Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
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Accepted Abstracts - Submitted Abstracts - Thesis Abstracts
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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

Quantifying the anisotropy in the infrared emission of powerful AGN

Sebastian F. Hönig[1], Christian Leipski[2], Robert Antonucci[1] and Martin Haas[3]

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We use restframe near- and mid-IR data of an isotropically selected sample of quasars and radio galaxies at $1.0 \leq z \leq 1.4$, which have been published previously, to study the wavelength-dependent anisotropy of the IR emission. For that we build average SEDs of the quasar subsample (= type 1 AGN) and radio galaxies (= type 2 AGN) from $\sim 1-17\,\mu$m and plot the ratio of both average samples. From 2 to 8 μm restframe wavelength the ratio gradually decreases from 20 to 2 with values around 3 in the 10 μm silicate feature. Longward of 12 μm the ratio decreases further and shows some high degree of isotropy at 15 μm (ratio ∼1.4). The results are consistent with upper limits derived from the X-ray/mid-IR correlation of local Seyfert galaxies. We find that the anisotropy in our high-luminosity radio-loud sample is smaller than in radio-quiet lower-luminosity AGN which may be interpreted in the framework of a receding torus model with luminosity-dependent obscuration properties. It is also shown that the relatively small degree of anisotropy is consistent with clumpy torus models.

Accepted by ApJ

E-mail contact: shoenig@physics.ucsb.edu,
preprint available at http://arxiv.org/abs/1105.0429

Flaring Patterns in Blazars

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Blazars radiate from relativistic jets launched by a supermassive black hole along our line of sight; the subclass of FSRQs exhibits broad emission lines, a telltale sign of a gas-rich environment and high accretion rate, contrary to the other subclass of the BL Lacertae objects. We show that this dichotomy of the sources in physical properties is enhanced in their flaring activity. The BL Lac flares yielded spectral evidence of being driven by further acceleration of highly relativistic electrons in the jet. Here we discuss spectral fits of multi-λ data concerning strong flares of the two flat spectrum radio quasars 3C 454.3 and 3C 279 recently detected in γ rays by the *AGILE* and *Fermi* satellites. We find that optimal spectral fits are provided by external Compton radiation enhanced by increasing production of thermal seed photons by growing accretion. We find such flares to trace patterns on the jet power - electron energy plane that diverge from those followed by flaring BL Lacs, and discuss why these occur.

Accepted by The Astrophysical Journal

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preprint available at http://arxiv.org/abs/1105.2887

On the Location of the γ-ray Outburst Emission in the BL Lacertae Object AO 0235+164 through Observations across the Electromagnetic Spectrum

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We present observations of a major outburst at centimeter, millimeter, optical, X-ray, and γ-ray wavelengths of the BL Lacertae object AO 0235+164. We analyze the timing of multi-waveband variations in the flux and linear polarization, as well as changes

in Very Long Baseline Array (VLBA) images at $\lambda = 7\,\mathrm{mm}$ with ~ 0.15 milliarcsecond resolution. The association of the events at different wavebands is confirmed at high statistical significance by probability arguments and Monte-Carlo simulations. A series of sharp peaks in optical linear polarization, as well as a pronounced maximum in the 7 mm polarization of a superluminal jet knot, indicate rapid fluctuations in the degree of ordering of the magnetic field. These results lead us to conclude that the outburst occurred in the jet both in the quasi-stationary "core" and in the superluminal knot, both parsecs downstream of the supermassive black hole. We interpret the outburst as a consequence of the propagation of a disturbance, elongated along the line of sight by light-travel time delays, that passes through a standing recollimation shock in the core and propagates down the jet to create the superluminal knot. The multi-wavelength light curves vary together on long time-scales (months/years), but the correspondence is poorer on shorter time-scales. This, as well as the variability of the polarization and the dual location of the outburst, agrees with the expectations of a multi-zone emission model in which turbulence plays a major role in modulating the synchrotron and inverse Compton fluxes.

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E-mail contact: iagudo@iaa.es
preprint available at http://arxiv.org/abs/1105.0549

Polarized Radio Sources: A Study of Luminosity, Redshift, and Infrared Colors

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The Dominion Radio Astrophysical Observatory Deep Field polarization study has been matched with the Spitzer Wide-Area Infrared Extragalactic Survey of the European Large Area Infrared Space Observatory Survey North 1 field. We have used Very Large Array observations with a total intensity rms of 87 μJy beam-1 to match SWIRE counterparts to the radio sources. Infrared color analysis of our radio sample shows that the majority of polarized sources are elliptical galaxies with an embedded active galactic nucleus. Using available redshift catalogs, we found 429 radio sources of which 69 are polarized with redshifts in the range of $0.04 < z < 3.2$. We find no correlation between redshift and percentage polarization for our sample. However, for polarized radio sources, we find a weak correlation between increasing percentage polarization and decreasing luminosity.

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preprint available at http://arxiv.org/abs/1103.4228

Interactions, star formation and extended nebulae in SDSS type 2 quasars at 0.3$\leq z \leq$0.6

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We present long-slit spectroscopy and imaging data obtained with FORS2 on the Very Large Telescope of 13 optically selected type 2 quasars at $z \sim$0.3-0.6 from the original sample of Zakamska et al. (2003). The sample is likely to be affected by different selection biases. We investigate the evidence for: a) mergers/interactions b) star formation activity in the neighborhood of the quasars and c) extended emission line regions and their nature. Evidence for mergers/interactions is found in 5/13 objects. This is a lower limit for our sample, given the shallowness of most of our continuum images. Although AGN photoionization cannot be totally discarded, line ratios consistent with stellar photoionization are found in general in companion galaxies/knots/nuclei near these same objects. On the contrary, the gas in the neighborhood of the quasar nucleus shows line ratios inconsistent with HII galaxies and typical of AGN photoionized nebulae. A natural scenario to explain the observations is that star formation is

ongoing in companion galaxies/knots/nuclei, possibly triggered by the interactions. These systems are, therefore, composite in their emission line properties showing a combination of AGN and star formation features.

Extended emission line regions (EELRs) have been found in 7/13 objects, although this fraction might be higher if a complete spatial coverage around the quasars was performed. The sizes vary between few and up to 64 kpc. In general, the EELRs apparently consist of an extended nebula associated with the quasar. In at least one case the EELR is associated with ionized tidal features.

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The Chandra Deep Field-South Survey: 4 Ms Source Catalogs

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We present source catalogs for the 4 Ms *Chandra* Deep Field-South (CDF-S), which is the deepest *Chandra* survey to date and covers an area of 464.5 sq. arcmin. We provide a main *Chandra* source catalog, which contains 740 X-ray sources that are detected with WAVDETECT at a false-positive probability threshold of 10^{-5} in at least one of three X-ray bands (0.5–8 keV, full band; 0.5–2 keV, soft band; and 2–8 keV, hard band) and also satisfy a binomial-probability source-selection criterion of $P < 0.004$ (i.e., the probability of sources not being real is less than 0.004); this approach is designed to maximize the number of reliable sources detected. A total of 300 main-catalog sources are new compared to the previous 2 Ms CDF-S main-catalog sources. We determine X-ray source positions using centroid and matched-filter techniques and obtain a median positional uncertainty of ≈ 0.42 arcsec. We also provide a supplementary catalog, which consists of 36 sources that are detected with WAVDETECT at a false-positive probability threshold of 10^{-5}, satisfy the condition of $0.004 < P < 0.1$, and have an optical counterpart with $R < 24$. Multiwavelength identifications, basic optical/infrared/radio photometry, and spectroscopic/photometric redshifts are provided for the X-ray sources in the main and supplementary catalogs. 716 ($\approx$ 97%) of the 740 main-catalog sources have multiwavelength counterparts, with 673 ($\approx$ 94% of 716) having either spectroscopic or photometric redshifts. The 740 main-catalog sources span broad ranges of full-band flux and 0.5–8 keV luminosity; the 300 new main-catalog sources span similar ranges although they tend to be systematically lower. Basic analyses of the X-ray and multiwavelength properties of the sources indicate that $> 75\%$ of the main-catalog sources are AGNs; of the 300 new main-catalog sources, about 35% are likely normal and starburst galaxies, reflecting the rise of normal and starburst galaxies at the very faint flux levels uniquely accessible to the 4 Ms CDF-S. Near the center of the 4 Ms CDF-S (i.e., within an off-axis angle of 3 arcmin), the observed AGN and galaxy source densities have reached 9800^{+1300}_{-1100} deg^{-2} and 6900^{+1100}_{-900} deg^{-2}, respectively. Simulations show that our main catalog is highly reliable and is reasonably complete. The mean backgrounds (corrected for vignetting and exposure-time variations) are 0.063 and 0.178 count Ms^{-1} pixel^{-1} (for a pixel size of 0.492 arcsec) for the soft and hard bands, respectively; the majority of the pixels have zero background counts. The 4 Ms CDF-S reaches on-axis flux limits of $\approx 3.2 \times 10^{-17}$, 9.1×10^{-18}, and 5.5×10^{-17} erg cm^{-2} s^{-1} for the full, soft, and hard bands, respectively. An increase in the CDF-S exposure time by a factor of $\approx$ 2–2.5 would provide further significant gains and probe key unexplored discovery space.

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E-mail contact: xuey@astro.psu.edu,
preprint available at http://arxiv.org/abs/1105.5643;
data and images available at http://www.astro.psu.edu/users/niel/cdfs/cdfs-chandra.html

Thesis Abstracts

Mid-infrared interferometry of AGN cores

Leonard Burtscher

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Ph.D dissertation directed by: Klaus Meisenheimer

Ph.D degree awarded: May 2011

Active Galactic Nuclei (AGNs) are among the most luminous objects in the universe and are classified into a number of types and subtypes. Unified models of AGNs explain some of this variety as a result of different viewing angles towards their cores instead of intrinsic differences: from some viewing angles, our line of sight would be blocked by a dusty torus. The spatial resolution necessary to resolve these warm dust structures at 10 micron is currently only provided by the Very Large Telescope Interferometer (VLTI) in Chile. First, extensive observations of the radio galaxy Centaurus A are examined that show an extended structure, which is probably connected to the Northern nuclear radio jet, at a distance of about 40 milli arcseconds (0.7 parsec) in front of the nucleus. Secondly, a study of the brightest so-called type 1 Seyfert galaxy, NGC 4151, reveals for the first time a resolved nuclear emitter in such a source. Its properties (size, temperature profile, emissivity) are similar to those of the alternative type 2 galaxies, studied previously. This is consistent with, though not necessarily confirmation of, unified models. Since the previous studies of type 2 source and modern torus models show a wide variety of nuclear dust structures, finally, the so-far most comprehensive study of resolved nuclear dust emission of AGNs is set up to study 13 AGNs of various luminosities L and distances reaching several hundred Mega Parsec. The first full analysis of this study shows in all but one galaxy that tori can be resolved and that their size on parsec scales is not simply proportional to $L^{0.5}$.

Meetings

AGN WInds in Charleston

Charleston, SC USA
October 15-18, 2011

Webpage: `http://chartasg.people.cofc.edu/winds4/winds/`
Email: `chartasg@cofc.edu`

We invite you to participate in the fourth AGN Winds meeting titled "AGN Winds in Charleston". This workshop is dedicated to the physical characteristics of AGN accretion disk winds - their structure, ionization state, kinematics, energetics, driving mechanism and their interaction with their environment. Graduate students are encouraged to attend this meeting. The AGN winds meeting will cover the following topics: (1) Observations of AGN outflows in absorption and emission (IR through X-ray), (2) Imaging observations of outflows, (3) The placement of AGN accretion disk winds in the context of evolution and unified/orientation models, (4) Simulations of AGN winds and (5) Feedback from AGN winds. We look forward to your ideas and participation.

SOC: George Chartas (chair), Karen Leighly, Fred Hamann, Mike Eracleous, Agata Rozanska, James Reeves, Francesco Tombesi, Mike Crenshaw, Tahir Yaqoob

LOC: George Chartas, Chris Fragile, Laura Penny, Kat Low, Alfair Meredith

Beijing International Summer School: The Physics and Evolution of AGNs

Beijing, China
September 3 - 9, 2011

Webpage: `http://indico.ihep.ac.cn/conferenceDisplay.py?confId=1870`
Email: `jiasm@ihep.ac.cn`

Rapid and exciting progress has been made in the last decade in our understanding of the physics and evolution of active galactic nuclei (AGNs), and the new concept of coevolution of supermassive black holes and galaxies has emerged.

The Beijing International Summer School on "The Physics and Evolution of AGNs" will take place on September 3-9, 2011 and will bring together PhD students and young astronomers to the frontiers of this exciting field of research, covering the topics of formation and evolution of supermassive black holes, accretion process, AGN physics and galaxy formation and evolution. The lectures will be given by Mike Crenshaw, Cedric Lacey, Alessandro Marconi and Hagai Netzer, who will provide an extensive overview of the field starting from the physical basis of AGN and supermassive black holes and getting to the more recent and hotly debated topics of research.

The "target participants" of the School are PhD students and young researchers with some background in astronomy and astrophysics who intend to pursue a research career in extragalactic astronomy. There is no limit on the number of participants, but the school will provide local support for only 20 international PhD students. The School is sponsored by National Science Foundation of China, and hosted by The Institute of High Energy Physics, Chinese Academy of Science, Beijing.

Lecturers: Mike Crenshaw; Cedric Lacey; Alessandro Marconi; Hagai Netzer

LOC Chair: Prof. Wang, Jian-Min