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Accepted Abstracts - Submitted Abstracts - Thesis Abstracts
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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

Simultaneous XMM-*Newton* and HST-COS observation of 1H 0419-577: II. Broadband spectral modeling of a variable Seyfert galaxy

L. Di Gesu[1], E. Costantini[1], E. Piconcelli[2], J. Ebrero[1], M. Mehdipour[3], and J. S. Kaastra[1]

[1] SRON Netherlands Institute for Space Research, Sorbonnelaan 2, 3584 CA Utrecht, The Netherlands
[2] Osservatorio Astronomico di Roma (INAF), Via Frascati 33, I–00040, Monteporzio Catone (Roma), Italy
[3] Mullard Space Science Laboratory, University College London, Holmbury St. Mary, Dorking, Surrey, RH5 6NT, UK

In this paper, we present the longest exposed (97 ks) XMM-*Newton* EPIC-pn spectrum ever obtained for the Seyfert 1.5 galaxy 1H 0419–577. With the aim of explaining the broadband emission of this source, we took advantage of the simultaneous coverage in the optical/UV that was provided in the present case by the XMM-*Newton* Optical Monitor and by a HST-COS observation. Archival FUSE flux measurements in the FUV were also used for the present analysis. We successfully modeled the X-ray spectrum and the optical/UV fluxes data points using a Comptonization model. We found that a blackbody temperature of $T \sim 56$ eV accounts for the optical/UV emission originating in the accretion disk. This temperature serves as input for the Comptonized components that model the X-ray continuum. Both a warm ($T_{\rm wc} \sim 0.7$ keV, $\tau_{\rm wc} \sim 7$) and a hot corona ($T_{\rm hc} \sim 160$ keV, $\tau_{\rm hc} \sim 0.5$) intervene to upscatter the disk photons to X-ray wavelengths. With the addition of a partially covering ($C_v \sim 50\%$) cold absorber with a variable opacity ($N_{\rm H} \sim [10^{19} - 10^{22}]$ cm^{-2}), this model can explain also the historical spectral variability of this source with the present dataset presenting the lowest one ($N_{\rm H} \sim 10^{19}$ cm^{-2}). We discuss a scenario where the variable absorber becomes less opaque in the highest flux states because it gets ionized in response to the variations of the X-ray continuum. The lower limit for the absorber density derived in this scenario is typical for the broad line region clouds. We infer that 1H 0419–577 may be viewed from an intermediate inclination angle $i \geq 54°$, and, on this basis, we speculate that the X-ray obscuration may be associated with the innermost dust-free region of the obscuring torus. Finally, we critically compare this scenario with all the different models (e.g., disk reflection) that have been used in the past to explain the variability of this source

Accepted for publications in Astronomy & Astrophysics,

E-mail contact: L.di.Gesu@sron.nl,
Preprint available at http://arxiv.org/abs/1401.5614

Investigating the sensitivity of observed spectral energy distributions to clumpy torus properties in Seyfert galaxies

C. Ramos Almeida[1,2,3], A. Alonso-Herrero[4,5], N. A. Levenson[6], A. Asensio Ramos[1,2], J. M. Rodríguez Espinosa[1,2], O. González-Martín[1,2], C. Packham[7] and M. Martínez[8]

[1] Instituto de Astrofísica de Canarias, Calle Vía Láctea, s/n, E-38205, La Laguna, Tenerife, Spain
[2] Departamento de Astrofísica, Universidad de La Laguna, E-38206, La Laguna, Tenerife, Spain
[3] Marie Curie Fellow
[4] Instituto de Física de Cantabria, CSIC-Universidad de Cantabria, E-39005, Santander, Spain
[5] Augusto González Linares Senior Research Fellow
[6] Gemini Observatory, Casilla 603, La Serena, Chile
[7] Department of Physics and Astronomy, University of Texas at San Antonio, One UTSA Circle, San Antonio, USA
[8] Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE), 72000 Puebla, México

We present nuclear spectral energy distributions (SEDs) from 1 to 18 μm of a small sample of nearby, nearly face-on and undisturbed Seyfert galaxies without prominent nuclear dust lanes. These nuclear SEDs probe the central $\sim$35 pc of the galaxies, on average, and include photometric and spectroscopic infrared (IR) data. We use these SEDs, the clumpy torus models of Nenkova et al. and a Bayesian approach to study the sensitivity of different IR wavelengths to the torus parameters. We find that high angular resolution 8–13 μm spectroscopy alone reliably constrains the number of clumps and their optical depth (N_0 and τ_V). On the other hand, we need a combination of mid- and near-IR subarcsecond resolution photometry to constrain torus width and inclination, as well as the radial distribution of the clouds (σ, i and q). For flat radial profiles (q=0, 1), it is possible to constrain the extent of the mid-IR-emitting dust within the torus (Y) when N-band spectroscopy is available, in addition to near-IR photometry. Finally, by fitting different combinations of average and individual Seyfert 1 and Seyfert 2 data, we find that, in general, for undisturbed, nearly face-on Seyferts without prominent nuclear dust lanes, the minimum combination of data necessary to reliably constrain all the torus parameters is J+K+M-band photometry + N-band spectroscopy.

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The Wide-field Infrared Survey Explorer properties of complete samples of radio-loud active galactic nucleus

Gürkan, G.[1], Hardcastle, M. J.[2] and Jarvis, M. J.[3]

[1] School of Physics, Astronomy and Mathematics, University of Hertfordshire, College Lane, Hatfield AL10 9AB, UK
[2] School of Physics, Astronomy and Mathematics, University of Hertfordshire, College Lane, Hatfield AL10 9AB, UK
[3] Astrophysics, Department of Physics, Keble Road, Oxford OX1 3RH, UK; Physics Department, University of the Western Cape, Bellville 7535, South Africa

We present an analysis of four complete samples of radio-loud active galactic nucleus (AGN; 3CRR, 2Jy, 6CE and 7CE) using near- and mid-IR data taken by the Wide-field Infrared Survey Explorer (WISE). The combined sample consists of 79 quasars and 273 radio galaxies, and covers a redshift range $0.003 < z < 3.395$. The dichotomy in the mid-IR properties of low- and high-excitation radio galaxies (LERGs and HERGs) is analysed for the first time using large complete samples. Our results demonstrate that a division in the accretion modes of LERGs and HERGs clearly stands out in the mid-IR-radio plane (L22 μm = 5×10^{43} erg s^{-1}). This means that WISE data can be effectively used to diagnose accretion modes in radio-loud AGN. The mid-IR properties of all objects were analysed to test the unification between quasars and radio galaxies, consistent with earlier work, and we argue that smooth torus models best reproduce the observation. Quasars are found to have higher mid-IR luminosities than radio galaxies. We also studied all the sources in the near-IR to gain insights into evolution of AGN host galaxies. A relation found between the near-IR luminosity and redshift, well known in the near-IR, is apparent in the two near-IR WISE bands, supporting the idea that radio sources are hosted by massive elliptical galaxies that formed their stars at high redshifts and evolved passively thereafter. Evaluation of the positions of the sample objects in WISE colour-colour diagrams shows that widely used WISE colour cuts are not completely reliable in selecting AGN.

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E-mail contact: g.gurkan-uygun@herts.ac.uk,
Preprint available at http://de.arxiv.org/abs/1308.4843

Determining Inclinations of Active Galactic Nuclei Via Their Narrow-Line Region Kinematics - II. Correlation With Observed Properties

T.C. Fischer[1], D.M. Crenshaw[1], S.B. Kraemer[2], H.R. Schmitt[3], T.J. Turner[4]

[1] Department of Physics and Astronomy, Georgia State University, Astronomy Offices, 25 Park Place, Suite 600, Atlanta, GA 30303
[2] Institute for Astrophysics and Computational Sciences, Department of Physics, The Catholic University of America, Washington, DC 20064
[3] Naval Research Laboratory, Washington, DC 20375 [4] Department of Astronomy, University of Maryland, College Park, MD 20742

Active Galactic Nuclei (AGN) are axisymmetric systems to first order; their observed properties are likely strong functions of inclination with respect to our line of sight, yet the specific inclinations of all but a few AGN are generally unknown. By determining the inclinations and geometries of nearby Seyfert galaxies using the kinematics of their narrow-line regions (NLRs), and comparing them with observed properties, we find strong correlations between inclination and total hydrogen column density, infrared color, and Hβ full-width at half maximum (FWHM). These correlations provide evidence that the orientation of AGN with respect to our line of sight affects how we perceive them, beyond the Seyfert 1/2 dichotomy. They can also be used to constrain 3D models of AGN components such as the broad-line region and torus. Additionally, we find weak correlations between AGN luminosity and several modeled NLR parameters, which suggests that the NLR geometry and kinematics are dependent to some degree on the AGN's radiation field.

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NuSTAR Observations of Heavily Obscured Quasars at $z \sim 0.5$

G. B. Lansbury[1], D. M. Alexander[1], A. Del Moro[1], P. Gandhi[1], R. J. Assef[2], D. Stern[3], J. Aird[1], D. R. Ballantyne[4], M. Baloković[5], F. E. Bauer[6,7], S. E. Boggs[8], W. N. Brandt[9,10], F. E. Christensen[11], W. W. Craig[11,12], M. Elvis[13], B. W. Grefenstette[5], C. J. Hailey[14], F. A. Harrison[5], R. C. Hickox[15], M. Koss[16], S. M. LaMassa[17], B. Luo[9,10], J. R. Mullaney[1], S. H. Teng[18], C. M. Urry[17] and W. W. Zhang[19]

[1] Department of Physics, University of Durham, South Road, Durham DH1 3LE, UK; g.b.lansbury@durham.ac.uk
[2] Núcleo de Astronomía de la Facultad de Ingeniería, Universidad Diego Portales, Av. Ejército Libertador 441, Santiago, Chile
[3] Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Mail Stop 169-221, Pasadena, CA 91109, USA
[4] Center for Relativistic Astrophysics, School of Physics, Georgia Institute of Technology, Atlanta, GA 30332, USA
[5] Cahill Center for Astrophysics, 1216 East California Boulevard, California Institute of Technology, Pasadena, CA 91125, USA
[6] Instituto de Astrofísica, Facultad de Física, Pontificia Universidad Catlica de Chile, 306, Santiago 22, Chile
[7] Space Science Institute, 4750 Walnut Street, Suite 205, Boulder, Colorado 80301, USA
[8] Space Sciences Laboratory, University of California, Berkeley, CA 94720, USA
[9] Department of Astronomy and Astrophysics, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[10] Institute for Gravitation and the Cosmos, The Pennsylvania State University, University Park, PA 16802, USA
[11] DTU Space-National Space Institute, Technical University of Denmark, Elektrovej 327, DK-2800 Lyngby, Denmark
[12] Lawrence Livermore National Laboratory, Livermore, CA 94550, USA
[13] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA
[14] Columbia Astrophysics Laboratory, 550 W 120th Street, Columbia University, NY 10027, USA
[15] Department of Physics and Astronomy, Dartmouth College, 6127 Wilder Laboratory, Hanover, NH 03755, USA
[16] Institute for Astronomy, Department of Physics, ETH Zurich, Wolfgang-Pauli-Strasse 27, CH-8093 Zurich, Switzerland
[17] Yale Center for Astronomy and Astrophysics, Physics Department, Yale University, PO Box 208120, New Haven, CT 06520-8120, USA
[18] Observational Cosmology Laboratory, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA
[19] NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA

We present *NuSTAR* hard X-ray observations of three Type 2 quasars at $z \approx 0.4$–0.5, optically selected from the Sloan Digital Sky Survey (SDSS). Although the quasars show evidence for being heavily obscured Compton-thick systems on the basis of the 2–10 keV to [OIII] luminosity ratio and multiwavelength diagnostics, their X-ray absorbing column densities ($N_{\rm H}$) are poorly known. In this analysis: (1) we study X-ray emission at > 10 keV, where X-rays from the central black hole are relatively unabsorbed, in order to better constrain $N_{\rm H}$; (2) we further characterize the physical properties of the sources through broad-band near-UV to mid-IR spectral energy distribution (SED) analyses. One of the quasars is detected with *NuSTAR* at > 8 keV with a no-source probability of $< 0.1\%$, and its X-ray band ratio suggests near Compton-thick absorption with $N_{\rm H} \gtrsim 5 \times 10^{23}$ cm^{-2}. The other two quasars are undetected, and have low X-ray to mid-IR luminosity ratios in both the low energy (2–10 keV) and high energy (10–40 keV) X-ray regimes that are consistent with extreme, Compton-thick absorption ($N_{\rm H} \gtrsim 10^{24}$ cm^{-2}). We find that for quasars at $z \sim 0.5$, *NuSTAR* provides a significant improvement compared to lower energy (< 10 keV) *Chandra* and *XMM-Newton* observations alone, as higher column densities can now be directly constrained.

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E-mail contact: g.b.lansbury@durham.ac.uk,
Preprint available at http://arxiv.org/abs/1402.2666

Optical spectroscopic observations of gamma-ray blazars candidates I: preliminary results

A. Paggi[1], D. Milisavljevic[1], N. Masetti[2], E. Jiménez-Bailón[3], V. Chavushyan[4], R. D'Abrusco[1], F. Massaro[5], M. Giroletti[2], H. A. Smith[1], R. Margutti[1], G. Tosti[6], J. R. Martinez Galarza[1], H. Otí-Floranes[3], M. Landoni[7], 8, 1, J. E. Grindlay[1], and S. Funk[5]

[1] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA [2] INAF - Istituto di Astrosica Spaziale e Fisica Cosmica di Bologna, via Gobetti 101, 40129, Bologna, Italy [3] Instituto de Astronomía, Universidad Nacional Autónoma de México, Apdo. Postal 877, Ensenada, 22800 Baja California, México [4] Instituto Nacional de Astrofísica, Óptica y Electrónica, Apartado Postal 51-216, 72000 Puebla, México [5] SLAC - National Laboratory and Kavli Institute for Particle Astrophysics and Cosmology, 2575 Sand Hill Road, Menlo Park, CA 94025, USA [6] Dipartimento di Fisica, Università degli Studi di Perugia, 06123 Perugia, Italy [7] INAF - Osservatorio Astronomico di Brera, Via Emilio Bianchi 46, I-23807 Merate, Italy [8] INFN - Istituto Nazionale di Fisica Nucleare, sede di Milano Bicocca, Piazza della Scienza, 3, 20126 Milano, Italy

A significant fraction ($\sim 30\%$) of the gamma-ray sources listed in the second *Fermi* LAT (2FGL) catalog is still of unknown origin, being not yet associated with counterparts at lower energies. Using the available information at lower energies and optical spectroscopy on the selected counterparts of these gamma-ray objects we can pinpoint their exact nature. Here we present a pilot project pointing to assess the effectiveness of the several classification methods developed to select gamma-ray blazar candidates. To this end, we report optical spectroscopic observations of a sample of 5 gamma-ray blazar candidates selected on the basis of their infrared WISE colors or of their low-frequency radio properties. Blazars come in two main classes: BL Lacs and FSRQs, showing similar optical spectra except for the stronger emission lines of the latter. For three of our sources the almost featureless optical spectra obtained confirm their BL Lac nature, while for the source WISEJ022051.24+250927.6 we observe emission lines with equivalent width $EW \sim 31$ Å, identifying it as a FSRQ with $z = 0.48$. The source WISEJ064459.38+603131.7, although not featuring a clear radio counterpart, shows a blazar-like spectrum with weak emission lines with $EW \sim 7$ Å, yielding a redshift estimate of $z = 0.36$. In addition we report optical spectroscopic observations of 4 WISE sources associated with known gamma-ray blazars without a firm classification or redshift estimate. For all of these latter sources we confirm a BL Lac classification, with a tentative redshift estimate for the source WISEJ100800.81+062121.2 of $z = 0.65$.

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E-mail contact: apaggi@cfa.harvard.edu

NuSTAR Reveals an Intrinsically X-ray Weak Broad Absorption Line Quasar in the Ultraluminous Infrared Galaxy Markarian 231

Stacy H. Teng[1], W.N. Brandt[2], F.A. Harrison[3], B. Luo[2], D.M. Alexander[4], F.E. Bauer[5,6], S.E. Boggs[7], F.E. Christensen[8], A. Comastri[9], W.W. Craig[10,7], A.C. Fabian[11], D. Farrah[12], F. Fiore[13], P. Gandhi[4], B.W. Grefenstette[3], C.J. Hailey[14], R.C. Hickox[15], K.K. Madsen[3], A.F. Ptak[16], J.R. Rigby[1], G. Risaliti[17,18], C. Saez[5], D. Stern[19], S. Veilleux[20,21], D.J. Walton[3], D.R. Wik[16], & W.W. Zhang[16]

[1]Observational Cosmology Laboratory, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA
[2]Department of Astronomy & Astrophysics, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802, USA
[3]Cahill Center for Astronomy and Astrophysics, California Institute of Technology, Pasadena, CA 91125, USA
[4]Department of Physics, Durham University, South Road, Durham DH1 3LE, UK
[5]Pontificia Universidad Católica de Chile, Departamento de Astronomía y Astrofísica, Casilla 306, Santiago 22, Chile
[6]Space Science Institute, 4750 Walnut Street, Suite 205, Boulder, CO 80301, USA
[7]Space Sciences Laboratory, University of California, Berkeley, CA, 94720, USA
[8]DTU Space - National Space Institute, Technical University of Denmark, Elektrovej 327, 2800 Lyngby, Denmark
[9]INAF – Osservatorio Astronomico di Bologna, Via Ranzani 1, 40127 Bologna, Italy
[10]Lawrence Livermore National Laboratory, Livermore, CA 94550, USA
[11]Institute of Astronomy, Madingley Road, Cambridge, CB3 0HA, UK
[12]Department of Physics, Virginia Tech, Blacksburg, VA 24061, USA
[13]Osservatorio Astronomico di Roma, via Frascati 33, 00040 Monteporzio Catone, Italy
[14]Columbia Astrophysics Laboratory, Columbia University, New York, NY 10027, USA

[15]Department of Physics and Astronomy, Dartmouth College, 6127 Wilder Laboratory, Hanover, NH 03755, USA
[16]X-ray Astrophysics Laboratory, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA
[17]INAF – Osservatorio Astrofisico di Arcetri, Largo, E. Fermi 5, I-50125 Firenze, Italy
[18]Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge, MA 02138, USA
[19]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109, USA
[20]Department of Astronomy, University of Maryland, College Park, MD 20742, USA
[21]Joint Space-Science Institute, University of Maryland, College Park, MD 20742, USA

We present high-energy (3–30 keV) *NuSTAR* observations of the nearest quasar, the ultraluminous infrared galaxy (ULIRG) Markarian 231 (Mrk 231), supplemented with new and simultaneous low-energy (0.5–8 keV) data from *Chandra*. The source was detected, though at much fainter levels than previously reported, likely due to contamination in the large apertures of previous non-focusing hard X-ray telescopes. The full band (0.5–30 keV) X-ray spectrum suggests the active galactic nucleus (AGN) in Mrk 231 is absorbed by a patchy and Compton-thin ($N_H \sim 1.2^{+0.3}_{-0.3} \times 10^{23}$ cm^{-2}) column. The intrinsic X-ray luminosity ($L_{0.5-30\ \rm keV} \sim 1.0 \times 10^{43}$ erg s^{-1}) is extremely weak relative to the bolometric luminosity where the 2–10 keV to bolometric luminosity ratio is ∼0.03% compared to the typical values of 2–15%. Additionally, Mrk 231 has a low X-ray-to-optical power law slope ($\alpha_{\rm OX} \sim -1.7$). It is a local example of a low-ionization broad absorption line (LoBAL) quasar that is intrinsically X-ray weak. The weak ionizing continuum may explain the lack of mid-infrared [O IV], [Ne V], and [Ne VI] fine-structure emission lines which are present in sources with otherwise similar AGN properties. We argue that the intrinsic X-ray weakness may be a result of the super-Eddington accretion occurring in the nucleus of this ULIRG, and may also be naturally related to the powerful wind event seen in Mrk 231, a merger remnant escaping from its dusty cocoon.

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E-mail contact: stacy.h.teng@nasa.gov,
Preprint available upon request

First X-ray-Based Statistical Tests for Clumpy-Torus Models: Eclipse Events from 230 Years of Monitoring of Seyfert AGN

A. G. Markowitz[1,2,3], M. Krumpe[4,1], R. Nikutta[5]

[1]University of California, San Diego, Center for Astrophysics and Space Sciences, 9500 Gilman Dr., La Jolla, CA 92093-0424, USA
[2]Dr. Karl Remeis Sternwarte, Sternwartstrasse 7, D-96049 Bamberg, Germany
[3]Alexander van Humboldt Fellow
[4]European Southern Observatory, Karl-Schwarzschild-Strasse 2, D-85748 Garching bei München, Germany
[5]Departamento de Ciencias Fisicas, Universidad Andrés Bello, Av. República 252, Santiago, Chile

We present an analysis of multi-timescale variability in line-of-sight X-ray absorbing gas as a function of optical classification in a large sample of Seyfert AGN to derive the first X-ray statistical constraints for clumpy-torus models. We systematically search for discrete absorption events in the vast archive of *RXTE* monitoring of dozens of nearby type I and Compton-thin type II AGN. We are sensitive to discrete absorption events due to clouds of full-covering, neutral or mildly ionized gas with columns $>\sim 10^{22-25}$ cm^{-2} transiting the line of sight.
We detect 12 eclipse events in 8 objects, roughly tripling the number previously published from this archive. Peak column densities span $\sim 4 - 26 \times 10^{22}$ cm^{-2}. Event durations span hours to months. The column density profile for an eclipsing cloud in NGC 3783 is doubly spiked, possibly indicating a cloud that is being tidally sheared.
We infer the clouds' distances from the black hole to span $\sim 0.3 - 140 \times 10^4 R_{\rm g}$. In seven objects, the clouds' distances are commensurate with the outer portions of Broad Line Regions (BLR), or the inner regions of infrared-emitting dusty tori. We discuss implications for cloud distributions in the context of clumpy-torus models. The probability of observing a source undergoing an absorption event, independent of constant absorption due to non-clumpy material, is $0.006^{+0.160}_{-0.003}$ for type Is and $0.110^{+0.461}_{-0.071}$ for type IIs.

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E-mail contact: almarkowitz@ucsd.edu
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Supplemental video animation available at http://www.nasa.gov/content/goddard/rxte-reveals-the-cloudy-cores-of-active-galaxies/

Meetings

The X-ray Universe 2014

Dublin, Ireland
16th - 19th June 2014

Webpage: http://xrayuniverse.esa.int
Email: xru2014@sciops.esa.int
Conference poster: http://xrayuniverse.esa.int/images/poster.pdf

The XMM-Newton Science Operations Centre of the European Space Agency (ESA) is organising the fourth astrophysical symposium in the series "The X-ray Universe". The intention is to gather a general collection of research in high energy astrophysics. The symposium will provide a showcase for results, discoveries and expectations from current and future X-ray missions.

SOC: J. Schmitt (chair), M. Arnaud, X. Barcons, M. Barstow, L. Brenneman, E. Churazov, A. Decourchelle, D. de Martino, C. Done, G. Garmire, S. Grebenev, M. Guedel, L. Harra, J. Kaastra, S. Komossa, K. Matsushita, B. McBreen, T. Montmerle, R. Petre, P. Predehl, G. Rauw, N. Rea, P. Rodriguez, N. Schartel (co-chair), S. Sciortino, G. Trinchieri, M. van der Klis, A. Vikhlinin, R. Warwick, J. Wilms, A. Zdziarski
LOC: J. Ness (chair), M. Ehle, C. Gabriel, P. Gallagher, A. Ibarra, N. Loiseau, A. Martin-Carrillo, B. McBreen, E. Ojero, R. Saxton, N. Schartel

The conference web page including details on the scientific organisation is available via
http://xrayuniverse.esa.int/
and information about registration and logistics can be found at
http://www.congrexprojects.com/2014-events/14a02/

Early registration is possible until Monday April 28 at
http://www.congrexprojects.com/2014-events/14a02/registration

Important dates
(subject to changes)

- Friday 28 February - Deadline for abstract submission
- second half of April - Notification to authors
- Monday 28 April - Deadline for early registration
- early June - Final announcement

- 15 June 18:00 - Reception and registration
- 16 June 08:00 - Registration
- 16 June 10:30 - Opening of the Conference
- 19 June 17:15 - End of the Conference

Special Announcements

Fizeau exchange visitors program - call for applications

2014-01-30

The Fizeau exchange visitors program in optical interferometry funds (travel and accommodation) visits of researchers to an institute of his/her choice (within the European Community) to perform collaborative work and training on one of the active topics of the European Interferometry Initiative. The visits will typically last for one month, and strengthen the network of astronomers engaged in technical, scientific and training work on optical/infrared interferometry. The program is open for all levels of astronomers (Ph.D. students to tenured staff). Applicants are strongly encouraged to seek also partial support from their home or host institutions.

The **deadline for applications is March 15**. Fellowships can be awarded for missions starting in May 2014.

Further informations and application forms can be found at www.european-interferometry.eu

The program is funded by OPTICON/FP7.

Please distribute this message also to potentially interested colleagues outside of the your community!

Looking forward to your applications,
Josef Hron & Laszlo Mosoni
(for the European Interferometry Initiative)

E-mail contact: fizeau@european-interferometry.eu