Active Galaxies Newsletter	*An electronic publication dedicated to the observation and theory of active galaxies*
No. 210 — April 2015	Editor: Megan Argo (agnews@manchester.ac.uk)

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

Mean and Extreme Radio Properties of Quasars and the Origin of Radio Emission

Rachael M. Kratzer[1] and Gordon T. Richards[1,2]

[1] Department of Physics, Drexel University, Philadelphia, PA, USA
[2] Max-Planck-Institut für Astronomie, Königstuhl 17, D-69117 Heidelberg, Germany

We investigate the evolution of both the radio-loud fraction (RLF) and (using stacking analysis) the mean radio loudness of quasars. We consider how these properties evolve as a function of redshift and luminosity, black hole (BH) mass and accretion rate, and parameters related to the dominance of a wind in the broad emission-line region. We match the FIRST source catalog to samples of luminous quasars (both spectroscopic and photometric), primarily from the Sloan Digital Sky Survey. After accounting for catastrophic errors in BH mass estimates at high redshift, we find that both the RLF and the mean radio luminosity increase for increasing BH mass and decreasing accretion rate. Similarly, both the RLF and mean radio loudness increase for quasars that are argued to have weaker radiation line driven wind components of the broad emission-line region. In agreement with past work, we find that the RLF increases with increasing optical/UV luminosity and decreasing redshift, while the mean radio loudness evolves in the exact opposite manner. This difference in behavior between the mean radio loudness and the RLF in L-z may indicate selection effects that bias our understanding of the evolution of the RLF; deeper surveys in the optical and radio are needed to resolve this discrepancy. Finally, we argue that radio-loud (RL) and radio-quiet (RQ) quasars may be parallel sequences, but where only RQ quasars at one extreme of the distribution are likely to become RL, possibly through slight differences in spin and/or merger history.

Published as: 2015, AJ, 149, 61

E-mail contact: gtr@physics.drexel.edu
Preprint available at http://adsabs.harvard.edu/abs/2015AJ....149...61K

A complete census of silicate features in the mid-infrared spectra of active galaxies

Evanthia Hatziminaoglou[1], Antonio Hernán-Caballero[2], Anna Feltre[3], Nuria Piñol-Ferrer[4]

[1] European Southern Observatory, Karl-Schwarzschikd-Str. 2, 85748 Garching bei München, Germany
[2] Instituto de Física de Cantabria, CSIC-UC, Avenida de los Castros s/n, 39005, Santander, Spain
[3] Institut d'Astrophysique de Paris, 98 bis boulevard Arago, 75014 Paris, France
[4] Department of Astronomy, Stockholm University, AlbaNova Center, 106 91 Stockholm, Sweden

We present a comprehensive study of the silicate features at 9.7 and 18 μm of a sample of almost 800 active galactic nuclei (AGN) with available spectra from the *Spitzer* InfraRed Spectrograph (IRS). We measure the strength of the silicate feature at 9.7 μm, $S_{9.7}$, before and after subtracting the host galaxy emission from the IRS spectra. The numbers of type 1 and 2 AGN with the feature in emission increase by 20 and 50%, respectively, once the host galaxy is removed, while 35% of objects with the feature originally in absorption exhibit it in even deeper absorption. The peak of $S_{9.7}$, $\lambda_{\rm peak}$, has a bimodal distribution when the feature is in emission, with about 65% of the cases showing $\lambda_{\rm peak} > 10.2$ μm. Silicates can appear in emission in objects with mid-infrared (MIR) luminosity spanning over six orders of magnitude. The derived distributions of the strength of the silicate features at 9.7 and 18 μm provide a solid test bed for modeling the dust distribution in AGN. Clumpiness is needed in order to produce absorption features in unobscured AGN and can also cause the silicates to be in absorption at 9.7 μm and in emission at 18 μm in type 1 sources. We find the 'cosmic' silicates of Ossenkopf et al. to be more consistent with the observations than Draine's 'astronomical' silicates. Finally, we discuss the possibility of a foreground absorber to explain the deep silicate absorption features in the MIR spectra of some type 2 AGN.

Accepted by ApJ.

E-mail contact: ehatzimi@eso.org
Preprint available at http://arxiv.org/abs/1502.05823

X-ray Insights into the Nature of PHL 1811 Analogs and Weak Emission-Line Quasars: Unification with a Geometrically Thick Accretion Disk?

B. Luo[1,2], W. N. Brandt[1,2,3], P. B. Hall[4], Jianfeng Wu[5], S. F. Anderson[6], G. P. Garmire[7], R. R. Gibson[6], R. M. Plotkin[8], G. T. Richards[9], D. P. Schneider[1,2], O. Shemmer[10], and Yue Shen[11]

[1]Department of Astronomy & Astrophysics, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[2]Institute for Gravitation and the Cosmos, The Pennsylvania State University, University Park, PA 16802, USA
[3]Department of Physics, 104 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[4]Department of Physics & Astronomy, York University, 4700 Keele Street, Toronto, ON M3J 1P3, Canada
[5]Harvard-Smithsonian Center for Astrophysics, MS 6, 60 Garden St, Cambridge, MA 02138, USA
[6]Department of Astronomy, University of Washington, Box 351580, Seattle, WA 98195, USA
[7]Huntingdon Institute for X-ray Astronomy, LLC, 10677 Franks Road, Huntingdon, PA 16652, USA
[8]Department of Astronomy, University of Michigan, 1085 South University Ave, Ann Arbor, MI 48109, USA
[9]Department of Physics, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, USA
[10]Department of Physics, University of North Texas, Denton, TX 76203, USA
[11]Carnegie Observatories, 813 Santa Barbara Street, Pasadena, CA 91101, USA

We present an X-ray and multiwavelength study of 33 weak emission-line quasars (WLQs) and 18 quasars that are analogs of the extreme WLQ, PHL 1811, at $z \approx 0.5$–2.9. New *Chandra* 1.5–9.5 ks exploratory observations were obtained for 32 objects while the others have archival X-ray observations. Significant fractions of these luminous type 1 quasars are distinctly X-ray weak compared to typical quasars, including 16 (48%) of the WLQs and 17 (94%) of the PHL 1811 analogs with average X-ray weakness factors of 17 and 39, respectively. We measure a relatively hard ($\Gamma = 1.16^{+0.37}_{-0.32}$) effective power-law photon index for a stack of the X-ray weak subsample, suggesting X-ray absorption, and spectral analysis of one PHL 1811 analog, J1521+5202, also indicates significant intrinsic X-ray absorption. We compare composite SDSS spectra for the X-ray weak and X-ray normal populations and find several optical–UV tracers of X-ray weakness; e.g., Fe II rest-frame equivalent width and relative color. We describe how orientation effects under our previously proposed "shielding-gas" scenario can likely unify the X-ray weak and X-ray normal populations. We suggest that the shielding gas may naturally be understood as a geometrically thick inner accretion disk that shields the broad line region from the ionizing continuum. If WLQs and PHL 1811 analogs have very high Eddington ratios, the inner disk could be significantly puffed up (e.g., a slim disk). Shielding of the broad emission-line region by a geometrically thick disk may have a significant role in setting the broad distributions of C IV rest-frame equivalent width and blueshift for quasars more generally.

Accepted by ApJ

E-mail contact: bul119@psu.edu
Preprint available at http://arxiv.org/abs/1503.02085

Probing the Physics of Narrow Line Regions in Active Galaxies II: The Siding Spring Southern Seyfert Spectroscopic Snapshot Survey (S7)

Michael A. Dopita[1,2], Prajval Shastri[3], Rebecca Davies[1], Lisa Kewley[1,4], Elise Hampton[1], Julia Scharwächter[5], Ralph Sutherland[1], Preeti Kharb[3], Jessy Jose[3], Harish Bhatt[3], S. Ramya [3], Chichuan Jin[6], Julie Banfield[7], Ingyin Zaw[8], Stéphanie Juneau[9], Bethan James[10] & Shweta Srivastava[11]

[1]RSAA, Australian National University, Cotter Road, Weston Creek, ACT 2611, Australia
[2]Astronomy Department, King Abdulaziz University, P.O. Box 80203, Jeddah, Saudi Arabia
[3]Indian Institute of Astrophysics, Koramangala 2B Block, Bangalore 560034, India
[4]Institute for Astronomy, University of Hawaii, 2680 Woodlawn Drive, Honolulu, HI, USA
[5]LERMA, Observatoire de Paris, CNRS, UMR 8112, 61 Avenue de l'Observatoire, 75014, Paris, France
[6]Qian Xuesen Laboratory for Space Technology, Beijing, China
[7]CSIRO Astronomy & Space Science, P.O. Box 76, Epping NSW, 1710 Australia
[8]New York University (Abu Dhabi) , 70 Washington Sq. S, New York, NY 10012, USA
[9]CEA-Saclay, DSM/IRFU/SAp, 91191 Gif-sur-Yvette, France
[10]Institute of Astronomy, Cambridge University, Madingley Road, Cambridge CB3 0HA, UK
[11]Astronomy and Astrophysics Division, Physical Research Laboratory, Ahmedabad 380009, India

Here we describe the *Siding Spring Southern Seyfert Spectroscopic Snapshot Survey* (S7) and present results on 64 galaxies drawn from the first data release. The S7 uses the Wide Field Spectrograph (WiFeS) mounted on the ANU 2.3m telescope located at the Siding Spring Observatory to deliver an integral field of 38×25 arcsec at a spectral resolution of $R = 7000$ in the red ($530 - 710$nm), and $R = 3000$ in the blue ($340 - 560$nm). From these data cubes we have extracted the Narrow Line Region (NLR) spectra from a 4 arc sec aperture centred on the nucleus. We also determine the Hβ and [O III] fluxes in the narrow lines, the nuclear reddening, the reddening-corrected relative intensities of the observed emission lines, and the Hβ and [O III] luminosities determined from spectra for which the stellar continuum has been removed. We present a set of images of the galaxies in [O III] [N II] and Hα which serve to delineate the spatial extent of the extended narrow line region (ENLR) and **also to** reveal the structure and morphology of the surrounding H II regions. Finally, we provide a preliminary discussion of those Seyfert 1 and Seyfert 2 galaxies which display coronal emission lines in order to explore the origin of these lines.

Accepted by Ap.J. Suppl. : arXiv 150102022

E-mail contact: Michael.Dopita@anu.edu.au
Preprint available at http://miocene.anu.edu.au/S7/

Modeling optical and UV polarization of AGNs III. From uniform-density to clumpy regions

F. Marin[1], R. W. Goosmann[2], and C. M. Gaskell[3]

[1]Astronomical Institute of the Academy of Sciences, Boční II 1401, CZ-14100 Prague, Czech Republic
[2]Observatoire Astronomique de Strasbourg, Université de Strasbourg, CNRS, UMR 7550, 11 rue de l'Université, 67000 Strasbourg, France
[3]Department of Astronomy and Astrophysics, University of California at Santa Cruz, California 95064, USA

Context: A growing body of evidence suggests that some, if not all, scattering regions of active galactic nuclei (AGNs) are clumpy. The inner AGN components cannot be spatially resolved with current instruments and must be studied by numerical simulations of observed spectroscopy and polarization data. Aims: We run radiative transfer models in the optical/UV for a variety of AGN reprocessing regions with different distributions of clumpy scattering media. We obtain geometry-sensitive polarization spectra and images to improve our previous AGN models and their comparison with the observations. Methods: We use the latest public version 1.2 of the Monte Carlo code STOKES presented in the first two papers of this series to model AGN reprocessing regions of increasing morphological complexity. We replace previously uniform-density media with up to thousands of constant-density clumps. We couple a continuum source to fragmented equatorial scattering regions, polar outflows, and toroidal obscuring dust regions and investigate a wide range of geometries. We also consider different levels of fragmentation in each scattering region to evaluate the importance of fragmentation for the net polarization of the AGN. Results: In comparison with uniform-density models, equatorial distributions of gas and dust clouds result in grayer spectra and show a decrease in the net polarization percentage at all lines of sight. The resulting polarization position angle depends on the morphology of the clumpy structure, with extended tori favoring parallel polarization while compact tori produce orthogonal polarization position angles. In the case of polar scattering regions, fragmentation increases the net polarization unless the cloud filling factor is small. A complete AGN model constructed from the individual, fragmented regions can produce low polarization percentages (< 2 %), with a parallel polarization angle for observer inclinations up to 70° for a torus half opening angle of 60°. For type-2 viewing angles the polarization switches to perpendicular and rises to ~ 50 %. Conclusions: Our modeling shows that the introduction of fragmented dusty tori significantly alters the resulting net polarization of an AGN. Comparison of our models to polarization observations of large AGN samples greatly favors geometrically compact clumpy tori over extended ones.

Accepted by A&A

E-mail contact: frederic.marin@asu.cas.cz
Preprint available at http://adsabs.harvard.edu/abs/2015arXiv150305311M

Probing the Physics of Narrow Line Regions in Active Galaxies III: Accretion and Cocoon Shocks in the LINER NGC 1052

Michael A. Dopita[1,2], I-Ting Ho[3], Linda L. Dressel[4], Ralph Sutherland[1], Lisa Kewley[1,4], Rebecca Davies[1], Elise Hampton[1], Prajval Shastri[6], Preeti Kharb[5], Jessy Jose[5], Harish Bhatt [5], S. Ramya [5], Julia Scharwächter[6], Chichuan Jin[7], Julie Banfield[8], Ingyin Zaw[9], Bethan James[10], Stéphanie Juneau[11], & Shweta Srivastava[12]

[1]Research School of Astronomy and Astrophysics, Australian National University, Canberra, ACT 2611, Australia.
[2]Astronomy Department, King Abdulaziz University, P.O. Box 80203, Jeddah, Saudi Arabia.
[3]Institute for Astronomy, University of Hawaii, 2680 Woodlawn Drive, Honolulu, HI 96822, USA
[4]Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, USA
[5]Indian Institute of Astrophysics, Koramangala 2B Block, Madiwala, Bangalore, 560034 Karnataka, India
[6]LERMA, Observatoire de Paris, CNRS, UMR 8112, 61 Avenue de l'Observatoire, 75014, Paris, France
[7]Qian Xuesen Laboratory for Space Technology, Beijing, China
[8]CSIRO Astronomy & Space Science, P.O. Box 76, Epping NSW, 1710 Australia
[9]New York University (Abu Dhabi) , 70 Washington Sq. S, New York, NY 10012, USA
[10]Institute of Astronomy, Cambridge University, Madingley Road, Cambridge CB3 0HA, UK
[11]CEA-Saclay, DSM/IRFU/SAp, 91191 Gif-sur-Yvette, France
[12]Astronomy and Astrophysics Division, Physical Research Laboratory, Ahmedabad 380009, India

We present Wide Field Spectrograph (WiFeS) integral field spectroscopy and HST FOS spectroscopy for the LINER galaxy NGC 1052. We infer the presence of a turbulent accretion flow forming a small-scale accretion disk. We find a large-scale outflow and ionisation cone along the minor axis of the galaxy. Part of this outflow region is photoionised by the AGN, and shares properties with the ENLR of Seyfert galaxies, but the inner ($R \lesssim 1.0$ arcsec) accretion disk and the region around the radio jet appear shock excited. The emission line properties can be modelled by a "double shock" model in which the accretion flow first passes through an accretion shock in the presence of a hard X-ray radiation, and the accretion disk is then processed through a cocoon shock driven by the overpressure of the radio jets. This model explains the observation of two distinct densities ($\sim 10^4$ and $\sim 10^6$ cm^{-3}), and provides a good fit to the observed emission line spectrum. We derive estimates for the velocities of the two shock components and their mixing fractions, the black hole mass, the accretion rate needed to sustain the LINER emission and derive an estimate for the jet power. Our emission line model is remarkably robust against variation of input parameters, and so offers a generic explanation for the excitation of LINER galaxies, including those of spiral type such as NGC 3031 (M81).

Accepted by Ap.J. (2015) 801, 42

E-mail contact: Michael.Dopita@anu.edu.au
Preprint available at http://miocene.anu.edu.au/S7/

Constraints on the temperature inhomogeneity in quasar accretion discs from the UV-optical spectral variability

Mitsuru Kokubo[1,2]

[1] Department of Astronomy, School of Science, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan
[2] Institute of Astronomy, University of Tokyo, 2-21-1 Osawa, Mitaka, Tokyo 181-0015, Japan

The physical mechanisms of the quasar ultraviolet (UV)-optical variability are not well understood despite the long history of observations. Recently, Dexter & Agol presented a model of quasar UV-optical variability, which assumes large local temperature fluctuations in the quasar accretion discs. This inhomogeneous accretion disc model is claimed to describe not only the single-band variability amplitude, but also microlensing size constraints and the quasar composite spectral shape. In this work, we examine the validity of the inhomogeneous accretion disc model in the light of quasar UV-optical spectral variability by using five-band multi-epoch light curves for nearly 9 000 quasars in the Sloan Digital Sky Survey (SDSS) Stripe 82 region. By comparing the values of the intrinsic scatter σ_{int} of the two-band magnitude-magnitude plots for the SDSS quasar light curves and for the simulated light curves, we show that Dexter & Agol's inhomogeneous accretion disc model cannot explain the tight inter-band correlation often observed in the SDSS quasar light curves. This result leads us to conclude that the local temperature fluctuations in the accretion discs are not the main driver of the several years' UV-optical variability of quasars, and consequently, that the assumption that the quasar accretion discs have large localized temperature fluctuations is not preferred from the viewpoint of the UV-optical spectral variability.

Accepted by MNRAS

E-mail contact: mkokubo@ioa.s.u-tokyo.ac.jp
Preprint available at http://arxiv.org/abs/1503.00001
Published article: http://mnras.oxfordjournals.org/content/449/1/94

Wind from the black-hole accretion disk driving a molecular outflow in an active galaxy

F. Tombesi[1,2], M. Melendez[2], S. Veilleux[2,3], J. N. Reeves[4,5], E. Gonzalez-Alfonso[6] and C. S Reynolds[2,3]

[1] X-ray Astrophysics Laboratory, NASA/Goddard Space Flight Center, Greenbelt, Maryland 20771, USA
[2] Department of Astronomy and CRESST, University of Maryland, College Park, Maryland 20742, USA
[3] Joint Space Science Institute, University of Maryland, College Park, Maryland 20742, USA
[4] Astrophysics Group, School of Physical and Geographical Sciences, Keele University, Keele, Staffordshire ST5 5BG, UK
[5] Center for Space Science and Technology, University of Maryland Baltimore County, 1000 Hilltop Circle, Baltimore, Maryland 21250, USA
[6] Universidad de Alcala, Departamento de Fisica y Matematicas, Campus Universitario, E-28871 Alcala de Henares, Madrid, Spain

Powerful winds driven by active galactic nuclei are often thought to affect the evolution of both supermassive black holes and their host galaxies, quenching star formation and explaining the close relationship between black holes and galaxies. Recent observations of large-scale molecular outflows in ultraluminous infrared galaxies support this quasar-feedback idea, because they directly trace the gas from which stars form. Theoretical models suggest that these outflows originate as energy-conserving flows driven by fast accretion-disk winds. Proposed connections between large-scale molecular outflows and accretion-disk activity in ultraluminous galaxies were incomplete because no accretion-disk wind had been detected. Conversely, studies of powerful accretion-disk winds have until now focused only on X-ray observations of local Seyfert galaxies and a few higher-redshift quasars. Here we report observations of a powerful accretion-disk wind with a mildly relativistic velocity (a quarter that of light) in the X-ray spectrum of IRAS F11119+3257, a nearby (redshift 0.189) optically classified type 1 ultraluminous infrared galaxy hosting a powerful molecular outflow. The active galactic nucleus is responsible for about 80 per cent of the emission, with a quasar-like luminosity of $1.5\text{x}10^{46}$ ergs per second. The energetics of these two types of wide-angle outflows is consistent with the energy-conserving mechanism that is the basis of the quasar feedback in active galactic nuclei that lack powerful radio jets (such jets are an alternative way to drive molecular outflows).

Published in the March 26th 2015 issue of Nature.

E-mail contact: ftombesi@astro.umd.edu
Printed version available at http://www.nature.com/nature/journal/v519/n7544/full/nature14261.html

3C 57 as an Atypical Radio-Loud Quasar: Implications for the Radio-Loud/Radio-Quiet Dichotomy

J.W. Sulentic[1], M. A. Martínez-Carballo[1], P. Marziani[2], A. del Olmo[1], G.M. Stirpe[3], S. Zamfir[4], I. Plauchu-Frayn[1]

[1] Instituto de Astrofisíca de Andalucía, IAA-CSIC, Glorieta de la Astronomia s/n, Granada, 18008, Spain
[2] INAF, Osservatorio Astronomico di Padova, vicolo dell' Osservatorio 5, Padova, 35122, Italy
[3] INAF-Osservatorio Astronomico di Bologna, via Ranzani 1, Bologna, 40127, Italy
[4] Department of Physics & Astronomy, University of Wisconsin, Stevens Points, USA

Lobe-dominated radio-loud (LD RL) quasars occupy a restricted domain in the 4D Eigenvector 1 (4DE1) parameter space which implies restricted geometry/physics/kinematics for this subclass compared to the radio-quiet (RQ) majority of quasars. We discuss how this restricted domain for the LD RL parent population supports the notion for a RQ-RL dichotomy among Type 1 sources. 3C 57 is an atypical RL quasar that shows both uncertain radio morphology and falls in a region of 4DE1 space where RL quasars are rare.

We present new radio flux and optical spectroscopic measures designed to verify its atypical optical/UV spectroscopic behaviour and clarify its radio structure. The former data confirms that 3C 57 falls off the 4DE1 quasar "main sequence" with both extreme optical [Fe II] emission ($R_{\rm FeII}\sim 1$) and a large CIVλ1549 profile blueshift ($\sim$ -1500 km s^{-1}). These parameter values are typical of extreme Population A sources which are almost always RQ. New radio measures show no evidence for flux change over a 50+ year timescale consistent with compact steep-spectrum (CSS or young LD) over core-dominated morphology. In the 4DE1 context where LD RL are usually low L/L$_{Edd}$ quasars we suggest that 3C 57 is an evolved RL quasar (i.e. large Black Hole mass) undergoing a major accretion event leading to a rejuvenation reflected by strong [Fe II] emission, perhaps indicating significant heavy metal enrichment, high bolometric luminosity for a low redshift source and resultant unusually high Eddington ratio giving rise to the atypical CIVλ1549.

Accepted by MNRAS

E-mail contact: chony@iaa.es, paola.marziani@oapd.inaf.it
Preprint available at http://arxiv.org/abs/1503.08295

Detection of Rest-frame Optical Lines from X-shooter Spectroscopy of Weak Emission Line Quasars

Richard M. Plotkin[1], **Ohad Shemmer**[2], **Benny Trakhtenbrot**[3], **Scott F. Anderson**[4], **W. N. Brandt**[5,6,7], **Xiaohui Fan**[8], **Elena Gallo**[1], **Paulina Lira**[9], **Bin Luo**[5,6], **Gordon T. Richards**[10], **Donald P. Schneider**[5,6], **Michael A. Strauss**[11], **and Jianfeng Wu**[12]

[1] Department of Astronomy, University of Michigan, 1085 South University Avenue, Ann Arbor, MI 48109, USA
[2] Department of Physics, University of North Texas, Denton, TX 76203, USA
[3] Institute for Astronomy, Department of Physics, ETH Zurich, Wolfgang-Pauli-Strasse 27, CH-8093 Zurich, Switzerland
[4] Department of Astronomy, University of Washington, Box 351580, Seattle, WA 98195, USA
[5] Department of Astronomy & Astrophysics, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[6] Institute for Gravitation and the Cosmos, The Pennsylvania State University, University Park, PA 16802, USA
[7] Department of Physics, 104 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[8] Steward Observatory, University of Arizona, 933 North Cherry Avenue, Tucson, AZ 85721, USA
[9] Departamento de Astronomia, Universidad de Chile, Camino del Observatorio 1515, Santiago, Chile
[10] Department of Physics, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, USA
[11] Department of Astrophysical Sciences, Princeton University, Princeton, NJ 08544, USA
[12] Harvard-Smithsonian Center for Astrophysics, MS 6, 60 Garden Street Cambridge, MA 02138, USA

Over the past 15 years, examples of exotic radio-quiet quasars with intrinsically weak or absent broad emission line regions (BELRs) have emerged from large-scale spectroscopic sky surveys. Here, we present spectroscopy of seven such weak emission line quasars (WLQs) at moderate redshifts ($z = 1.4 - 1.7$) using the X-shooter spectrograph, which provides simultaneous optical and near-infrared spectroscopy covering the rest-frame ultraviolet through optical. These new observations effectively double the number of WLQs with spectroscopy in the optical rest-frame, and they allow us to compare the strengths of (weak) high-ionization emission lines (e.g., C IV) to low-ionization lines (e.g., C II, Hβ, Hα) in individual objects. We detect broad Hβ and Hα emission in all objects, and these lines are generally toward the weaker end of the distribution expected for typical quasars (e.g., Hβ has rest-frame equivalent widths ranging from 15–40 Å.). However, these low-ionization lines are not exceptionally weak, as is the case for high-ionization lines in WLQs. The X-shooter spectra also display relatively strong optical C II emission, Hβ FWHM < 4000 km s^{-1}, and significant C IV blueshifts ($\approx$1000-5500 km s^{-1}) relative to the systemic redshift; two spectra also show elevated ultraviolet C II emission, and an outflowing component to their (weak) C II emission lines. These properties suggest that WLQs are exotic versions of "wind-dominated" quasars. Their BELRs either have unusual high-ionization components, or their BELRs are in an atypical photoionization state because of an unusually soft continuum.

Accepted by ApJ

E-mail contact: rplotkin@umich.edu
Preprint available at http://arxiv.org/abs/1503.07523

Weak Emission Line Quasars in the Context of a Modified Baldwin Effect

Ohad Shemmer[1] **and Sara Lieber**[1]

[1] Department of Physics, University of North Texas, Denton, TX 76203, USA

We investigate the relationship between the rest-frame equivalent width (EW) of the C IV λ1549 broad-emission line, monochromatic luminosity at rest-frame 5100 Å, and the Hβ1-based Eddington ratio in a sample of 99 ordinary quasars across the widest possible ranges of redshift ($0 < z < 3.5$) and bolometric luminosity ($10^{44} \lesssim L \lesssim 10^{48}$ erg s^{-1}). We find that EW(C IV) is primarily anti-correlated with the Eddington ratio, a relation we refer to as a modified Baldwin effect (MBE), an extension of the result previously obtained for quasars at $z < 0.5$. Based on the MBE, weak emission line quasars (WLQs), typically showing EW(C IV) $\lesssim 10$ Å, are expected to have extremely high Eddington ratios. By selecting all WLQs with archival Hβ and C IV spectroscopic data, nine sources in total, we find that their Hβ-based Eddington ratios are typical of ordinary quasars with similar redshifts and luminosities. Four of these WLQs can be accommodated by the MBE, but the other five deviate significantly from this relation, at the $\gtrsim 3\sigma$ level, by exhibiting C IV lines much weaker than predicted from their Hβ-based Eddington ratios. Assuming the supermassive black-hole masses in all quasars can be determined reliably using the single-epoch Hβ-method, our results indicate that EW(C IV) cannot depend solely on the Eddington ratio. We briefly discuss a strategy for further investigation into the roles that basic physical properties play in controlling the relative strengths of broad-emission lines in quasars.

Accepted by The Astrophysical Journal

E-mail contact: ohad@unt.edu
Preprint available at http://arxiv.org/abs/1503.07547

FACT - Monitoring Blazars at Very High Energies

Daniela Dorner[1], M. L. Ahnen[2], M. Bergmann[1], A. Biland[2], M. Balbo[3], T. Bretz[2], J. Buß[4], S. Einecke[4], J. Freiwald[4], C. Hempfling[1], D. Hildebrand[2], G. Hughes[2], W. Lustermann[2], K. Mannheim[1], K. Meier[1], S. Mueller[2], D. Neise[2], A. Neronov[3], A.-K. Overkemping[4], A. Paravac[1], F. Pauss[2], W. Rhode[4], T. Steinbring[1], F. Temme[4], J. Thaele[4], S. Toscano[3], P. Vogler[2], R. Walter[3] and A. Wilbert[1]

[1]Universität Würzburg, Institute for Theoretical Physics and Astrophysics, Emil-Fischer-Str. 31, 97074 Würzburg, Germany
[2]ETH Zurich, Institute for Particle Physics, Otto-Stern-Weg 5, 8093 Zurich, Switzerland
[3]University of Geneva, ISDC Data Center for Astrophysics, Chemin d'Ecogia 16, 1290 Versoix, Switzerland
[4]TU Dortmund, Experimental Physics 5, Otto-Hahn-Str. 4, 44221 Dortmund, Germany

The First G-APD Cherenkov Telescope (FACT) was built on the Canary Island of La Palma in October 2011 as a proof of principle for silicon based photosensors in Cherenkov Astronomy. The scientific goal of the project is to study the variability of active galatic nuclei (AGN) at TeV energies. Observing a small sample of TeV blazars whenever possible, an unbiased data sample is collected. This allows to study the variability of the selected objects on timescales from hours to years. Results from the first three years of monitoring will be presented.

To provide quick flare alerts to the community and trigger multi-wavelength observations, a quick look analysis has been installed on-site providing results publicly online within the same night. In summer 2014, several flare alerts were issued. Results of the quick look analysis are summarized.

SUBMITTED to Proceedings Fermi Symposium on Feb 9th 2015

E-mail contact: dorner@astro.uni-wuerzburg.de
DRAFT is available at http://arxiv.org/abs/1502.02582

The results of the quick look analysis are available on http://www.fact-project.org/monitoring.

Meetings

STFC Introductory Summer School: Atomic processes and spectral modelling in astrophysics

Astrophysics Research Centre, School of Mathematics and Physics, Queen's University Belfast, Northern Ireland, UK
31st August 2015 - 4th September 2015

Webpage: `http://go.qub.ac.uk/stfc-iss`
Email: `f.keenan@qub.ac.uk`

Spectroscopy makes an essential contribution to the study of a myriad of astronomical sources, ranging from the Sun to the most distant quasars. Modelling of the emission and/or absorption line spectra of such sources provides a wealth of information on their fundamental properties, including (but not limited to) velocity, temperature, particle density and chemical composition. Vital requirements for the reliable modelling of astronomical spectra include: (i) knowledge of the atomic processes which are important in generating the spectrum, (ii) accurate atomic data for these processes, either measured in the laboratory or calculated using atomic structure packages, (iii) sophisticated spectral modelling codes, which include all relevant atomic processes and produce a realistic spectral model which may be confidently compared with observations.

The STFC Introductory Summer School is designed to play an essential role in the early training of both PhD students and postdoctoral researchers in all of the above by providing:

- an introduction to the atomic processes of importance in different types of astronomical sources;
- how data for these processes are measured or (more often) calculated;
- an introduction to the various computer codes available for modelling astronomical spectra;
- what information spectral modelling codes can provide on astronomical sources, ranging from the Sun to quasars, and what are their limitations;
- an introduction to current and future spectroscopic facilities available to UK astrophysicists;
- advice on career development and public engagement;
- allowing PhD students and postdoctoral participants to interact scientifically with each other, and also with lecturers who are leaders in their research field.

The Summer School, including accommodation, meals and travel expenses, is free for STFC-sponsored and self-supporting PhD students, and tuition-free for many other categories of students and postdoctoral researchers. More information and a draft lecture schedule can be found on the Summer School website:

http://go.qub.ac.uk/stfc-iss

Registration for the Summer School is now open via the above website, and should be completed by Friday 3rd July 2015 to guarantee accommodation.

Please contact the Summer School director Francis Keenan at f.keenan@qub.ac.uk if you have any questions.

European Radio Interferometry School 2015

ESO, Garching, Germany

September 6th - 10th

Webpage: `http://www.eso.org/sci/meetings/2015/eris2015.html`
Email: `eris2015@eso.org`

We are pleased to announce that the Sixth European Radio Interferometry School (ERIS2015) will be held at ESO, Garching, Germany from September 6th 10th, 2015.

ERIS will provide 5 days of lectures and tutorials on how to obtain scientific results from radio interferometry at metre to sub-millimetre wavelengths. It is the sixth in a series of schools sponsored by RadioNet. Topics to be covered include:

- Fundamentals of radio interferometry
- Calibration of continuum, spectral-line and polarization data
- Imaging, deconvolution and self-calibration
- Interferometry at metre (LOFAR), cm (Jansky VLA, eMERLIN) and mm (ALMA, NOEMA) wave-lengths; Very Long Baseline Interferometry (EVN)
- Extracting information from images and data cubes; interpreting the results
- Choosing the most effective array(s) for your project and writing proposals

Participants will be expected to bring their own laptops with the most commonly used data-reduction packages, CASA and AIPS, installed. Datasets from a range of arrays including ALMA, e-MERLIN, Jansky VLA, EVN and LOFAR will be provided for use in the tutorials.

The school will start at 0850 on Sunday September 6th and end on Thursday September 10th during the afternoon (this is to allow participants to travel to the IRAM Single Dish School, which starts on September 11th). The registration deadline is July 15th 2015. Details of the school, including a registration link, can be found at http://www.eso.org/sci/meetings/2015/eris2015.html

The registration fee will be EUR180. This covers: accommodation for 5 nights; all lunches and refreshments during the school; two buffet dinners at ESO and a weekly ticket for the U-Bahn (subway). We expect to be able to accommodate up to about 80 participants. If you have any questions, please contact us at eris2015@eso.org.

LOC: Robert Laing (ESO, Chair), Elena Zuffanelli (ESO), Andy Biggs (ESO), Dirk Petry (ESO), Anita Richards (JBCA, Manchester).

SOC: Robert Laing (ESO; Chair), Anita Richards (JBCA, University of Manchester), Tiziana Venturi (INAF-IRA, Bologna), Liz Humphreys (ESO), Andy Biggs (ESO), Vincent Pie tu (IRAM, Grenoble), Wouter Vlemmings (OSO/Chalmers University), Katherine Johnston (University of Leeds), Roberto Pizzo (AS- TRON), John McKean (ASTRON), Bob Campbell (JIVE).

The school is generously supported by RadioNet3 and ESO.

Special Announcements

Call for e-MERLIN proposals - Cycle-3

For observations September 2015 - January 2016
Deadline for Receipt of Proposals: 23:59:59 UT on 30th April 2015

Webpage: `http://www.e-merlin.ac.uk/observe/call_cycle3.html`
Email: `emerlin@jb.man.ac.uk`

e-MERLIN requests proposals from the international astronomical community for observations to be made during Cycle-3. Proposals are competitively peer-reviewed under standard STFC rules by the PATT e-MERLIN Time Allocation Committee. Allocation will be made on the basis of scientific merit and technical feasibility alone. During the first 5 semesters of e-MERLIN operations 50% of observing time has been allocated to 12 large legacy projects, and most of the remaining time will be allocated via PATT to standard proposals solicited prior to each observing semester.

e-MERLIN provides high resolution (40-150mas) and high sensitivity ([7]-14 microJy [inc. lovell Telescope] in Cycle-3) imaging at cm wavelengths as well as polarimetry, spectroscopy and astrometry. Cycle-3 observations will commence in September 2015.

Developments during Cycle-3: Following final testing and commissioning, the introduction of the full 2 GHz bandwidth at C-Band is scheduled for delivery during the cycle-3 observing period. PATT observations made after this development may benefit from this extra bandwidth once it becomes available, however, this will be offered initially on a shared-risk basis. All proposals should be justified assuming the current available bandwidth of 512 MHz.

Cycle-3 e-MERLIN Observations : September 2015 - January 2016
Deadline for Receipt of Proposals - 23:59:59 UT on 30th April 2015

Observing frequencies available:-
L-Band: 1.23GHz to 1.74GHz
C-Band: 4.5GHz to 7.5GHz

Commencing in Summer 2015, The University of Manchester is undertaking a £15M work programme on the Lovell Telescope. As such during this e-MERLIN cycle there will be a limited availability of up to 10 days of the Lovell telescope for the inclusion within e-MERLIN PATT observations at L and C-band. Proposers must make a detailed case for the inclusion of the Lovell telescope in their proposed observations.

During Cycle 3, e-MERLIN C-band operations utilising bandwidths wider than 512MHz will be on a best-efforts basis and no programmes are guaranteed. Proposals should assume 512MHz observing bandwidth. However, PIs of allocated proposals which may benefit from these enhanced capabilities will be informed and given the option to use these capabilities.

Proposers should consult the allocated e-MERLIN legacy programme to avoid conflicts (see notes below). In cases where PATT proposals directly replicate portions of allocated legacy projects, legacy projects will normally be given priority.

During Cycle-3 there is one VLBI session. Simultaneous joint VLBI+e-MERLIN observations cannot be guaranteed although every effort will be made to provide simultaneous or contemporanious matching e-MERLIN observations for joint programmes. EVN proposals should be submitted to the EVN Programme Committee - details for proposing for EVN time can be found via the EVN web pages.