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
Jobs Adverts - Meetings Adverts - Special Announcements

From the Editor

Welcome to all the new subscribers, and thanks to everyone who contributed to this issue of the Active Galaxies Newsletter. This newsletter is intended to disseminate paper abstracts, meeting announcements, job adverts and other information which may be of interest to the active galaxies community. It is produced monthly and, whilst the deadline for contributions is the last day of the month, contributions may be submitted at any time.

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. Please note that the editor may reject submissions which do not use the template. As always, any suggestions or feedback regarding the newsletter are welcome.

Thanks for your continued subscription.

Megan Argo

Abstracts of recently accepted papers

Broad-band spectral energy distribution of 3000 Å break quasars from the Sloan Digital Sky Survey

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The Sloan Digital Sky Survey (SDSS) discovered a few unusual quasars with a characteristic break in the continuum around 3000 Å that neither shows the typical structure of broad absorption line (BAL) troughs nor is explained by typical intrinsic dust reddening. We used the method of Kohonen self-organising maps for a systematic search for objects with such properties in the SDSS spectra archive. We constructed a sample of 23 quasars classified as 3000 Å break quasars and two comparison samples of quasars with similar properties, to some extent, but also showing typical BAL features. We computed ensemble-averaged broad-band SEDs based on archival data from SDSS, GALEX, 2MASS, UKIDSS, and WISE. The SEDs were corrected for intrinsic dust absorption by the comparison with the average SED of normal quasars. The de-reddened arithmetic median composite SED of the 3000 Å break quasars is found to be indistinguishable from that of the unusual BAL quasars. We conclude that 3000 Å break quasars are most likely extreme versions of BAL quasars. Assuming that the intrinsic SED of the continuum source is represented by the quasar composite SED, the 3000 Å break quasars tend to be intrinsically more luminous than ordinary quasars.

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Preprint available at http://arxiv.org/abs/1601.00544

The gamma-ray emitting radio-loud narrow-line Seyfert 1 galaxy PKS 2004−447 - I. The X-ray View

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As part of the TANAMI multiwavelength progam, we discuss new X-ray observations of the γ-ray and radio-loud narrow line Seyfert 1 galaxy (γ-NLS1) PKS 2004−447. The active galaxy is a member of a small sample of radio-loud NLS1s detected in γ-rays by the *Fermi* Large Area Telescope. It stands out for being the radio-loudest and the only southern-hemisphere source in this sample. We present results from our X-ray monitoring program comprised of *Swift* snapshot observations from 2012 through 2014 and two new X-ray observations with *XMM-Newton* in 2012. Supplemented by archival data from 2004 and 2011, our data set allows for a careful analysis of the X-ray spectrum and variability of this peculiar source. The (0.5–10) keV spectrum is described well by a power law ($\Gamma \sim 1.6$), which can be interpreted as non-thermal emission from a relativistic jet. The source exhibits moderate flux variability on timescales of both months and years. Correlated brightness variations in the (0.5–2) keV and (2–10) keV bands are explained by a single variable spectral component, such as the one from the jet. A possible soft excess seen in the data from 2004 cannot be confirmed by the new *XMM-Newton* observations taken during low-flux states. Any contribution to the total flux in 2004 is less than 20% of the power-law component. The (0.5–10) keV luminosities of PKS 2004−447 are in the range of $(0.5–2.7)\times10^{44}\,\mathrm{erg\,s^{-1}}$. A comparison of the X-ray properties among the known γ-NLS1 galaxies shows that in four out of five cases the X-ray spectrum is dominated by a flat power law without intrinsic absorption. These objects are moderately variable in their brightness, while spectral variability is observed in at least two sources. The major difference across the X-ray spectra of γ-NLS1s is the luminosity, which spans a range of almost two orders of magnitude from $10^{44}\,\mathrm{erg\,s^{-1}}$ to $10^{46}\,\mathrm{erg\,s^{-1}}$ in the (0.5–10) keV band.

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Preprint available at: http://arxiv.org/abs/1509.03735

The nuclear dust lane of Circinus: collimation without a torus

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In some AGN, nuclear dust lanes connected to kpc-scale dust structures provide all the extinction required to obscure the nucleus, challenging the role of the dusty torus proposed by the Unified Model. In this letter we show the pc-scale dust and ionized gas maps of Circinus constructed using sub-arcsec-accuracy registration of infrared VLT AO images with optical *Hubble Space Telescope* images. We find that the collimation of the ionized gas does not require a torus but is caused by the distribution of dust lanes of the host galaxy on ∼10 pc scales. This finding questions the presumed torus morphology and its role at parsec scales, as one of its main attributes is to collimate the nuclear radiation, and is in line with interferometric observations which show that most of the pc-scale dust is in the polar direction. We estimate that the nuclear dust lane in Circinus provides 1/3 of the extinction required to obscure the nucleus. This constitutes a conservative lower limit to the obscuration at the central parsecs, where the dust filaments might get optically thicker if they are the channels that transport material from ∼100 pc scales to the centre.

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Unravelling the complex structure of AGN-driven outflows: I. Kinematics and sizes

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Outflows driven by active galactic nuclei (AGNs) are often invoked as agents of the long-sought AGN feedback. Yet, characterizing and quantifying the impact on their host galaxies has been challenging. We present Gemini Multi-Object Spectrograph integral field unit data of 6 local (z< 0.1) and luminous ($L_{[OIII]} > 10^{42}$ erg s^{-1}) Type 2 AGNs. In the first of a series of papers, we investigate the kinematics and constrain the size of the outflows. The ionized gas kinematics can be described as a superposition of a gravitational component that follows the stellar motion and an outflow-driven component that shows large velocity (up to 600 km s^{-1}) and large velocity dispersion (up to 800 km s^{-1}). Using the spatially resolved measurements of the gas, we kinematically measure the size of the outflow, which is found to be between 1.3 and 2.1 kpc. Due to the lack of a detailed kinematic analysis, previous outflow studies likely overestimate their size by up to more than a factor of 2, depending on how the size is estimated and whether the [OIII] or Hα emission line is used. The relatively small size of the outflows for all 6 of our objects casts doubts on their potency as a mechanism for negative AGN feedback.

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ZFOURGE catalogue of AGN candidates: an enhancement of 160μm-derived star-formation rates in active galaxies to $z = 3.2$

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We investigate active galactic nuclei (AGN) candidates within the FourStar Galaxy Evolution Survey (ZFOURGE) to determine the impact they have on star-formation in their host galaxies. We first identify a population of radio, X-ray, and infrared-selected AGN by cross-matching the deep K_s-band imaging of ZFOURGE with overlapping multi-wavelength data. From this, we construct a mass-complete ($\log(M_*/M_\odot) \geq 9.75$), AGN luminosity limited sample of 235 AGN hosts over $z = 0.2 - 3.2$. We compare the rest-frame $U - V$ versus $V - J$ (UVJ) colours and specific star-formation rates (sSFRs) of the AGN hosts to a mass-matched control sample of inactive (non-AGN) galaxies. UVJ diagnostics reveal AGN tend to be hosted in a lower fraction of quiescent galaxies and a higher fraction of dusty galaxies than the control sample. Using 160μm *Herschel* PACS data, we find the mean specific star-formation rate of AGN hosts to be elevated by 0.34 ± 0.07 dex with respect to the control sample across all redshifts. This offset is primarily driven by infrared-selected AGN, where the mean sSFR is found to be elevated by as much as a factor of $\sim$5. The remaining population, comprised predominantly of X-ray AGN hosts, is found mostly consistent with inactive galaxies, exhibiting only a marginal elevation. We discuss scenarios that may explain these findings and postulate that AGN are less likely to be a dominant mechanism for moderating galaxy growth via quenching than has previously been suggested.

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Multi-Epoch Observations of Extremely High-Velocity Emergent Broad Absorption

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We present the discovery of the highest velocity C IV broad absorption line to date in the z=2.47 quasar SDSS J023011.28+005913.6, hereafter J0230. In comparing the public DR7 and DR9 spectra of J0230, we discovered an emerging broad absorption trough outflowing at ∼60,000 km s^{-1}, which we refer to as trough A. In pursuing follow up observations of trough A, we discovered a second emergent C IV broad absorption trough outflowing at ∼40,000 km s^{-1}, namely trough B. In total, we collected seven spectral epochs of J0230 that demonstrate emergent and rapidly (∼10 days in the rest-frame) varying broad absorption. We investigate two possible scenarios that could cause these rapid changes: bulk motion and ionization variability. Given our multi-epoch data, we were able to rule out some simple models of bulk motion, but have proposed two more realistic models to explain the variability of both troughs. Trough A is likely an augmented 'crossing disk' scenario with the absorber moving at $10,000 < v$ (km s^{-1}) $< 18,000$. Trough B can be explained by a flow-tube feature travelling across the emitting region at $8,000 < v$ (km s^{-1}) $< 56,000$. If ionization variability is the cause for the changes observed, trough A's absorber has $n_e \geq 724$ cm^{-3} and is at $r_{equal} \geq 2.00$ kpc, or is at $r < 2.00$ kpc with no constraint on the density; trough B's absorber either has $n_e \geq 1540$ cm^{-3} and is at $r_{equal} \geq 1.37$ kpc, or is at $r < 1.37$ kpc with no constraint on the density.

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NuSTAR unveils a low-luminosity heavily obscured AGN in the LIRG NGC 6286

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We report the detection of a heavily obscured Active Galactic Nucleus (AGN) in the luminous infrared galaxy (LIRG) NGC 6286, identified in a 17.5 ks *NuSTAR* observation. The source is in an early merging stage, and was targeted as part of our ongoing *NuSTAR* campaign observing local luminous and ultra-luminous infrared galaxies in different merger stages. NGC 6286 is clearly detected above 10 keV and, by including the quasi-simultaneous *Swift*/XRT and archival *XMM-Newton* and *Chandra* data, we find that the source is heavily obscured [$N_{\rm H} \simeq (0.95-1.32)\times 10^{24}$ cm^{-2}], with a column density consistent with being Compton-thick [CT, $\log(N_{\rm H}/{\rm cm}^{-2}) \geq 24$]. The AGN in NGC 6286 has a low absorption-corrected luminosity ($L_{2-10\,\rm keV} \sim 3-20\times 10^{41}\,{\rm erg\,s^{-1}}$) and contributes $\lesssim$1% to the energetics of the system. Because of its low-luminosity, previous observations carried out in the soft X-ray band (<10 keV) and in the infrared did not notice the presence of a buried AGN. NGC 6286 has multi-wavelength characteristics typical of objects with the same infrared luminosity and in the same merger stage, which might imply that there is a significant population of obscured low-luminosity AGN in LIRGs that can only be detected by sensitive hard X-ray observations.

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RoboPol: Optical polarization-plane rotations and flaring activity in blazars

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We present measurements of rotations of the optical polarization of blazars during the second year of operation of RoboPol, a monitoring programme of an unbiased sample of gamma-ray bright blazars specially designed for effective detection of such events, and we analyse the large set of rotation events discovered in two years of observation. We investigate patterns of variability in the polarization parameters and total flux density during the rotation events and compare them to the behaviour in a non-rotating state. We have searched for possible correlations between average parameters of the polarization-plane rotations and average parameters of polarization, with the following results: (1) there is no statistical association of the rotations with contemporaneous optical flares; (2) the average fractional polarization during the rotations tends to be *lower* than that in a non-rotating state; (3) the average fractional polarization during rotations is correlated with the rotation rate of the polarization plane in the jet rest frame; (4) it is likely that distributions of amplitudes and durations of the rotations have physical upper bounds, so arbitrarily long rotations are not realised in nature.

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Preprint available at http://arxiv.org/abs/1601.03392

Local SDSS galaxies in the Herschel Stripe82 survey: A critical assessment of optically-derived star-formation rates

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We study a set of 3319 galaxies in the redshift interval $0.04 < z < 0.15$ with far-infrared (FIR) coverage from the Herschel Stripe 82 survey (HerS), and emission-line measurements, redshifts, stellar masses and star-formation rates (SFRs) from the SDSS (DR7) MPA/JHU database. About 40% of the sample are detected in the Herschel/SPIRE 250 μm band. Total infrared (TIR) luminosities derived from HerS and ALLWISE photometry allow us to compare infrared and optical estimates of SFR with unprecedented statistics for diverse classes of galaxies. We find excellent agreement between TIR-derived and emission line-based SFRs for H II galaxies. Other classes, such as active galaxies and evolved galaxies, exhibit systematic discrepancies between optical and TIR SFRs. We demonstrate that these offsets are attributable primarily to survey biases and the large intrinsic uncertainties of the D_n4000– and colour–based optical calibrations used to estimate the SDSS SFRs of these galaxies. Using a classification scheme which expands upon popular emission-line methods, we demonstrate that emission-line galaxies with uncertain classifications include a population of massive, dusty, metal-rich star-forming systems that are frequently neglected in existing studies. We also study the capabilities of infrared selection of star-forming galaxies. FIR selection reveals a substantial population of galaxies dominated by cold dust which are missed by the long-wavelength WISE bands. Our results demonstrate that Herschel large-area surveys offer the means to construct large, relatively complete samples of local star-forming galaxies with accurate estimates of SFR that can be used to study the interplay between nuclear activity and star-formation.

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ALMA resolves extended star formation in high-z AGN host galaxies

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We present high resolution ($0.3''$) Atacama Large Millimeter Array (ALMA) 870 μm imaging of five $z\approx1.5$–4.5 X-ray detected AGN (with luminosities of $L_{2-8\,\mathrm{keV}} > 10^{42}\,\mathrm{erg\,s^{-1}}$). These data provide a $\gtrsim20\times$ improvement in spatial resolution over single-dish rest-frame FIR measurements. The sub-millimetre emission is extended on scales of FWHM$\approx0.2''$–$0.5''$, corresponding to physical sizes of 1–3 kpc (median value of 1.8 kpc). These sizes are comparable to the majority of z=1–5 sub-millimetre galaxies (SMGs) with equivalent ALMA measurements. In combination with spectral energy distribution analyses, we attribute this rest-frame far-infrared (FIR) emission to dust heated by star formation. The implied star-formation rate surface densities are $\approx$20–200 $M_{\odot}\,\mathrm{yr^{-1}\,kpc^{-2}}$, which are consistent with SMGs of comparable FIR luminosities (i.e., $L_{\mathrm{IR}}\approx[1$–$5]\times10^{12}\,\mathrm{L_{\odot}}$). Although limited by a small sample of AGN, which all have high FIR luminosities, our study suggests that the kpc-scale spatial distribution and surface density of star formation in high-redshift star-forming galaxies is the same irrespective of the presence of X-ray detected AGN.

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COSPAR Event E1.7 on Radio Galaxies

Istanbul, Turkey
30 July - 7 August 2016

Webpage: `http://www.cospar-assembly.org/admin/sessioninfo.php?session=581`
Email: `beckmann@apc.in2p3.fr`

Radio Galaxies: Resolving the AGN Phenomenon

3 half day session (Event 1.7) at the 41st COSPAR Scientific Assembly 2016

Radio galaxies are providing us with excellent laboratories, where we can probe physical aspects, unification, and cosmic evolution of AGN. Thanks to recent space-based observations, we are now able to resolve the different components of radio galaxies, both in imaging and in spectroscopy. Observations from the radio to the X-ray range can probe the ejection of matter into the jet and monitor their evolution over decades. Gamma-ray observations have shown that radio galaxies are detectable up to the VHE range, although their jets are not pointing at us. At the same time, we observe them out to the early Universe up to redshifts larger than $z = 5$. Planck maps will provide us with new insights into the population of radio galaxies and their distribution in space in the 30-900 GHz range.

It is time to take a closer look again at these sources, to revise the physical picture of radio galaxies, and to answer questions like:

- What triggers highly relativistic jets - and how are they launched?
- How are the jets so well collimated very close to the central engine and how is it confined over a distance of, in some cases, several 100 kpc?
- How do radio galaxies emit VHE photons into the line of sight?
- Why is there no hot spot seen in some radio lobes?
- Are all radio galaxies obscured?
- Why are some AGN in the radiative mode while others are in the jet mode?
- What are the intrinsic differences between low-excitation and high-excitation radio galaxies and how do these relate to the FR-I/II classification?
- What is the high-redshift luminosity function of radio galaxies and how does it evolve to the present day Universe?
- How do radio galaxies interact with their environment?

Scientific Event Main Scientific Organizer (MSO): Volker Beckmann (APC Paris, France)
Scientific Event Deputy Organizer (DO): Claudio Ricci (Pontificia Universidad Catolica de Chile, Santiago)

Scientific Organizing Committee:
Loredana Bassani (IASF/INAF Bologna, Italy), Chris Done (Durham University, UK), Anne Lähteenmäki (Metsähovi Radio Observatory, Finland), Paolo Padovani (ESO, Germany), Tadayuki Takahashi (ISAS/JAXA, Japan), Yoshihiro Ueda (Kyoto University, Japan), Sylvain Veilleux (University of Maryland, USA)

Confirmed Solicited Speakers: Marco Chiaberge (STScI, USA), Andy Fabian (IoA Cambridge, UK), Martin Hardcastle (University of Hertfordshire, UK), Greg Madejski (SLAC, USA), Jonathan McKinney (University of Maryland, USA), Raffaella Morganti (ASTRON, The Netherlands)

Information, request for financial support, registration and abstract submission pages of the 41st COSPAR Scientific Assembly can be found at
http://www.cospar-assembly.org/
http://cospar2016.tubitak.gov.tr/

Abstract submission deadline: February 12

Shining from the heart of darkness: black hole accretion and jets

Kathmandu, Nepal
October 16-21, 2016

Webpage: http://events.iasfbo.inaf.it/nepal2016/index.php
Email: stefanie.komossa@gmx.de

Sixth in a series of astrophysical conferences held in Kathmandu (Nepal), this meeting will mainly focus on accretion physics and the mechanisms of jet launching and evolution in galactic and extragalactic black hole sources. Major observational and theoretical results on compact, accreting and jetted sources, especially galactic binaries, Seyfert galaxies, blazars and stellar tidal disruption events will be addressed, including multi-messenger physics, and gravitational waves in particular.

XMM-Newton: The Next Decade

ESAC, Madrid, Spain
09th - 11th May 2016

Webpage: http://xmmworkshop.esa.int
Email: xmmws2016@sciops.esa.int

The recent generation of high energy observatories has enabled unprecedented progress to be made in our understanding of astrophysics in the X-ray domain. Current technical evaluations suggest that the XMM-Newton spacecraft and its scientific instruments may continue to provide first class X-ray observations well into the next decade. Other X-ray missions are planned to be launched soon, including Astro-H and e-ROSITA. Coupled with new ground-based developments, this will open up new exciting opportunities for multi-wavelength and follow-up observations, to which XMM-Newton is ideally placed to play a major role.

This workshop will summarise the state of our current knowledge derived from X-ray astrophysics. We will discuss some of the major achievements over the past years, and identify a set of fundamental questions still to be addressed. Within this context a primary aim of the workshop will be to define the key scientific topics which will have the highest scientific importance and impact. We will seek to identify observing programs of maximum long-term value to the entire astronomical community. Many of these programs are likely to require large amounts of observing time on only a few carefully selected targets or sky areas. We strongly encourage innovative ideas for applications, and the formation of well organised major collaborations.

Invited Speakers: Monique Arnaud, Massimo Cappi, Anne Decourchelle, Jelle Kaastra, Ian McHardy, Etienne Pointecouteau, Nanda Rea, Thomas Reiprich, Juergen Schmitt, Beate Stelzer

Solicited Speakers: David Alexander, Alexey Boyarsky, William N. Brandt, Graziella Branduardi-Raymont, Joel Bregman, Eugene Churazov, Andrea Comastri, Jelle de Plaa, Tim de Zeeuw, Dominique Eckert, Andrew Fabian, Frank Haberl, Werner Hofmann, Stefanie Komossa, Xavier Luri, Roberto Maiolino, Matt Middleton, Raffaella Morganti, Kirpal Nandra, Fabrizio Nicastro, Takaya Ohashi, Marguerite Pierre, Peter Predehl, Gregor Rauw, Guido Risaliti, Belinda Wilkes

SOC: Martin Ward (chair), Monique Arnaud, Xavier Barcons, Hans Boehringer, Catherine Cesarsky, Anne Decourchelle, Chris Done, Ioannis Georgantopoulos, Brian McBreen, Richard Mushotzky, Nanda Rea, Marco Salvati, Craig Sarazin, Norbert Schartel (co-chair), Juergen Schmitt, Beate Stelzer

LOC: Jan-Uwe Ness (chair), Michelle Arpizou, Jacobo Ebrero, Matthias Ehle, Carlos Gabriel, Idoia Garca, Aitor Ibarra, Eleni Kalfountzou, Simone Migliari, Richard Saxton, Norbert Schartel, Ana Willis

Registration is possible until Thursday 14th April 2016 at
http://xmmworkshop.esa.int/#registration