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

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

Polarized extended Lyα emission from a z=2.3 radio galaxy

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We present spatially resolved spectropolarimetic measurements of the 100-kpc scale gaseous environment of the z=2.34 radio galaxy TXS 0211-122. The polarization level of the narrow Lyα emission is low centrally (P<5 %), but rises to P=16.4$\pm$4.6 % in the Eastern part of the nebula, indicating that the nebula is at least partly powered by the scattering of Lyα photons by HI. Not only is this the first detection of polarized Lyα around a radio-loud active galaxy, it is also the second detection to date for any kind of Lyα nebula. We also detect a pair of diametrically opposed UV continuum sources along the slit, at the outer edges of the Lyα nebula, which we suggest may be the limb of a dusty shell, related to the large-scale HI absorbers often associated with high-z radio galaxies.

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preprint available at arXiv:1302.2813

An HST/WFC3-UVIS View of the Starburst in the Cool Core of the Phoenix Cluster

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We present *Hubble Space Telescope Wide Field Camera 3* observations of the core of the Phoenix Cluster (SPT-CLJ2344-4243) in five broadband filters spanning rest-frame 1000–5500Å. These observations reveal complex, filamentary blue emission, extending for >40 kpc from the brightest cluster galaxy. We observe an underlying, diffuse population of old stars, following an $r^{1/4}$ distribution, confirming that this system is somewhat relaxed. The spectral energy distribution in the inner part of the galaxy, as well as along the extended filaments, is a smooth continuum and is consistent with that of a star-forming galaxy, suggesting that the extended, filamentary emission is not due to the central AGN, either from a large-scale ionized outflow or scattered polarized UV emission, but rather a massive population of young stars. We estimate an extinction-corrected star formation rate of 798 ± 42 $M_\odot$ yr^{-1}, consistent with our earlier work based on low spatial resolution ultraviolet, optical, and infrared imaging. The lack of tidal features and multiple bulges, combine with the need for an exceptionally massive ($> 10^{11}$ $M_\odot$) cold gas reservoir, suggest that this star formation is not the result of a merger of gas-rich galaxies. Instead, we propose that the high X-ray cooling rate of ∼2700 $M_\odot$ yr^{-1} is the origin of the cold gas reservoir. The combination of such a high cooling rate and the relatively weak radio source in the cluster core suggests that feedback has been unable to halt cooling in this system, leading to this tremendous burst of star formation.

Accepted by ApJ Letters

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preprint available at arXiv:1211.7058

Luminosity-dependent unification of Active Galactic Nuclei and the X-ray Baldwin effect

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The existence of an anti-correlation between the equivalent width (EW) of the narrow core of the iron Kα line and the luminosity of the continuum (i.e. the X-ray Baldwin effect) in type-I active galactic nuclei has been confirmed over the last years by several studies carried out with *XMM-Newton*, *Chandra* and *Suzaku*. However, so far no general consensus on the origin of this trend has been reached. Several works have proposed the decrease of the covering factor of the molecular torus with the luminosity (in the framework of the luminosity-dependent unification models) as a possible explanation for the X-ray Baldwin effect. Using the fraction of obscured sources measured by recent X-ray and IR surveys as a proxy of the half-opening angle of the torus, and the recent Monte-Carlo simulations of the X-ray radiation reprocessed by a structure with a spherical-toroidal geometry by Ikeda et al. (2009) and Brightman & Nandra (2011), we test the hypothesis that the X-ray Baldwin effect is related to the decrease of the half-opening angle of the torus with the luminosity. Simulating the spectra of an unabsorbed population with a luminosity-dependent covering factor of the torus as predicted by recent X-ray surveys, we find that this mechanism is able to explain the observed X-ray Baldwin effect. Fitting the simulated data with a log-linear $L_{2-10\,\mathrm{keV}} - EW$ relation, we found that in the Seyfert regime ($L_{2-10\,\mathrm{keV}} \leq 10^{44.2}\,\mathrm{erg\,s^{-1}}$) luminosity-dependent unification produces a slope consistent with the observations for average values of the equatorial column densities of the torus of $\log N_{\mathrm{H}}^{\mathrm{T}} \geq 23.1$, and can reproduce both the slope and the intercept for $\log N_{\mathrm{H}}^{\mathrm{T}} \simeq 23.2$. Lower values of $N_{\mathrm{H}}^{\mathrm{T}}$ are obtained considering the decrease of the covering factor of the torus with the luminosity extrapolated from IR observations ($22.9 \leq \log N_{\mathrm{H}}^{\mathrm{T}} \leq 23$). In the quasar regime ($L_{2-10\,\mathrm{keV}} > 10^{44.2}\,\mathrm{erg\,s^{-1}}$) a decrease of the covering factor of the torus with the luminosity slower than that observed in the Seyfert regime (as found by recent hard X-ray surveys) is able to reproduce the observations for $23.2 \leq \log N_{\mathrm{H}}^{\mathrm{T}} \leq 24.2$.

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preprint available at arXiv:1302.1070

The Chandra-COSMOS survey IV: X-ray spectra of the bright sample

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We present the X-ray spectral analysis of the 390 brightest extragalactic sources in the *Chandra*-COSMOS catalog, showing at least 70 net counts in the 0.5-7 keV band. This sample has a 100% completeness in optical-IR identification, with ~75% of the sample having a spectroscopic redshift and ~25% a photometric redshift. Our analysis allows us to accurately determine the intrinsic absorption, the broad band continuum shape (Γ) and intrinsic $L_{2-10keV}$ distributions, with an accuracy better than 30% on the spectral parameters for 95% of the sample. The sample is equally divided in type-1 (49.7%) and type-2 AGN (48.7%) plus few passive galaxies at low z. We found a significant difference in the distribution of Γ of type-1 and type-2, with small intrinsic dispersion, a weak correlation of Γ with $L_{2-10keV}$ and a large population (15% of the sample) of high luminosity, highly obscured (QSO2) sources. The distribution of the X-ray/Optical flux ratio ($\mathrm{Log}(F_X/F_i)$) for type-1 is narrow ($0 < X/O < 1$), while type-2 are spread up to $X/O = 2$. The X/O correlates well with the amount of X-ray obscuration. Finally, a small sample of Compton thick candidates and peculiar sources is presented. In the appendix we discuss the comparison between *Chandra* and *XMM–Newton* spectra for 280 sources in common. We found a small systematic difference, with *XMM–Newton* spectra that tend to have softer power-laws and lower obscuration.

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preprint available at http://arxiv.org/abs/1302.1062

The Origin of Dust in Early-Type Galaxies and Implications for Accretion onto Supermassive Black Holes

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We have conducted an archival Spitzer study of 38 early-type galaxies in order to determine the origin of the dust in approximately half of this population. Our sample galaxies generally have good wavelength coverage from 3.6μm to 160μm, as well as visible-wavelength HST images. We use the Spitzer data to estimate dust masses, or establish upper limits, and find that all of the early-type galaxies with dust lanes in the HST data are detected in all of the Spitzer bands and have dust masses of $\sim 10^{5-6.5} M_\odot$, while galaxies without dust lanes are not detected at 70μm and 160μm and typically have $< 10^5 M_\odot$ of dust. The apparently dust-free galaxies do have 24μm emission that scales with the shorter wavelength flux, yet substantially exceeds the expectations of photospheric emission by approximately a factor of three. We conclude this emission is dominated by hot, circumstellar dust around evolved stars that does not survive to form a substantial interstellar component. The order of magnitude variations in dust masses between galaxies with similar stellar populations rules out a subtantial contribution from continual, internal production in spite of the clear evidence for circumstellar dust. We demonstrate that the interstellar dust is not due to purely external accretion, unless the product of the merger rate of dusty satellites and the dust lifetime is at least an order of magnitude higher than expected. We propose that dust in early-type galaxies is seeded by external accretion, yet the accreted dust is maintained by continued growth in externally-accreted cold gas beyond the nominal lifetime of individual grains. The several Gyr depletion time of the cold gas is long enough to reconcile the fraction of dusty early-type galaxies with the merger rate of gas-rich satellites. As the majority of dusty early-type galaxies are also low-luminosity Active Galactic Nuclei

and likely fueled by this cold gas, their lifetime should similarly be several Gyr.

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preprint available at arxiv:1302.5124

The Black Hole and Central Stellar Population of MCG–6-30-15

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We present the first near-infrared integral field spectroscopy observations of the galaxy MCG–6-30-15. The H-band data studied in this paper cover the central 500 pc of the galaxy at the best resolution ($0''.1$) so far. The spectra of the innermost regions are dominated by broad brackett series emission lines and non-stellar continuum, under which we are able to trace the distribution and kinematics of the stars and also the [Fe II] line emission. We find that there is a counter-rotating stellar core extending out to 125 pc, which appears to be associated with the [Fe II] emission. Based on the mass-to-light ratio, and the presence of this emission line, we estimate the age of the central stellar population to be of order of 65 Myr. We show that the gas needed to fuel the black hole is, at most, only 1 per cent of that needed to form these stars. We derive independent constraints on the black hole mass using the dynamical information and determine an upper limit for the black hole mass, $M_{\rm BH} < 6 \times 10^7 {\rm M}_\odot$, that is consistent with other estimates.

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preprint available at arxiv:1302.5116

Meetings

"The restless nature of AGNs: variability as a probe of the central engine"
Naples, Italy, 20-23 May 2013

*Scientific rationale: *
It is widely accepted that variability provides important information on the nature of the emission mechanisms and the geometry of the central source in Active Galactic Nuclei. This is an exciting time in the field of AGN variability, due to the wealth of new results produced in the last few years. This conference intends to focus on *radio-quiet* sources, discussing our current understanding of the central source variability across the IR, optical, and UV regimes up to hard X-rays, and the clues that variability provides about the physics and structure of the AGN phenomena. The contributions are intended to address the problem of AGN variability both from the observational and theoretical point of view, on short and long time scales, presenting results and expectations from wide-field/deep surveys, pointed observations, ground-based and space observatories.

The *topics* will include:

- X-ray flux and spectral variability
- UV emission/absorption variability, correlations and SED variability
- Variability on the optical band: reverberation, the continuum and the full sky surveys
- AGN variability analysis methods
- Variability constrains on theoretical models: from the MRI to the X-ray corona.

More information, including instructions for registration and abstract submission, are available at the website: http://astrofisica.na.infn.it/restle

IMPORTANT DATES
January 16 2013: Registration Opens
March 24 2013: Registration Closes
April 7 2013: Schedule announced
May 20-23 2013: Conference