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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

Emission Line Properties of the Large Bright Quasar Survey

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We present measurements of the optical/UV emission lines for a large homogeneous sample of 993 quasars from the Large Bright Quasar Survey. Our largely automated technique accounts for continuum breaks and galactic reddening, and we perform multicomponent fits to emission line profiles, including the effects of blended iron emission, and of absorption lines both galactic and intrinsic. Here we describe the fitting algorithm and present the results of line fits to the LBQS sample, including upper limits to line equivalent widths when warranted. The distribution of measured line parameters, principally equivalent width and FWHM, are detailed for a variety of lines, including upper limits. We thus initiate a large-scale investigation of correlations between the high energy continuum and emission lines in quasars, to be extended to complementary samples using similar techniques. High quality, reproducible measurements of emission lines for uniformly selected samples will advance our understanding of active galaxies, especially in a new era of large surveys selected by a variety of complementary methods.

Accepted by The Astrophysical Journal

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preprint available at http://xxx.lanl.gov/abs/astro-ph/0011373

Testing the Unified Model with an Infrared Selected Sample of Seyfert Galaxies

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We present a series of statistical tests done to a sample of 29 Seyfert 1 and 59 Seyfert 2 galaxies selected from mostly isotropic properties, their far infrared fluxes and warm infrared colors. Such selection criteria provide a profound advantage over the criteria used by most investigators in the past, such as ultraviolet excess. These tests were done using ground based high resolution VLA A-configuration 3.6 cm radio and optical B and I imaging data. From the relative number of Seyfert 1's and Seyfert 2's we calculate that the torus half opening angle is 48°. We show that, as seen in previous papers, there is a lack of edge-on Seyfert 1 galaxies, suggesting dust and gas along the host galaxy disk probably play an important role in hiding some nuclei from direct view. We find that there is no statistically significant difference in the distribution of host galaxy morphological types and radio luminosities of Seyfert 1's and Seyfert 2's, suggesting that previous results showing the opposite may have been due to selection effects. The average extension of the radio emission of Seyfert 1's is smaller than that of Seyfert 2's by a factor of $\sim 2-3$, as predicted by the Unified Model. A search for galaxies around our Seyferts allows us to put a lower and an upper limit on the possible number of companions around these galaxies of 19% and 28%, respectively, with no significant difference in the number of companion galaxies between Seyfert 1's and Seyfert 2's. We also show that there is no preference for the radio jets to be aligned closer to the host galaxy disk axis in late type Seyferts, unlike results claimed by previous papers. These results, taken together, provide strong support for a Unified Model in which type 2 Seyferts contain a torus seen more edge-on than the torus in type 1 Seyferts.

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preprint available at astro-ph/0103263

The new sample of Giant radio sources: I. Radio imaging, optical identification and spectroscopy of selected candidates

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A new sample of very large angular size radio sources has been selected from the 1.4 GHz VLA surveys: FIRST and NVSS. This sample will be very useful for an observational constraint on the time evolution of double radio sources, especially their size, predicted by numerous analytical models of such evolution (cf. Introduction). In this paper we present radio and optical data for a large fraction of the sample sources. They are: high-frequency VLA maps with very weak radio cores detected, deep optical images showing the identified faint host galaxies not visible on the DSS images, and optical spectra of the identified galaxies brighter than about R$\sim$18.5 mag taken with the McDonald Observatory 2.1m telescope. For 15 galaxies (of which 4 do not belong to the complete sample) the redshift has been determined. In the result, 44 per cent of galaxies in the complete sample have redshift data (with one exception all redshifts are less than 0.33), of which 70 per cent have a linear size exceeding 1 Mpc. The photometric redshift estimates for other 11 galaxies with 19 mag$<$R$<$21.7 mag (0.3$<$z$<$0.5) predict their sizes much over 1 Mpc.

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E-mail contact: jamrozy@oa.uj.edu.pl,
astro-ph 0103155

A spectroscopic and photometric study of short-timescale variability in NGC 5548

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Results of a ground-based optical monitoring campaign on NGC 5548 in June 1998 are presented. The broad-band fluxes (U,B,V), and the spectrophotometric optical continuum flux $F_\lambda(5100\,\text{Å})$ monotonically decreased in flux while the broad-band R and I fluxes and the integrated emission-line fluxes of Hα and Hβ remained constant to within 5% . On June 22, a short continuum flare was detected in the broad band fluxes. It had an amplitude of about ~18% and it lasted only ≈90 min. The broad band fluxes and the optical continuum $F_\lambda(5100\,\text{Å})$ appear to vary simultaneously with the EUV variations. No reliable delay was detected for the broad optical emission lines in response to the EUVE variations. Narrow Hβ emission features predicted as a signature of an accretion disk were not detected during this campaign. However, there is marginal evidence for a faint feature at $\lambda \simeq 4962$ Å with FWHM≃6Å redshifted by Δv≃1100 km s^{-1} with respect to Hβ_{narrow}.

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Size-Mass-luminosity relations in AGN and the role of the accretion disc

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We address the question of the relations between the black hole's mass, the accretion rate, the bolometric luminosity, the optical luminosity and the size of the Broad Line Region (BLR) in Active Galactic Nuclei, using recent observational data obtained from monitoring campaigns. We show that a standard accretion disc cannot account for the observed optical luminosity, unless it radiates at super-Eddington rates. This implies the existence of another, dominant emission mechanism in the optical range, or a non standard disc (non stationary, ADAF and/or strong outflows). Narrow Line Seyfert 1 galaxies (NLS1s) are most extreme in this context: they have larger bolometric to Eddington luminosity ratios than Broad Line Seyfert 1 (BLS1s), and most likely a larger "non disc" component in the optical range. From realistic simulations of self-gravitating α-discs, we have systematically localized the gravitationally unstable disc and shown that, given uncertainties on both the model and observations, it coincides quite well with the size of the BLR. We therefore suggest that the gravitationally unstable disc is the source which releases BLR clouds in the medium. However the influence of the ionization parameter is also required to explain the correlation found between the size of the BLR and the luminosity. In this picture the size of the BLR in NLS1s (relative to the black hole size) is larger (and the emission line width smaller) than in BLS1s simply because their Eddington ratio is larger.

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preprint astro-ph/0103303

Codes for optically thick and hot photoionized media - Radiative transfer and new developments

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We describe a code designed for hot media (T $\geq$ a few 10^4 K), optically thick to Compton scattering. It computes the structure of a plane-parallel slab of gas in thermal and ionization equilibrium, illuminated on one side or on both sides by a given spectrum. This code has been presented in a previous paper (Dumont, Abrassart & Collin 2000), where several aspects were already discussed. So we focus here mainly on the recent developments. Presently the code solves the transfer of the continuum with the Accelerated Lambda Iteration method (ALI) and that of the lines in a two stream Eddington approximation, without using the local escape probability formalism to approximate the line transfer. This transfer code is coupled with a Monte Carlo code which allows to take into account direct and inverse Compton diffusions, and to compute the spectrum emitted up to

MeV energies, in any geometry. The influence of a few physical parameters is shown, and the importance of the density and pressure distribution (constant density, pressure equilibrium, or hydrostatic equilibrium) is stressed. Recent improvements in the treatment of the atomic data are described, and foreseen developments are mentioned.

to appear in the proceedings of the meeting "The Challenge of High Resolution X-Ray through IR Spectroscopy of Photoionized Plasmas" held in Lexington, 15-17 November 2000, ASP Conf. Series, Ed. G. Ferland, preprint astro-ph/0103317

An Empirical Ultraviolet Template for Iron Emission in Quasars as Derived from I Zw 1

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We present an empirical template spectrum suitable for fitting and subtracting/studying the Fe II and Fe III line emission in the restframe UV spectra of quasars and active galatic nuclei (AGNs), the first empirical UV iron template to cover the full range of $\lambda1250-3090$Å. Iron emission is often a severe contaminant in optical–UV spectra of AGNs, limiting the accuracy of measurements of both strong and weak emission lines and the continuum emission. It thereby affects studies of line and continuum interrelations, the ionization structure, and elemental abundances in AGNs. The iron template presented here is based on *Hubble Space Telescope* spectra of the Narrow Line Seyfert 1 galaxy, I Zwicky 1. The intrinsic narrow lines ($\gtrsim$ 900 km s^{-1}) and the rich iron spectrum of I Zw 1 make the template particularly suitable for use with most AGN spectra.

The iron emission spectrum, the line identifications, and the measurements of absorption and emission lines are presented and compared with the work of Laor et al. The methods used to develop and apply the template are described. We illustrate the application of the derived Fe II and Fe III templates by fitting and subtracting iron emission from the spectra of four high redshift quasars and of the nearby quasar, 3C273, confirming their general applicability to active galaxies despite the somewhat unusual properties of I Zw 1. We briefly discuss the small discrepancies between the observed iron emission of these quasars and the ultraviolet template, and compare the template with previously published ones. We discuss the advantages and limitations of the UV Fe II and Fe III templates and of the template fitting method. We conclude that the templates work sufficiently well to be a valuable and important tool for eliminating and studying the iron emission in active galaxies, at least until accurate theoretical iron emission models are developed.

In I Zw 1 the narrow line width reveals that C III] is heavily blended with Si III] λ 1892, Al III $\lambda\lambda$ 1854,1863, and Fe III transitions. This suggests that the C III] line strength and width may be overestimated in many quasar line studies where the lines are broader and deblending is not possible. This affects density estimates of the broad line region.
(Abridged)

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preprint available at http://www.astronomy.ohio-state.edu/~vester/preprints.html and soon also via astro-ph.

A Chandra Observation of M51: Active Nucleus and Nuclear Outflows

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We present a Chandra ACIS-S observation of the nuclear region of the nearby spiral galaxy M51 (NGC 5194), which has a low-luminosity Seyfert 2 nucleus. The X-ray image shows the nucleus, southern extranuclear cloud, and northern loop, the morphology of the extended emission being very similar to those seen in radio continuum and optical emission line images. The X-ray spectrum of the nucleus is well represented by a model consisting of soft thermal plasma with $kT \approx 0.5$ keV, a very hard continuum, and an Fe Kα emission line at 6.45 keV with an equivalent width of > 2 keV. The very strong Fe line and the flat continuum indicate that the nucleus is obscured by a column density in excess of 10^{24} cm^{-}2 and the spectrum is dominated by reflected emission from cold matter near the nucleus. The X-ray spectra of the extranuclear clouds are well fitted by a thermal plasma model with $kT \approx 0.5$ keV. This spectral shape and morphology strongly suggest that the clouds are shock heated by the bi-polar outflow from the nucleus. The shock velocities of the extranuclear cloud and northern loop inferred from the temperatures of the X-ray gas are 690 kms-1 and 660 kms-1, respectively. By assuming a steady-state situation in which the emission of the extranuclear clouds is powered by the jets, the mechanical energy in the jets is found to be comparable to the bolometric luminosity of the nucleus.

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E-mail contact: terasima@astro.umd.edu, preprint available at astro-ph/0103287

Meetings

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Second Announcement
Elizabeth and Frederick White Workshop
AGN variability across the Electromagnetic Spectrum
25 - 29 June 2001 Sydney, Australia

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Variability has been an excellent probe of the physical conditions within the most energetic, inner regions of active galactic nuclei (AGN). Such variability is seen across the entire observable electromagnetic spectrum on time-scales from minutes to years and implies energetic processes on a magnitude seen nowhere else in the Universe.

The advances in instrumentation, including improved sensitivity and stability, have enabled better temporal sampling and accuracy of flux density measurements. This has resulted in the discovery of extremely short time scale variability over the entire EM spectrum. Such variability, if intrinsic to the source, suggests extremely small physical scales, that cannot be probed through direct imaging.

The interpretation of the short term fluctuations at radio frequencies is still under debate as intrinsic variability leads to unacceptable physical conditions such as excessive brightness temperatures and opacity problems. The evidence thus far suggests extrinsic mechanisms, such as interstellar scintillation, are dominant.

In this meeting we intend to bring together Australian and overseas participants to address current problems in understanding the astrophysics underlying the mechanisms responsible for the observed variability in AGN. We will focus on a multi-wavelength approach, since the massive energy release from AGN can be understood more fully only by observing its properties over the entire wavelength range available. In addition we intend to discuss future multi-wavelength observing strategies to improve coordination between observatories across the Earth, including the satellite observatories in space.

Key themes:

- review of observations at all wavelengths
- interaction between theory and observation
- fundamental mechanisms for intrinsic variability
- radio intra-day variability
- multiwavelength monitoring of AGN
- future observations and theory

Invited speakers include:

Mitch Begelman (University of Colorado)

Joss Bland-Hawthorn (AAO)

Denise Gabuzda (JIVE)

Tadashi Kifune (University of Tokyo)

Kenneth Kellermann (NRAO)

Jean-Pierre Macquart (University of Sydney)

Apostolos Mastichiadis (University of Athens)

Reshmi Mukherjee (Columbia University)

Elena Pian (Osservatorio Astronomico di Trieste)

Barnaby Rickett (University of California)

Marco Salvati (Arcetri Astrophysical Observatory)

Meg Urry (STScI)*

Stefan Wagner (Landessternwarte, Heidelberg)

Rachel Webster (University of Melbourne)

*to be confirmed

IMPORTANT DEADLINES:

Abstracts...............................2001 Mar 31

Registration...........................2001 Mar 31

Proceedings............................2001 Jul 31

The number of participants will be limited to approximately 80 people. The registration fee is AU$250 (AU$200 for students). The welcome reception, the morning and afternoon tea, lunch and a CD of the workshop proceedings will be provided. The cost of the workshop Harbour Cruise dinner is AU$60.

Please use the registration form provided at: http://www.atnf.csiro.au/cgi-bin/agnworkshop_register

Abstracts should be sent to agnworkshop@atnf.csiro.au.

For more information on the meeting please have a look at our web page: http://www.atnf.csiro.au/people/lkedzior/agn_workshop.html or send an e-mail to agnworkshop@atnf.csiro.au

Scientific Organizing Committee:

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David Jauncey (ATNF)

Lucyna Kedziora-Chudczer (AAO/ATNF)

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