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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. As always, any suggestions or feedback regarding the newsletter are welcome.

Many thanks for your continued subscription.

Megan Argo

Abstracts of recently accepted papers

A compendium of AGN inclinations with corresponding UV/optical continuum polarization measurements

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The anisotropic nature of active galactic nuclei (AGN) is thought to be responsible for the observational differences between type-1 (pole-on) and type-2 (edge-on) nearby Seyfert-like galaxies. In this picture, the detection of emission and/or absorption features is directly correlated to the inclination of the system. The AGN structure can be further probed by using the geometry-sensitive technique of polarimetry, yet the pairing between observed polarization and Seyfert type remains poorly examined. Based on archival data, I report here the first compilation of 53 estimated AGN inclinations matched with ultraviolet/optical continuum polarization measurements. Corrections, based on the polarization of broad emission lines, are applied to the sample of Seyfert-2 AGN to remove dilution by starburst light and derive information about the scattered continuum alone. The resulting compendium agrees with past empirical results, i.e. type-1 AGN show low polarization degrees ($P \leq 1$ %) predominantly associated with a polarization position angle parallel to the projected radio axis of the system, while type-2 objects show stronger polarization percentages ($P > 7$ %) with perpendicular polarization angles. The transition between type-1 and type-2 inclination occurs between 45° and 60° without noticeable impact on P. The compendium is further used as a test to investigate the relevance of four AGN models. While an AGN model with fragmented regions matches observations better than uniform models, a structure with a failed dusty wind along the equator and disc-born, ionized, polar outflows is by far closer to observations. However, although the models correctly reproduce the observed dichotomy between parallel and perpendicular polarization, as well as correct polarization percentages at type-2 inclinations, further work is needed to account for some highly polarized type-1 AGN.

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Preprint available at: http://adsabs.harvard.edu/abs/2014arXiv1404.2417M

A Simultaneous 3.5 and 1.3 mm Polarimetric Survey of Active Galactic Nuclei in the Northern Sky

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Short millimeter observations of radio-loud active galactic nuclei (AGN) offer an excellent opportunity to study the physics of their synchrotron-emitting relativistic jets, from where the bulk of radio and millimeter emission is radiated. On one hand, AGN jets and their emission cores are significantly less affected by Faraday rotation and depolarization than at longer wavelengths. On the other hand, the millimeter emission of AGN is dominated by the compact innermost regions in the jets, where the jet can not be seen at longer wavelengths due to synchrotron opacity. We present the first dual frequency simultaneous 86 GHz and 229 GHz polarimetric survey of all four Stokes parameters of a large sample of 211 radio-loud active galactic nuclei, designed to be flux limited at 1 Jy at 86 GHz. Most of the observations were made in mid August 2010 using the XPOL polarimeter on the IRAM 30 m millimeter radio telescope. Linear polarization detections above 3σ median level of $\sim 1.0\,\%$ are reported for 183 sources at 86 GHz, and for 23 sources at 229 GHz, where the median 3σ level is $\sim 6.0\,\%$. We show a clear excess of the linear polarization degree detected at 229 GHz with regard to that at 86 GHz by a factor of ~ 1.6, thus implying a progressively better ordered magnetic field for blazar jet regions located progressively upstream in the jet. We show that the linear polarization angle, both at 86 and 229 GHz, and the jet structural position angle for both quasars and BL Lacs do not show a clear preference to align in either parallel or perpendicular directions. Our variability study with regard to the 86 GHz data from our previous survey points out a large degree of variation. In particular, total flux and linear polarization changes in time scales of years by median factors of ~ 1.5 in total flux, and ~ 1.7 in linear polarization degree –maximum variations by factors up to 6.3, and ~ 5, respectively–, are reported. Also, 86 % of sources showing linear polarization angles evenly distributed with regard to our previous measurements.

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Preprint available at: http://arxiv.org/abs/1402.0717

Peculiar radio structures in the central regions of galaxy cluster Abell 585

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In this paper, we analyse the peculiar radio structure observed across the central region of the galaxy cluster Abell 585 (z=0.12). In the low-resolution radio maps, this structure appears uniform and diffuse on angular scales of 3 arcmin, and is seemingly related to the distant (z=2.5) radio quasar B3 0727+409 rather than to the cluster itself. However, after a careful investigation of the unpublished archival radio data with better angular resolution, we resolve the structure into two distinct arcmin-scale features, which resemble typical lobes of cluster radio galaxies with no obvious connection to the background quasar. We support this conclusion by examining the spectral and polarization properties of the features, demonstrating in addition that the analysed structure can hardly be associated with any sort of a radio minihalo or relics of the cluster. Yet at the same time we are not able to identify host galaxies of the radio lobes in the available optical and infrared surveys. We consider some speculative explanations for our findings, including gravitational wave recoil kicks of supermassive black holes responsible for the lobes formation in the process of merging massive ellipticals within the central parts of a rich cluster environment, but we do not reach any robust conclusions regarding the origin of the detected radio features.

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Gamma-ray Flare of PKS 1222+216 in 2010: Effect of Jet Dynamics at the Recollimation Zone

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The γ-ray flare of PKS 1222+216, observed in June 2010, is interpreted as an outcome of jet dynamics at recollimation zone. We obtained the γ-ray light-curves in three different energy bands, namely, 100–300 MeV, 300 MeV–1 GeV and 1–3 GeV from observations by the *Fermi* Large Area Telescope (LAT). We also use the *Swift*–XRT flux from 0.3–10 keV obtained from archival data. We supplement these with the 0.07–0.4 TeV observations with MAGIC telescope, available in the literature. The detection of source at very high energy (VHE, $E > 100$ GeV) with a differential photon spectral index of 2.7 ± 0.3 and the rapid variability associated with it suggests that the emission arises from a compact region located beyond the broad line emitting region. The plausible γ-ray emission mechanism can then be inverse Compton scattering of IR photons from obscuring torus. Further, the decay time of LAT flare cannot be explained by considering simple radiative loss mechanisms. Hence, to interpret the LAT light curves, we develop a model where the broadband emission originates from a compact region, arising plausibly from the compression of jet matter at the recollimation zone. The flare is then expressed as an outcome of jet deceleration probably associated with this focusing effect. Based on this model, the rise of the LAT flare is attributed to the opening of emission cone followed by the decay resulting from jet deceleration. The parameters of the model are further constrained by reproducing the broadband spectral energy distribution of the source obtained during the flare episode. Our study suggests that the particle energy density exceeds magnetic energy density by a large factor which in turn may cause rapid expansion of the emission region. However, near equipartition can be achieved towards the end of LAT flare during which the compact emission region would have expanded to the size of jet cross-section.

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