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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.

Rob Beswick

Abstracts of recently accepted papers

A multiwavelength map of the nuclear region of NGC7582

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We performed a detailed analysis of the *Chandra* and *HST* images of the Seyfert 2 galaxy, NGC 7582. The dust lane, as mapped by the *HST* NIR and optical images, strongly influences the morphology of the soft X-ray em ission, being spatially coincident with excess of X-ray absorption. Two 'hot spo ts', i.e. regions where emission from higher ionization stages of O and Ne is st ronger, are observed in the soft X-ray image. They can be tracers of variations of the ionization parameter, even if, at least for one of them, absorption may b e the dominant effect. The positions of the 'hot spots' suggest that they are no t affected by the star-formation regions observed with *HST*, being locat ed far away from them. Therefore, the starburst does not seem to play an importa nt role in the photoionization of the soft X-ray emitting gas. The resulting pic ture is consistent with modified unification scenarios, where the Compton-thick torus coexists with a large-scale Compton-thin material associated with the dust lane and circumnuclear gas is photoionized by the AGN along torus-free lines of sight.

Accepted by MNRAS

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preprint available at astro-ph/0610277

Supermassive binary black holes among cosmic gamma-ray sources

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Supermassive binary black holes (SBBHs) are a natural outcome of galaxy mergers. Here we show that low-frequency ($f \leq 10^{-6}$ Hz) quasi-periodic variability observed from cosmic blazar sources can provide substantial inductive support for the presence of close ($d \leq 0.1$ pc) SBBHs at their centers. It is argued on physical grounds that such close binary systems are likely to give rise to different (although not independent) periodicities in the radio, optical and X-ray/TeV regime, and, hence that detection of appropriate period ratios significantly corroborates the SBBH interpretation. This is illustrated for a binary model where optical longterm periodicity is related to accretion disk interactions, radio periodicity to Newtonian jet precession, and periodicities in the high energy bands to the orbital motion of the jet. We use the observed periodicities to constrain the properties for a sample of SBBH candidates including OJ 287 and AO 0235+16, and discuss the results within the context of jet activity and binary evolution.

Accepted by Astrophysics and Space Science

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GPS radio sources: new optical observations and an updated master list

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Aims. Identify optical counterparts, address uncertain identifications and measure previously unknown redshifts of the host galaxies of candidate GPS radio sources, and study their stellar populations.
Methods. Long slit spectroscopy and deep optical imaging in the B, V and R bands, obtained with the Very Large Telescope.
Results. We obtain new redshifts for B0316+161, B0407-658, B0904+039, B1433-040, and identify the optical counterparts of B0008-421 and B0742+103. We confirm t he previous identification for B0316+161, B0407-658, B0554-026, and B0904+039, and find that the previous identification for B0914+114 is incorrect. Using updated published radio spectral information we classify as non GPS the following sources: B0407-658 , B0437-454, B1648+015. The optical colors of typical GPS sources are consistent with single instantaneous burst stellar population models but do not yield useful information on age or metallicity. A new master list of GPS sources is presented.r

Accepted by Astronomy and Astrophysics.

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preprint available at http://xxx.lanl.gov/abs/astro-ph/0611600

The variable X-ray spectrum of Markarian 766 - I. Principal components analysis

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Aims: We analyse a long XMM-Newton spectrum of the narrow-line Seyfert 1 galaxy Mrk 766, using the marked spectral variability on timescales > 20 ks to separate components in the X-ray spectrum. Methods: Principal components analysis is used to identify distinct emission components in the X-ray spectrum, possible alternative physical models for those components are then compared statistically. Results: The source spectral variability is well-explained by additive variations, with smaller extra contributions most likely arising from variable absorption. The principal varying component, eigenvector one, is found to have a steep (photon index 2.4) power-law shape, affected by a low column of ionised absorption that leads to the appearance of a soft excess. Eigenvector one varies by a factor 10 in amplitude on time-scales of days and appears to have broad ionised Fe K-alpha emission associated with it: the width of the ionised line is consistent with an origin at about 100 gravitational radii. There is also a strong component of near-constant emission that dominates in the low state, whose spectrum is extremely hard above 1 keV, with a soft excess at lower energies, and with a strong edge at Fe K but remarkably little Fe K-alpha emission. Although this component may be explained as relativistically-blurred reflection from the inner accretion disc, we suggest that its spectrum and lack of variability may alternatively be explained as either (i) ionised reflection from an extended region, possibly a disc wind, or (ii) a signature of absorption by a disc wind with a variable covering fraction. Absorption features in the low state may indicate the presence of an outflow.

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Relativistic beaming and the intrinsic properties of extragalactic radio jets

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Relations between the observed quantities for a beamed radio jet, apparent transverse speed and apparent luminosity ($\beta_{\rm app}$,L), and the intrinsic quantities, Lorentz factor and intrinsic luminosity (γ,L_o), are investigated. The inversion from measured to intrinsic values is not unique, but approximate limits to γ and L_o can be found using probability arguments. Roughly half the sources in a flux density–limited, beamed sample have a value of γ close to the measured $\beta_{\rm app}$. The methods are applied to observations of 119 AGN jets made with the VLBA at 15 GHz during 1994–2002. The results strongly support the common relativistic beam model for an extragalactic radio jet. The ($\beta_{\rm app}$,L) data are closely bounded by a theoretical envelope, an *aspect* curve for $\gamma = 32$, $L_o = 10^{25}\,{\rm W\,Hz^{-1}}$. This gives limits to the maximum values of γ and L_o in the sample: $\gamma_{\rm max} \approx 32$, and $L_{o,\rm max} \sim 10^{26}\,{\rm W\,Hz^{-1}}$. No sources with both high $\beta_{\rm app}$ and low L are observed. This is not the result of selection effects due to the observing limits, which are flux density $S > 0.5$ Jy, and angular velocity $\mu < 4$ mas yr^{-1}. Many of the fastest quasars have a pattern Lorentz factor γ_p close to that of the beam, γ_b, but some of the slow quasars must have $\gamma_p \ll \gamma_b$. Three of the 10 galaxies in the sample have a superluminal feature, with speeds up to $\beta_{\rm app} \approx 6$. The others are at most mildly relativistic. The galaxies are not off–axis versions of the powerful quasars, but Cygnus A might be an exception.

Accepted by Astrophys. J

E-mail contact: mhc@astro.caltech.edu,preprint available at http://arxiv.org/abs/astro-ph/0611642

Inward bound: following gas flows from nuclear spirals to the accretion disk

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A recent analysis of HST optical images of 34 nearby early-type active galaxies and of a matched sample of 34 inactive galaxies – both drawn from the Palomar survey – shows a clear excess of nuclear dusty structures (filaments, spirals and disks) in the active galaxies. This result supports the association of the dusty structures with the material which feeds the supermassive black hole (hereafter SMBH). Among the inactive galaxies there is instead an excess of nuclear stellar disks. As the active and inactive galaxies can be considered two phases of the "same" galaxy, the above findings and dust morphologies suggest an evolutionary scenario in which external material (gas and dust) is captured to the nuclear region where it settles and ends up feeding the active nucleus and replenishing the stellar disk – which is hidden by the dust in the active galaxies – with new stars. This evolutionary scenario is supported by recent gas kinematics of the inner few hundred parsecs of NGC 1097, which shows streaming motions (with velocities $\sim$50 km s^{-1}) towards the nucleus along spiral arms. The implied large scale mass accretion rate is much larger than the one derived in previous studies for the nuclear accretion disk, but is just enough to accumulate one million solar masses over a few million years in the nuclear region, thus consistent with the recent finding of a young circumnuclear starburst of one million solar masses within 9 parsecs from the nucleus in this galaxy.

To appear in *Black Holes: from Stars to Galaxies – across the Range of Masses, Proceedings of the IAU Symp. No. 238, 2006, eds. V. Karas and G. Matt*

E-mail contact: thaisa@ufrgs.br, preprint available at http://arxiv.org/abs/astro-ph/0611888

Thesis Abstracts

Radio Studies of Starburst Galaxies

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Ph.D dissertation directed by: Alan Pedlar

Ph.D degree awarded: 2006

A study of the distribution of OH gas in the central region of the nearby active starburst galaxy M82 has confirmed two previously known bright maser spots and revealed several new main line masers. Three of these are seen only at 1665 MHz, one is detected only at 1667 MHz, while the rest are detected in both lines. Observations covering both the 1665 and 1667 MHz lines, conducted with both the Very Large Array (VLA) and the Multi-Element Radio Linked Interferometer Network (MERLIN), have been used to accurately measure the positions and velocities of these features. This has allowed a comparison with catalogued continuum features in the starburst such as HII regions and supernova remnants, as well as known water and satellite line OH masers. Most of the main line masers are associated with known HII regions although the two detected only at 1665 MHz are coincident with supernova remnants. Velocities are measured for each maser spot and the distribution is compared to that seen in both OH and HI gas.

The progress of a five-year programme designed to monitor a sample of nearby starburst galaxies for new radio supernova events is also described. If all stars with a mass greater than $8\,M_{\odot}$ end their lives in supernova explosions via core collapse, then the star formation rate within a galaxy can be calculated from the supernova rate, assuming a reasonable initial mass function. The goal of this project is to search for radio bright core-collapse supernovae in the central regions of the sample galaxies which are heavily obscured at optical wavelengths due to dust created by the starburst activity. To date, several radio supernovae have been observed through this programme. One of which, J103851+532927 in NGC3310, probably exploded in the late 1990s but was missed by observers at the time. Archival and recent observations have been used to construct a radio light curve and a global VLBI experiment has been carried out in an attempt to resolve the expanding remnant. In addition, two recent Type II supernovae (SN 2004dj and 2004et), first detected optically, have been observed extensively with MERLIN resulting in the best sampled radio "light" curve for a Type II-P SNe since SN 1987A.

Meetings

First Announcement:
FROM PLANETS TO DARK ENERGY: THE MODERN RADIO UNIVERSE

The University of Manchester, UK
October 1-5, 2007

Webpage: http://www.jb.man.ac.uk/mru2007/
Email enquires: mru2007@jb.man.ac.uk

Dear colleagues,

This is the first announcement of the conference "From Planets to Dark Energy: the Modern Radio Universe", organised by the University of Manchester and to be held **October 1st-5th 2007** in Manchester, UK.

Conference Rationale:
This meeting will focus on the current status of future prospects for the key science themes to be addressed by the Square Kilometre Array (SKA). The SKA will have of the order of a million square metres of collecting area and will achieve a spatial resolution better than 0.1 arcsecond at 1.4 GHz. With such a telescope, some of the major questions of our time can be addressed. What are dark energy and dark matter? What is the origin of the observed structure in the Universe? How did planets like the Earth form?

The location and timing of the meeting are deliberate; October 4th 2007 will be the 50th anniversary of the lunch of Sputnik I and the radar detection of the Sputnik launch rocket by the 76-m (250-ft) Lovell telescope at Jodrell Bank Observatory. This meeting will therefore also celebrate 50 years of the Space Age and the Lovell telescope with a review of the modern state of radio astronomy and the new horizons that the SKA will open.

Confirmed Invited Speakers:

- Chris Carilli (USA)
- Jim Cordes (USA)
- Thiebault Damour (France)
- Andrea Ferrara (Italy)
- Bryan Gaensler (Australia)
- Guido Garay (Chile)
- Micheal Kramer (UK)
- Steve Rawlings (UK)
- Frank Shu (Taiwan)
- Kandu Subramanian (India)

Scientific Organising Committee:
Susanne Aalto (Sweden), Rustan Dagkesamanskiy (Russia), Phil Diamond (UK. Chair), Luigina Feretti (Italy), Steve Furlanetto (USA), Bryan Gaensler (USA), Vicky Kaspi (Canada), Luis Rodriguez (Mexico), Dick Manchester (Australia), Ravi Subrahmanyan (India), Richard Schilizzi (The Netherlands. Co-Chair), Steve Rawlings (UK), Alex Szalay (USA), Jill Tarter (USA) & Xiang-Ping Wu (China)

Registration & Conference Size:
If you are interested in receiving further announcements, please send an email to majordomo@jb.man.ac.uk. with "subscribe mru2007" in the body of the message. Registration and abstract submission will be available in early 2007 and will be announced on the webpage and via a second email.

The conference fee will be 250GBP. This fee will cover the costs of organisation of the conference, the publication of proceedings and the participation of delegates at the 50th anniversary celebrations of the first observations of the Lovell Telescope at Jodrell Bank Observatory.

The size of this conference is strictly limited by the conference venue to $\sim$200 delegates. Only full registration will guarantee attendance to the conference, so we urge all interested people to register early next year. Registration will open in early 2007. This will be advertised in the next announcement and on the webpage.

PROGRAM:
In addition to invited talks, contributed papers (oral or poster) can be presented. The SOC will select a limited number of contributions for oral presentation on the basis of the submitted abstracts. The details of the full program will be published near to the conference date.

PROCEEDINGS:
The contributions will be published as proceedings. Details will be given soon.

Important Dates:

- November 2006: First announcement
- January 2007: Second announcement; Registration open
- June 2007: Third and Final announcement
- July 1 2007: Registration and Abstract submission deadline
- August 1 2007: Final Conference Programme
- October 1 2007: Conference Starts
- October 5 2007: Conference Ends

For more information you can visit the conference website: `http://www.jb.man.ac.uk/mru2007/`

Please forward this announcement any interested colleagues.

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If you move or your e-mail address changes, please send the editor your new address. If the Newsletter repeatedly bounces back from an address then that address is deleted from the mailing list.