Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
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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.

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.

Janine van Eymeren

Abstracts of recently accepted papers

A 3.5 mm Polarimetric Survey of Radio Loud AGN

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We present the results from the first large (>100 source) 3.5 mm polarimetric survey of radio loud active galactic nuclei (AGN). This wavelength is favorable within the radio–mm range for measuring the intrinsic linearly polarized emission from AGN, since in general it is only marginally affected by Faraday rotation of the electric vector position angle, and depolarization. The I, Q, U, and V Stokes parameter observations were performed with the XPOL polarimeter at the IRAM 30 m Telescope on different observing epochs from July 2005 (when most of the measurements were made) to October 2009. Our sample consists of 145 flat-radio-spectrum AGN with declination $>-30^\circ$ (J2000.0) and flux density ≥ 1 Jy at ~ 86 GHz, as measured at the IRAM 30 m Telescope from 1978 to 1994. This constraint on the radio spectrum causes our sample to be dominated by blazars, which allows us to conduct new statistical studies on this class of high-luminosity, relativistically-beamed emitters. We detect linear and circular polarization (above minimum 3σ levels of $\sim$1.5 %, and $\sim$0.3 %) for 76 %, and 6 % of the sample, respectively. We find a clear excess in degree of linear polarization detected at 86 GHz with regard to that at 15 GHz by a factor of ~ 2. Over our entire source sample, the luminosity of the jets is anti–correlated with the degree of linear polarization. Consistent with previous findings claiming larger Doppler factors for brighter γ-ray blazars, quasars listed in our sample, and in the *Fermi* Large Area Telescope Bright Source Catalog (LBAS), show larger luminosities than non–LBAS ones, but our data do not allow us to confirm the same for BL Lac objects. We do not find a clear relation between the linear polarization angle and the jet structural position angle for any source class in our sample. We interpret this as the consequence of a markedly non-axisymmetric character of the 3 mm emitting region in the jets. We find that intrinsic circular polarization is the most likely mechanism for generation

of the circular polarization detected in our observations. Our new data can be used to estimate the 3.5 mm AGN contribution to measurements of the linear polarization of the cosmic microwave background, such as those performed by the Planck satellite.

Accepted for Publication in The Astrophysical Journal Supplement Series

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The Evolution of $M_*/M_{\rm BH}$ Between z=2 and z=0

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We propose a novel method to estimate $M_*/M_{\rm BH}$, the ratio of stellar mass (M_*) to black hole mass ($M_{\rm BH}$) at various redshifts using two recent observational results: the correlation between the bolometric luminosity of active galactic nuclei (AGN) and the star formation rate (SFR) in their host galaxies, and the correlation between SFR and M_* in star-forming (SF) galaxies. Our analysis is based on $M_{\rm BH}$ and $L_{\rm bol}$ measurements in two large samples of type-I AGN at z≃1 and z≃2, and the measurements of $M_*/M_{\rm BH}$ in 0.05<z<0.2 red galaxies. We find that $M_*/M_{\rm BH}$ depends on $M_{\rm BH}$ at all redshifts. At z≃2, $M_*/M_{\rm BH}$∼280 and ∼40 for $M_{\rm BH}$=10^8 and $M_{\rm BH}$=$10^9 M_\odot$, respectively. $M_*/M_{\rm BH}$ grows by a factor of ∼4-8 from z≃2 to z=0 with extreme cases that are as large as 10–20. The evolution is steeper than reported in other studies, probably because we treat only AGN in SF hosts. We caution that estimates of $M_*/M_{\rm BH}$ evolution which ignore the dependence of this ratio on $M_{\rm BH}$ can lead to erroneous conclusions.

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Star formation in AGN hosts in GOODS-N

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Sensitive *Herschel* far-infrared observations can break degeneracies that were inherent to previous studies of star formation in high-z AGN hosts. Combining PACS 100 and 160μm observations of the GOODS-N field with 2Msec *Chandra* data, we detect ∼20% of X-ray AGN individually at $> 3\sigma$. The host far-infrared luminosity of AGN with $L_{2-10\rm keV} \approx 10^{43}\rm erg\,s^{-1}$ increases with redshift by an order of magnitude from z=0 to z∼1. In contrast, there is little dependence of far-infrared luminosity on AGN luminosity, for $L_{2-10\rm keV} <\sim 10^{44}\rm erg\,s^{-1}$ AGN at z>∼1. We do not find a dependence of far-infrared luminosity on X-ray obscuring column, for our sample which is dominated by $L_{2-10\rm keV} < 10^{44}\rm erg\,s^{-1}$ AGN. In conjunction with properties of local and luminous high-z AGN, we interpret these results as reflecting the interplay between two paths of AGN/host coevolution. A correlation of AGN luminosity and host star formation is traced locally over a wide range of luminosities and also extends

to luminous high z AGN. This correlation reflects an evolutionary connection, likely via merging. For lower AGN luminosities, star formation is similar to that in non-active massive galaxies and shows little dependence on AGN luminosity. The level of this secular, non-merger driven star formation increasingly dominates over the correlation at increasing redshift.

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preprint available at http://arxiv.org/abs/1005.2562

The Jet-Driven Outflow in SDSS J1517+3353: Implications for Double-Peaked Narrow-Line AGN

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We report on the study of an intriguing active galaxy that was selected as a potential multiple supermassive black hole merger in the early-type host SDSS J151709.20+335324.7 (z = 0.135) from a complete search for double-peaked [O III] lines from the SDSS spectroscopic quasi-stellar object (QSO) database. Ground-based SDSS imaging reveals two blue structures on either side of the photometric center of the host galaxy, separated from each other by about 5.7 kpc. From a combination of SDSS fiber and Keck/HIRES long-slit spectroscopy, it is demonstrated that, in addition to these two features, a third distinct structure surrounds the nucleus of the host galaxy. All three structures exhibit highly ionized line emission with line ratios characteristic of Seyfert II active galactic nuclei. The analysis of spatially resolved emission-line profiles from the HIRES spectrum reveal three distinct kinematic subcomponents, one at rest and the other two moving at 350 km/s and 500 km/s with respect to the systemic velocity of the host galaxy. A comparison of imaging and spectral data confirm a strong association between the kinematic components and the spatial knots, which implies a highly disturbed and complex active region in this object. A comparative analysis of the broadband positions, colors, kinematics, and spectral properties of the knots in this system lead to two plausible explanations: (1) a multiple active galactic nucleus (AGN) produced due to a massive dry merger, or (2) a very powerful radio jet-driven outflow. Subsequent VLA radio imaging reveals a clear jet aligned with the emission-line gas, confirming the latter explanation. We use the broadband radio measurements to examine the impact of the jet on the interstellar medium of the host galaxy, and find that the energy in the radio lobes can heat a significant fraction of the gas to the virial temperature. Finally, we discuss tests that may help future surveys distinguish between jet-driven kinematics and true black-hole binaries. J1517+3353 is a remarkable laboratory for AGN feedback and warrants deeper follow-up study.

In the Appendix, we present high-resolution radio imaging of a second AGN with double-peaked [O III] lines, SDSS J112939.78+605742.6, which shows a sub-arcsecond radio jet. If the double-peaked nature of the narrow lines in radio-loud AGNs are generally due to radio jet interactions, we suggest that extended radio structure should be expected in most of such systems.

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preprint available at arXiv:1005.0021

Magnetohydrodynamic Accretion Disk Winds as X-ray Absorbers in Active Galactic Nuclei

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We present the two-dimensional (2D) ionization structure of self-similar magnetohydrodynamic (MHD) winds off accretion disks around irradiated by a central X-ray point source. Based on earlier observational clues and theoretical arguments, we focus our attention on a subset of these winds, namely those with radial density dependence $n(r) \propto 1/r$ (r is the spherical radial coordinate). We employ the photoionization code `XSTAR` to compute the ionic abundances of a large number of ions of different elements and then compile their line-of-sight (LOS) absorption columns. We focus our attention on the distribution of the column density of the various ions as a function of the ionization parameter ξ (or equivalently r) and the angle θ. Particular attention is paid to the absorption measure distribution (AMD), namely their Hydrogen-equivalent column per logarithmic ξ interval, $dN_H/d\log\xi$, which provides a measure of the winds' radial density profiles. For the chosen density profile $n(r) \propto 1/r$

the AMD is found to be independent of ξ, in good agreement with its behavior inferred from the X-ray spectra of several active galactic nuclei (AGNs). For the specific wind structure and X-ray spectrum we also compute detailed absorption line profiles for a number of ions to obtain their LOS velocities, $v \sim 100-300$ km s^{-1} (at $\log \xi \sim 2-3$) for Fe XVII and $v \sim 1,000-4,000$ km s^{-1} (at $\log \xi \sim 4-5$) for Fe XXV, in good agreement with the observation. Our models describe the X-ray absorption properties of these winds with only *two parameters*, namely the mass-accretion rate $\dot{m}$ and LOS angle θ. The probability of obscuration of the X-ray ionizing source in these winds decreases with increasing $\dot{m}$ and increases steeply with the LOS inclination angle θ. As such, we concur with previous authors that these wind configurations, viewed globally, incorporate all the requisite properties of the parsec scale "torii" invoked in AGN unification schemes. We indicate that a combination of the AMD and absorption line profile observations can uniquely determine these model parameters and their bearing on AGN population demographics.

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preprint available at NASA/ADS

Variability and the X-ray/UV ratio of active galactic nuclei

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The observed relation between the X-ray radiation from active galactic Nnuclei, originating in the corona, and the optical/UV radiation from the disk is usually described by the anticorrelation between the UV to X-ray slope α_{ox} and the UV luminosity. Many factors can affect this relation, including: i) enhanced X-ray emission associated with the jets of radio-loud AGNs, ii) X-ray absorption associated with the UV broad absorption line (BAL) outflows, iii) other X-ray absorption not associated with BALs, iv) intrinsic X-ray weakness, v) UV and X-ray variability, and non-simultaneity of UV and X-ray observations. The separation of these effects provides information about the intrinsic $\alpha_{ox} - L_{UV}$ relation and its dispersion, constraining models of disk-corona coupling. We use simultaneous UV/X-ray observations to remove the influence of non-simultaneous measurements from the $\alpha_{ox} - L_{UV}$ relation. We extract simultaneous data from the second XMM-Newton serendipitous source catalogue (XMMSSC) and the XMM-Newton Optical Monitor Serendipitous UV Source Survey catalogue (XMMOMSUSS), and derive the single-epoch α_{ox} indices. We use ensemble structure functions to analyse multi-epoch data. We confirm the anticorrelation of α_{ox} with L_{UV}, and do not find any evidence of a dependence of α_{ox} on z. The dispersion in our simultaneous data ($\sigma \sim 0.12$) is not significantly smaller than in previous non-simultaneous studies, suggesting that "artificial α_{ox} variability" introduced by non-simultaneity is not the main cause of dispersion. "Intrinsic α_{ox} variability" , i.e., the true variability of the X-ray to optical ratio, is instead important, and accounts for $\sim 30\%$ of the total variance, or more. "Inter-source dispersion", due to intrinsic differences in the average α_{ox} values from source to source, is also important. The dispersion introduced by variability is mostly caused by the long timescale variations, which are expected to be driven by the optical variations.

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Meetings

10th EVN Symposium 2010: VLBI and the new generation of radio arrays

Manchester, UK
September 20th-24th, 2010

Webpage: http://www.jodrellbank.manchester.ac.uk/meetings/evn2010
Email: evnsymp2010@jb.man.ac.uk

SCIENTIFIC RATIONALE: Jodrell Bank Centre for Astrophysics and the University of Manchester, on behalf of the European VLBI Consortium, will host the 10th European VLBI Network Symposium from September 20th to 24th, 2010. The Symposium will be held at the University of Manchester, UK.

At this conference the latest scientific results and technical developments from VLBI and e-VLBI results will be reported. The timing of this meeting coincides with the development of, and first results from a number of new and upgraded radio facilities around the globe, such as e-MERLIN, LOFAR, EVLA, ALMA, and the SKA pathfinders ASKAP and MeerKAT. This meeting will incorporate some of the firs results from these new instruments, in addition to the unique scientific and technical contribution of VLBI in this new era of radio astronomy.

PLANNED SCIENCE SESSIONS will include: Life cycle of matter in stars and galaxies; AGN and cosmic star-formation; Extreme Astrophysics; Astrometry, Geodesy, space and planetary science; and Techniques & developments.

VENUE: The conference will be held in the University of Manchester's conference venue, the Weston Building, which is situated in city centre of Manchester. Manchester itself is a vibrant city with ample attractions and amenities for all visitors. Block bookings of rooms for the duration of the meeting at the conference venue itself. Further information regarding this conference as well as specific details regarding the venue and accommodation will available shortly on the conference website and in subsequent announcements. This meeting will also incorporate the EVN Users meeting and a trip to Jodrell Bank Observatory.

Jobs

PDRA position in Extragalactic Astrophysics

Jodrell Bank Centre for Astrophysics, The University of Manchester
Closing date : 30th June 2010
Reference : EPS/10215

The Jodrell Bank Centre for Astrophysics (JBCA) invites applications for a Research Associate. The position has been awarded as part of the STFC programme From Planck to Planets.

The successful candidate will be expected to work with the JBCA group (and their collaborators) who study the properties of faint radio sources, both in the nearby Universe and at high redshift. Much of the research will be carried out at radio wavelengths and will focus on the largest two approved e-MERLIN (`http://www.e-merlin.ac.uk`) legacy programmes, e-MERGE and LeMMINGs. A PhD is required, together with a strong background in extragalactic astrophysics, and expertise in data analysis, preferably in radio synthesis imaging. Applicants awaiting confirmation of their PhD award are welcome to apply, and may be appointed as a Research Assistant (Level 5).

This position is tenable for a fixed term up until 31st March 2012, with possible extension.

Information about JBCA and the research it undertakes are available at `http://www.jb.man.ac.uk/`

Further job particulars are available `here`.

Informal enquires should be made to Dr R. Beswick (Robert.Beswick [at] manchester.ac.uk), or Profs. I. Browne (ian.w.browne [at] manchester.ac.uk), S. Mao (Shude.Mao [at] manchester.ac.uk)

Closing date 30th June 2010