Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
No. 39 — June 2000	Editor: Matt Redman (mpr@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.
Matt Redman

Abstracts of recently accepted papers

Warm absorbers in Narrow-line Seyfert 1 galaxies

Stefanie Komossa

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We present a study of the X-ray properties of several NLSy1 galaxies, focusing on their warm absorbers. In the first part, we discuss properties of dusty and dust-free warm absorbers in NLSy1s, and study their potential contribution to high-ionization optical iron lines. In the second part, we summarize our work on the exceptional spectral variability of the NLSy1 galaxy RX J0134.3−4258 (from $\Gamma \simeq -4.4$ in the ROSAT all-sky survey observation, to $\simeq -2.2$ in our subsequent pointed observation).

to appear in /em Observational and theoretical progress in the study of Narrow-line Seyfert 1 galaxies, New Astronomy, in press

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Preprint and related papers are available at http://www.xray.mpe.mpg.de/∼skomossa/

Mid-infrared diagnostics to distinguish AGNs from starbursts

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We present new mid-infrared (MIR) diagnostics to distinguish emission of active galactic nuclei (AGN) from that originating in starburst regions. Our method uses empirical spectroscopic criteria based on the fact that MIR emission from star forming or active galaxies arises mostly from HII regions, photo-dissociation regions (PDRs) and AGNs. The analysis of the strength of the 6.2 μm Unidentified Infrared Band (UIB) and the MIR continuum shows that UIBs are very faint or absent in regions harboring the intense and hard radiation fields of AGNs and pure HII regions, where the UIB carriers could be destroyed.

The MIR signature of AGNs is the presence of an important continuum in the 3-10 μm band which originates from very hot dust heated by the intense AGN radiation field. Using these two distinct spectral properties found in our MIR templates, we build diagnostic diagrams which provide quantitative estimates of the AGN, PDR and HII region contribution in a given MIR spectrum. This new MIR classification can be used to reveal the presence of AGNs highly obscured by large columns of dust.

Accepted by Astronomy & Astrophysics

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preprint available at http://arXiv.org/abs/astro-ph/0005376

Spatial resolution bias in the mid-infrared Starburst/AGN classification

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We present the effects of limited spatial resolution to the observed mid-infrared (MIR) spectrum of an active galactic nucleus (AGN) surrounded by a disk with massive star forming regions. Using MIR observations of the face-on nearby Seyfert 1 galaxy NGC 6814, we vary the observing aperture and examine the evolution of the observed AGN/starburst fraction with our MIR diagnostic. We show that the spatial resolution of ISOCAM is sufficient to disentangle AGN from starburst features in nuclear regions of nearby galaxies ($D < 50$ Mpc). However, with the exception of a few ultra-luminous galaxies, dilution effects hide completely the AGN contribution in more distant galaxies.

Proceedings of the XIXth Rencontres de Moriond, "Building the Galaxies: from the Primordial Universe to the Present", p. 79, 1999 eds F. Hammer, T.X.T. Thuan, V. Cayatte, B. Guiderdoni and J. Tran Than Van

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X-Ray and Optical Variability in NGC 4051 and the Nature of Narrow-Line Seyfert 1 Galaxies

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We report on the results of a three-year program of coordinated X-ray and optical monitoring of the narrow-line Seyfert 1 galaxy NGC 4051. The rapid continuum variations observed in the X-ray spectra are not detected in the optical, although the *time-averaged* X-ray and optical continuum fluxes are well-correlated. Variations in the flux of the broad Hβ line are found to lag behind the optical continuum variations by 6 days (with an uncertainty of 2–3 days), and combining this with the line width yields a virial mass estimate of $\sim 1.1 \times 10^6\, M_\odot$, at the very low end of the distribution of AGN masses measured by line reverberation. Strong variability of He II λ4686 is also detected, and the response time measured is similar to that of Hβ, but with a much larger uncertainty. The He II λ4686 line is almost five times broader than Hβ, and it is strongly blueward asymmetric, as are the high-ionization UV lines recorded in archival spectra of NGC 4051. The data are consistent with the Balmer lines arising in a low to moderate inclination disk-like configuration, and the high-ionization lines arising in an outflowing wind, of which we observe preferentially the near side. Previous observations of the narrow-line region morphology of this source suggest that the system is inclined by $\sim 50°$, and if this is applicable to the broad Hβ-emitting region, a central mass of $\sim 1.4 \times 10^6\, M_\odot$ can be inferred. During the third year of monitoring, both the X-ray continuum and the He II λ4686 line went into extremely low states, although the optical continuum and the Hβ broad line were both still present and variable. We suggest that the inner part of the accretion disk may have gone into an advection-dominated state, yielding little radiation from the hotter inner

disk.

Accepted by Ap. J.

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Clues to Quasar Broad Line Region Geometry and Kinematics

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We present evidence that the high-velocity C IV λ1549 emission line gas of radio-loud quasars may originate in a disk-like configuration, in close proximity to the accretion disk often assumed to emit the low-ionization lines. For a sample of 36 radio-loud $z \approx 2$ quasars we find the 20–30% peak width to show significant inverse correlations with the fractional radio core-flux density, R, the radio axis inclination indicator. Highly inclined systems have broader line wings, consistent with a high-velocity field perpendicular to the radio axis. By contrast, the narrow line-core shows no such relation with R, so the lowest velocity C IV-emitting gas has an inclination independent velocity field. We propose that this low-velocity gas is located at higher disk-altitudes than the high-velocity gas. A planar origin of the high-velocity C IV-emission is consistent with the current results and with an accretion disk-wind emitting the broad lines. A spherical distribution of randomly orbiting broad-line clouds and a polar high-ionization outflow are ruled out.

Accepted by Astroph. J. Letters

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preprint will soon become available on astro-ph.

X-ray emission from Seyfert 2 galaxies with optical polarized broad lines

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We analyze the $0.5 - 10$ keV spectra of six Seyfert 2 galaxies observed with the X-ray satellite ASCA: Mrk 3, Mrk 348, Mrk 1210, Mrk 477, NGC 7212, and Was 49b. These galaxies were selected based on their possession of optical polarized broad lines. In the $2 - 10$ keV band, their spectra are heavily absorbed, with $2 - 10$ keV absorption-corrected X-ray luminosities ranging from 10^{42} to 10^{43} ergs s^{-1}. The observed X-ray emission is generally only about one tenth that predicted based on their known infrared and Hβ luminosities. This apparent X-ray weakness can be understood if a considerable fraction of the nuclear activity is completely blocked from view by thick matter along our line of sight to the nucleus.

All of these galaxies possess significant soft X-ray emission whose origin appears to be scattered light from their nuclear emission. Based on this hypothesis, we estimate a typical scattering efficiency for X-rays to be about 10%. This efficiency is larger than the few % found for ordinary Seyfert 2 galaxies with no report of optical polarized broad lines. A large scattering efficiency is best explained by an apparent weakness of the hard X-ray luminosity rather than unusually strong scattered light in the soft band. When we estimate the scattering efficiency using the intrinsic luminosity derived assuming Compton scattering dominates the hard X-ray spectrum, as opposed to a purely absorbed nuclear continuum, the efficiency can be less and is similar to that of ordinary Seyfert 2 galaxies. Since the difference between our sample and ordinary Seyfert 2 galaxies can be explained by the difference of viewing angle, the similar scattering efficiency suggests the existence of a scattering region that is larger than the putative dusty torus.

Accepted by Astrophys. J.

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preprint available at astro-ph/0006054

ISOPHOT observations of 3CR quasars and radio galaxies

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In order to check for consistency with the radio-loud AGN unification scheme, ISOPHOT data obtained for two small sets of intermediate redshift steep-spectrum 3CR radio galaxies and quasars are being examined. Supplementary submillimeter and centimeter radio data for the quasars are also taken into account, in order to assess the magnitude of any beamed nonthermal radiation. The fact that we find broad-lined objects to be somewhat more luminous in their far-infrared output than narrow-lined objects, hints at a contradiction to the unification scheme. However, as the sample objects are not particularly well matched, the sample size is small, and the FIR radiation may still be partly anisotropic, this evidence is, at the moment, weak.

Accepted by Astronomy & Astrophysics

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Preprint available at http://www.astro.rug.nl/Preprints/preprints_2000.html#303

Iron K line Variability in the Low-Luminosity Active Galactic Nucleus NGC 4579

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We present results of new *ASCA* observations of the low-luminosity AGN (LLAGN) NGC 4579 obtained on 1998 December 18 and 28, and we report on detection of variability of an iron K emission line. The X-ray luminosities in the 2–10 keV band for the two observations are nearly identical ($L_X \approx 2\times10^{41}$ ergs s^{-1}), but they are $\sim$35% larger than that measured in 1995 July by Terashima et al. An Fe K emission line is detected at 6.39 ± 0.09 keV (source rest frame) which is lower than the line energy $6.73^{+0.13}_{-0.12}$ keV in the 1995 observation. If we fit the Fe lines with a blend of two Gaussians centered at 6.39 keV and 6.73 keV, the intensity of the 6.7 keV line decreases, while the intensity of the 6.4 keV line increases, within an interval of 3.5 yr. This variability rules out thermal plasmas in the host galaxy as the origin of the ionized Fe line in this LLAGN. The detection and variability of the 6.4 keV line indicates that cold matter subtends a large solid angle viewed from the nucleus and that it is located within $\sim$ 1 pc from the nucleus. It could be identified with an optically thick standard accretion disk. If this is the case, a standard accretion disk is present at the Eddington ratio of $L_{\rm Bol}/L_{\rm Eddington} \sim 2\times10^{-3}$. A broad disk-line profile is not clearly seen and the structure of the innermost part of accretion disk remains unclear.

To appear in ApJ Letters

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A New Narrow-Line Seyfert 1 galaxy : RX J1236.9+2656

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We report identification of a narrow-line Seyfert 1 galaxy RX J1236.9+2656. X-ray emission from the NLS1 galaxy undergoes long-term variability with 0.1–2.0 keV flux changing by a factor of $\sim$ 2 within $\sim$ 3 yr. The *ROSAT* PSPC spectrum of RX J1236.9+2656 is well represented by a power-law of $\Gamma_X = 3.7^{+0.5}_{-0.3}$ absorbed by matter in our own Galaxy ($N_H = 1.33\times10^{20}$ cm^{-2}). Intrinsic soft X-ray luminosity of the NLS1 galaxy is estimated to be $\sim 1.5\times10^{43}$ erg s^{-1} in the energy band of $0.1-2.0$ keV. The optical spectrum of RX J1236.9+2656 is typical of NLS1 galaxies and shows narrow Balmer emission lines (1100 km s^{-1} < FWHM < 1700 km s^{-1}) of Hβ, Hα, and forbidden lines of [O III] and [N II]. Fe II multiplets, usually present in optical spectra of NLS1 galaxies, are also detected in RX J1236.9+2656.

Accepted by Astronomy & Astrophysics as a research note

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Active Nucleus in a Poststarburst Galaxy : KUG 1259+280

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We report the discovery of an active nucleus in a poststarburst galaxy, KUG 1259+280, based on its X-ray and optical characteristics. The X-ray source in KUG 1259+280 was detected during a search for ultra-soft sources in the ROSAT pointings. High resolution X-ray imaging observations with *ROSAT* HRI show that X-ray emission from KUG 1259+280 is unresolved. X-ray emission from KUG 1259+280 is highly variable, an episode in which X-ray intensity changed by a factor ~ 2.5 within ~ 1300 s has been detected. *ROSAT* PSPC spectra of this galaxy is found to be well represented by a steep power-law of photon index, $\Gamma_X \sim 4.25$, and a change in the absorbing column within ~ 1 d is indicated. The rest frame intrinsic X-ray luminosity of KUG 1259+280 is found to be $\sim 3.6 - 4.7 \times 10^{42}$ erg s^{-1} similar to that of low luminosity Seyfert galaxies. Mass of the central massive object within KUG 1259+280 is estimated to be in the range $10^5 - 10^7 M_\odot$. Optical spectrum of the nuclear region of the galaxy is complex and shows Balmer absorption and collisionally excited lines of [O III], and [N II]. The presence of forbidden emission lines and the absence of Balmer emission lines in spectrum of KUG 1259+280 could be due to photoionization by a diluted power-law continuum modified by enhanced stellar absorption due to a poststarburst event. Estimated Balmer line strengths free of stellar absorptions and forbidden line strengths indicate the nucleus of KUG 1259+280 to be LINER-like in nature. However, the low-ionization forbidden line [O I]λ6300 usually present in LINER spectra, is not detected in the spectrum of KUG 1259+280. X-ray characteristics – variability, point-like appearance, luminosity and steepness of spectrum indicate that nucleus in KUG 1259+280 is active and perhaps like that of narrow-line Seyfert type 1 galaxies.

Accepted by MNRAS

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Meetings

Emission Lines from Jet Flows - First announcement

Isla Mujeres, Cancún, Mexico
November 13-17, 2000
Hosted by the Instituto de Astronomia, Universidad Nacional Autonoma de Mexico

You are invited to preregister now for this event by using our online registration program on our WEBSITE at http://www.astroscu.unam.mx/jet2000/

Further announcements will be sent to all those who preregister. Report any problem when registering to the registration manager at jet2000@astroscu.unam.mx

The second announcement, detailing registration fee, hotel reservations, etc, will be sent before the end of June All the information contained in this email, and future emails, will be available at our website above.

SCIENTIFIC GOALS AND TOPICS

This meeting is meant to bring together researchers in the fields of emission line jets from stars and from galaxies. These two fields have many common challenges and problems, and we feel that it would be interesting to have an opportunity for a mutual exchange of ideas. The conference will have approximately 12 review talks, and a number of shorter talks on related subjects. In particular, the subjects of HH objects, molecular outflows, jets in photoionized regions, jets from Seyfert galaxies and jets from other active galaxies (at low and at high z) will be covered. Particular emphasis will be given to discussions of the excitation mechanisms (shocks, turbulence and photoionization) of the emission line spectra of the jets.

1.Observation of emission lines in/around

Jets in AGN: in nuclear regions of Seyferts; in large scale gas around radio galaxies – at low redshift, at high redshift $z > 2$

Stellar Jets: photoionized jets – in PN, in HII regions; YSO jets – Herbig-Haro jets, H2 jets, molecular outflows; jets in interacting binaries; jets from compact stellar objects.

2.Modelling of the emission lines

Excitation of the lines; shocks; turbulence; photoionization; dynamics and line profiles; working surfaces; MHD jets; entrainment

PRELIMINARY LIST OF INVITED SPEAKERS

AGN: Will van Breugel, Clive Tadhunter, Montse Vilar-Martín, Huub Röttgering, Mike Dopita, Philip Best, Pierre Ferruit

STELLAR: Sylvie Cabrit, John Bally, Bo Reipurth, John Dyson, Chema Torrelles, Alberto Noriega-Crespo, José Alberto López

SCIENTIFIC ORGANIZING COMMITTEE

Stellar: Karl-Hein Böhm, Jorge Cantó, John Dyson, Luis Felipe Rodriguéz, Bo Reipurth, John Raymond, Alex Raga (chair)

AGN: Pierre Ferruit, Huub Röttgering, Clive Tadhunter, Montse Villar-Martín, Andrew Wilson, Wil van Breugel, Luc Binette (chair)

LOCAL ORGANIZING COMMITTEE

Pablo Velázquez, Ricardo González, Dulce González, Diethild Starkmeth, Elizabeth Themsel, Oswaldo Toledano, Lucero Uscanga, Alex Raga, Luc Binette

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