC observations of the Seyfert galaxy NGC 3227. Large amplitude X-ray variability is detected, with a factor $\sim 15$ change in count rate within about 3 years. Smaller changes are seen on the timescale of days, the largest being a factor of 3.5. No strong *spectral* variability is found throughout the pointed observation. The X-ray spectrum is modeled in terms of warm absorption and both, a dust-free warm absorber and one with internal dust, give an excellent spectral fit. Additionally using multi-wavelength observations of NGC 3227, the *dusty* warm absorber is favored and suggested as an explanation for the lack of a large cold absorbing column in the soft X-ray region despite excess reddening along the line of sight. Self-consistent re-calculation of the models including Galactic-ISM-like dust results in an ionization parameter $\log U \simeq -0.25$ and a column density $\log N_{\rm w} \simeq 21.8$ of the warm absorber. X-ray variability and dust survival arguments are used to constrain the density and further properties of the ionized material. The influence of dust and other parameters on the thermal stability of the warm absorber is investigated. Predictions are given for the absorber-intrinsic optical–UV line emission and absorption.

To appear in Astronomy & Astrophysics 327, 483, 1997

E-mail contact: skomossa@rosat.mpe-garching.mpg.de; paper available as MPE preprint 418 and astro-ph/9707003

## ROSAT evidence for AGN and superwind activity in NGC 6240 and NGC 2782

**Hartmut Schulz**[2,3], **Stefanie Komossa**[1], **Thomas W. Berghöfer**[4] **and Berto Boer**[2]

[1] Max-Planck-Institut für extraterrestrische Physik, 85740 Garching, Germany
[2] Astronomisches Institut der Ruhr-Universität, D-44780 Bochum, Germany
[3] Department of Physics and Astronomy, Dartmouth College, Hanover, USA
[4] Space Sciences Laboratory, Berkeley, USA

We present ROSAT observations of the starburst galaxy NGC 2782 (HRI plus a weak PSPC frame) and the ultraluminous infrared galaxy NGC 6240 (PSPC). The (0.1–2.4) keV spectra of both objects appear similar. However, due to better sampling spectral modeling is only warranted in case of NGC 6240 for which both a single thermal Raymond-Smith model ($kT = 0.44 \pm 0.15$ keV) or a hybrid model consisting of 80% power-law with the canonical photon index $-1.9$ plus 20% Raymond-Smith contribution ($kT = 0.63 \pm 0.35$ keV) lead to good fits. However, the single thermal model turns out to be unlikely because it yields a

luminosity of $3.8\,10^{43}$ erg s$^{-1}$, which is hard to reach in a starburst superwind–scenario. The hybrid model leads to a more moderate luminosity of $5.2\,10^{42}$ erg s$^{-1}$, of which $1.0\,10^{42}$ erg s$^{-1}$ can be attributed to shocked superwind gas. We link the remaining $4.2\,10^{42}$ erg s$^{-1}$ powerlaw to an AGN component because the alternative of inverse-compton scattering of the FIR radiation leads to a too low flux when estimated with available data. The result appears to be consistent with preliminarily announced ASCA observations.

For NGC 2782 we find $L_x$(0.1–2.4 keV) = $4\,10^{41}$ erg s$^{-1}$ (within a factor of four) which can be explained by emission from a shocked superwind region with a high preshock density in agreement with earlier optical evidence for an outflowing supershell.

To appear in Astronomy & Astrophysics

E-mail contact: chinga@t-online.de or skomossa@rosat.mpe-garching.mpg.de;
paper available as MPE preprint 425 and astro-ph/9710098

## *Dusty* warm absorbers in active galaxies: The case of NGC 3786

**Stefanie Komossa**[1] **and Henner Fink**[1,†]

[1] Max-Planck-Institut für extraterrestrische Physik, 85740 Garching, Germany
[†] deceased in Dec. 1996

(Abridged) We report on the detection of the Seyfert 1.8 galaxy NGC 3786 in X-rays. The X-ray data are found to display interesting spectral and temporal properties. These are analyzed on the basis of ROSAT PSPC observations. The two most conspicuous features revealed by the X-ray analysis are (i) evidence for strong excess absorption along the line of sight, part (or all) of which seems to be caused by the presence of a *warm absorber*, and (ii) high-amplitude variability between the 2y-separated observations of a factor of ∼10 in count rate, with an intrinsic (0.1–2.4 keV) luminosity of $L_{\rm x} \simeq$ a few $\times 10^{42}$ erg/s during the high-state. These findings are discussed in light of the Sy 1.8 nature of NGC 3786. ¿From several absorption models that provide a successful description of the X-ray spectrum, we favor the one involving a warm absorber *with internal dust*, for which we obtain an ionization parameter of $\log U \simeq -0.8$, a column density of $\log N_{\rm w} \simeq 21.7$, a density-scaled distance from the nucleus of $r \simeq 0.055/\sqrt{n_8}$ pc, and a density $n_{\rm H} \lesssim 10^8$ cm$^{-3}$. Placing the dusty material between BLR and NLR, this model is shown to provide an explanation for (a) the observed steepness of the broad Balmer decrement by dust reddening, and (b) the detected drop in X-ray count rate, e.g. by variability in the column density. The warm absorber may be related to the dusty torus and/or the component of *hot dust* in NGC 3786 for which evidence was recently reported by Nelson (1996).

Contribution to the annual meeting of the *Astronomische Gesellschaft* (Innsbruck, Sept. 1997), AG abs. ser. 13, full paper will appear in Astronomy & Astrophysics 327, 555, 1997

E-mail contact: skomossa@rosat.mpe-garching.mpg.de

## Simultaneous and follow-up optical observations of the X-ray outburst in NGC 5905: Constraints on outburst scenarios

**Stefanie Komossa**[1], **Norbert Bade**[2], **Jochen Greiner**[3] **and Gaghik Tovmassian**[4]

[1] Max-Planck-Institut für extraterrestrische Physik, 85740 Garching
[2] Hamburger Sternwarte
[3] Astronom. Inst. Potsdam
[4] Observatorio Astronomico Nacional, México

(Abridged) NGC 5905 is one of the very few galaxies that underwent a huge X-ray outburst, the change in photon countrate being a factor ∼100. The outburst spectrum is both, very soft and luminous (Bade, Komossa & Dahlem 1996). Also remarkable in this context is the fact that NGC 5905 is an HII-type galaxy as shown by optical pre-outburst emission line spectra that do not reveal any signs of Seyfert activity. One exciting explanation of the X-ray observation is that we may have witnessed the tidal disruption of a star by a supermassive black hole (Rees 1988, 1990) residing in the nucleus of this galaxy.

In the present work, we discuss this and other possible outburst scenarios through a thorough analysis of all existing ROSAT PSPC X-ray observations of NGC 5905. We also present *simultaneous* and long-term optical photometry of NGC 5905 based on photographic plates taken at Sonneberg Observatory as well as follow-up optical spectroscopy performed at the OAN de México, the SAO 6 m telescope, and Calar Alto. Similarities with the X-ray outburst in IC 3599 are discussed and photoionization models for the (first strong then fading) optical high-ionization lines in the post-outburst spectra of IC 3599 are presented.

Contribution to the annual meeting of the *Astronomische Gesellschaft* (Innsbruck, Sept. 1997), AG abs. ser. 13

E-mail contact: skomossa@rosat.mpe-garching.mpg.de

# Meetings

## Structure and Kinematics of Quasar Broad Line Regions

Lincoln, Nebraska
Monday March 23 – Thursday March 26, 1998

This meeting is intended to address fundamental questions about the structure, nature, motions and origin of quasar broad line regions. The following topics will be emphasized:

| | |
|---|---|
| Absorption (intrinsic only) | Abundances |
| Anisotropy | Cloud properties |
| Coronal Lines | Fe II emission |
| General Correlations | High Energy Continuum Connections |
| High Ionization Broad Lines | Inter-cloud medium |
| Intermediate Line Region (ILR) | Kinematic Models |
| Luminosity Effects | Mass/Luminosity/Radius Relationships |
| NLR/BLR relationship | Narrow Line Seyfert 1's (I Zw 1 objects) |
| Orientiation Effects | Origin of the BLR |
| Photoionization Modelling Issues | Profiles |
| Profile Variability | Radio Structure/BLR Relationships |
| Reverberation Mapping | Spectropolarimetry |
| 3C 390.3 objects | Unification Theory |
| Velocity Shifts | Very Broad Line Region (VBLR) |
| Warm Absorber | X-ray Lines |

Further details will be given in a second mailing. Note the following deadlines:

If you wish to attend you should complete the electronic pre-registration form by the pre-registration deadline of Nov. 26, 1997

If you wish to present a paper the abstract deadline is: Jan. 1, 1998

Other deadlines:

Early registration payment deadline: February 1, 1998

Manuscript deadline for conference proceedings: May 15, 1998

If you wish to be placed on the mailing list, please complete the electronic form on the conference web site:

http://www.unl.edu:80/physics/blr_conf.html

Those without web access may contact:


| | | |
|---|---|---|
| C. Martin Gaskell | or | Stephanie A. Snedden |
| Dept. Physics & Astronomy | | Dept. Physics & Astronomy |
| University of Nebraska | | University of Nebraska |
| Lincoln, NE 68588-0111 | | Lincoln, NE 68588-0111 |
| USA | | USA |
| gaskell@unlinfo.unl.edu | | snedden@unlinfo.unl.edu |
| Tel: (402) 472-4788 | | Tel: (402) 472-3578 |
| FAX: (402) 472-2879 | | FAX: (402) 472-2879 |


We would be grateful if you would please draw this meeting to the attention of collaborators, colleagues, and graduate students who might not have received this announcement.

# Announcement

The International AGN Watch AGN monitoring consortium has established a World-Wide Website at URL:

http://www.astronomy.ohio-state.edu/~agnwatch/

The purpose of this website is to promote further use of AGN Watch data by providing at a single location all data and papers produced by the International AGN Watch. Light curves and spectra are available on this site, as well as information about previous and on-going AGN Watch projects and on policies concerning use of AGN Watch data. Abstracts of all AGN Watch papers are included, and copies of accepted but not yet published AGN Watch papers are also available to be downloaded.
Contact person: Bradley M. Peterson, Ohio State University
email: peterson@astronomy.ohio-state.edu

The Active Galaxies Newsletter is available on the World Wide Web. You can access it via the University of Manchester home page :- http://axp2.ast.man.ac.uk:8000/~ajh/agn/