

CURRICULUM VITAE

Athanassios Akylas

**Institute for Astronomy Astrophysics
Space Applications & Remote Sensing**

National Observatory of Athens

November 2021

SUMMARY

I have joined National Observatory of Athens in 2006 as a scientific staff and in 2017 I was elected senior scientist at the Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing.

My main research activities include: i) AGN physics and variability ii) X-ray Background Synthesis Models and highly obscured and Compton-thick AGN, iii) Spectral properties and Unification Models of AGN, iv) development of automated techniques for X-ray data reduction and analysis, v) Application of Artificial Intelligence and Machine learning techniques for image analysis and signal detection in X-ray observations.

Since its early phase in 2015, I have actively joined the ATHENA's mission '[Energetic Universe](#)' working group. The aim of this group is to bring the expertise and effort to bear in support of ATHENA mission. The Energetic Universe working group is in charge of assisting the Athena Study Science Team ([ASST](#)) in the scientific support of the ATHENA Science Objective "Complete census of AGN", by testing, through simulations, the capabilities and the efficiency of various potential instrument configurations on board ATHENA.

Moreover, the X-ray group at NOA (along with University of Crete) officially joined the [ATHENA WFI](#) consortium, led by the Max-Planck-Institute. The Greek contribution led by NOA will focus on the development of software for the science data analysis of the WFI instrument on board Athena. In this framework I closely work with the X-ray team to develop a 3D source detection algorithm for X-ray observations. Finally, I am the principal investigator (for Greece) of the H2020 SPACE "XMM2ATEHNA" research project that aims to develop and test new methods and software for XMM-Newton data analysis which can then be used by the next generation X-ray observatory, ATHENA.

My research work (h-index 17) has resulted in 43 referred scientific publications in international refereed journals (850 citations) and 26 non-referred publications (proceedings and catalogues) (source: [NASA-ADS](#)).

In parallel with my research activities, I am actively involved in public outreach and education. I have been involved in the organization of Advanced Astronomy Schools for post graduate students and young postdocs and actively participate with presentations and workshops in the educational activities of the NOA's visitor center (e.g the [space cadet](#) art project, 2021). I am also involved in the actions of the [Tipping Point program](#) and guest speaker in [TEDX Chania 2018](#) and [Athens Science Festival 2019](#)) and tutor in [Changing Landscapes - Dance & Science Lab \(2020\)](#).

PERSONAL DETAILS

Name: Athanassios
Surname: Akylas
Address: National Observatory of Athens, Institute of Astronomy, Astrophysics Space Applications and Remote Sensing, I. Metaxa & V. Pavlou 1, Pedeli, 15236, Athens, Greece
Tel: 0030 210 8109165
Fax: 0030 210 8040453
Email: aakylas@noa.gr

STUDIES

- Ph.D. in Astronomy & Astrophysics, National & Capodistrian University of Athens, Greece (2006)
- B. Sc. in Astronomy, Astrophysics & Mechanics, National & Capodistrian University of Athens, Greece (2000)
- Diploma in Physics, National & Capodistrian University of Athens, Greece (1998)

EMPLOYMENT

- ✚ Senior Scientist, National Observatory of Athens, Institute of Astronomy, Astrophysics Space Applications and Remote Sensing (2016-today)
- ✚ Scientific staff, National Observatory of Athens, Institute of Astronomy, Astrophysics Space Applications and Remote Sensing (2005-2016)
- ✚ Research Associate in the scientific program "X-ray astronomy with XMM-Newton", National Observatory of Athens, Institute of Astronomy, Astrophysics Space Applications and Remote Sensing (2001-2005)
- ✚ Research Associate, in the Greek-Italian scientific program "Observations of Active Galactic nuclei with BeppoSAX" (1999-2001)

RESEARCH INTERESTS

My research interests include (a) AGN physics and X-ray variability, (b) AGN obscuration and XRB synthesis models, (c) simulations and modelling of X-ray spectra, (d) Automated data reduction and analysis techniques of X-ray observations. v) Application of Artificial Intelligence and Machine learning techniques for image analysis and signal detection in X-ray observations.

APPLIED EXPERTISE

Automated extraction of metadata from X-ray observations

A pipeline procedure has been developed to automatically process large astronomical datasets. This process includes cleaning of the data, extraction of the exposure and background maps, run source detection algorithms, extract scientific products, such as light curves, spectra and background files. The scripts make use of both generic astronomical packages (e.g. FTOOLS) or mission specific packages (e.g CIAO, SAS).

These techniques have been integrated in the AHEAD project (<http://ahead.iaps.inaf.it/>).

Automated analysis of X-ray spectra

An automated spectral fitting procedure has been developed to fit large spectral datasets. These scripts call generic X-ray packages, (such as XSPEC) determine the best minimization statistical technique, fit the appropriate model to the data, extract the parameters of the fitted model and their uncertainties using standard or Bayesian approach.

These techniques have been integrated in the AHEAD project were IAASARS participates (<http://ahead.iaps.inaf.it/>).

X-ray Background Synthesis Models

I have developed a code for the synthesis of the spectrum of the X-ray background. The code takes as input user specified parameters and then returns the predicted spectrum for the X-ray background and the number count distribution. The code is available on line though <http://indra.astro.noa.gr>

Simulations

I have developed the necessary scripts and performed detailed simulations for (a) modelling the spectrum of AGN, (b) fitting the X-ray background, (c) making predictions for the performance of various configurations of the WFI instrument, on board ESA's X-ray mission Athena.

AI WORK IN SOURCE DETECTION AND VARIABILITY

RESEARCH PROGRAMS

I have actively participated in the following Projects

1. **GSRT Project for the Development of Greek Astronomer database**, PI N. Matsopoulos, (1999-2001). **Work performed:** Construction of the information database.
2. **Greek-Italian bilateral 2-year grant (GSRT) for the analysis of X-ray AGN monitoring observations with BeppoSAX**, (Greek PI. I. Georgantopoulos, Italian PI A. Comastri), 1999-2001. **Work performed:**
Reduction and analysis of X-ray data from BeppoSAX

3. **Greek-Spanish bilateral 2-year grant (GSRT) for the detection obscured AGN in XMM data** (Greek PI I. Georgantopoulos, Spanish PI X. Barcons), 2000-2002. **Work performed:** Reduction, analysis and scientific exploitation of X-ray data from XMM-Newton
4. **Greek-British bilateral 2-year grant (GSRT) for Observations of group of galaxies with the XMM Newton X-ray**, PI M. Plionis), 2000-2002. **Work performed:** Reduction analysis and scientific exploitation of X-ray data from XMM-Newton
5. **GSRT (Excellence), X-ray Astronomy with ESA's XMM mission**, PI Dr I. Georgantopoulos, 2002-2006. **Work performed:** Analysis and scientific exploitation of X-ray data from XMM-Newton.
6. 2006-2008 GSRT, EXPLORING GALAXIES WITH NASA'S CHANDRA X-RAY MISSION, PI Dr. I. Georgantopoulos, 2006-2008. Work performed: Reduction and analysis of X-ray data
7. Greek ministry of Education (Thales Project), "The invisible side of formation and Evolution of supermassive Black Holes in the Universe", PI Dr. A. Georgakakis, 2012-2015. **Work performed:** Modelling of the AGN spectra/Simulations
8. **2012-2015, GSRT, (Supporting postdoctoral Researchers), MUSES**, PI Dr. I. Georgantopoulos. **Work performed:** Develop an automated pipeline processing and analysis pipeline for scientific data
9. **ESA SAPS Project, Linking data with Publications for ESA's Missions**, PI. Prof. I. Daglis, 2012-2015. **Work performed:** Analysis of linking practices, design of the user interface, design of the classification algorithm, testing.
10. **ESA PRODEX Project, Construction of an XMM spectral fit database**, PI Dr I. Georgantopoulos, 2012-2015. **Work performed:** Develop scripts for automated Bayesian fitting procedures
11. **ESA PRODEX, Enhanced XMM-Newton spectral-fit database by the inclusion of photometric redshifts**, PI Dr I. Georgantopoulos, 2016-2017. **Work performed:** contribution in the application of photometric redshift estimation methods in the 3XMM catalogue.
12. **H2020, "A Definitive Study of Cosmic Dust in the Local Universe"**, PI E. Xilouris, 2014-2018. **Work performed:** Analysis of X-ray data, spectral extraction and estimation of spectral parameters.
13. **H2020, "Integrated Activities in the High Energy Astrophysics Domain"**, PI I. Georgantopoulos, 2015-2018. **Work performed:** Trainer on data analysis for scientists and engineers at all stages of their career.
14. **ESA SAPS Project, Linking data with Publications for ESA's Missions**, PI. Dr. Akylas Thanassis and Dr. O. Giannakis, 2017-2019. Work performed: Study for automated publication classification and predictive analytics for ESA's mission publications.
15. **H2020, "Integrated Activities in the High Energy Astrophysics Domain"**, PI I. Georgantopoulos, 2020-2024. **Work performed:** Instructor on data analysis for scientists and engineers at all stages of their career.
16. **ESA "XMM-RAPID"** PI for NOA Georgakakis, 2019-2020. **Work performed:** contribution in the Upper limit calculation of XMM-Newton observations and storage to look up tables designed for big data handling.
17. **H2020, "XMM-Newton: pathfinder for future multi-wavelength and multi-messenger observations with Athena"**, PI A. Akylas, 2021-2024. Work performed: Project management

CONFERENCES

I have given oral or poster contributions in the following conferences:

- Santorini, Greece, "Large Scale Structure in the X-ray Universe", September 1999
- Noordwijk, Holland, 'New Visions of the X-ray Universe', November 2001
- Santander, Spain, "X-ray Surveys in the Light of new observatories", September 2002
- Mykonos, Greece, "Multiwavelength Cosmology", June 2003
- Athens, Greece, 6th Conference Hellenic Astronomical Society, September 2003
- Escorial, Spain The X-ray Universe 2005 ESA Symposium
- Madrid, Spain, "Variable and Broad Fe lines around black holes", ESAC, June 2006
- Madrid/ESAC, Spain, "XMM: the next decade", June 2007
- Rhodes, Greece, "X-ray surveys: Evolution of accretion, star-formation and large-scale structure", July 2007 o National Technical University of Athens: "Innovative methods for transmission, receive and analysis of X-ray images", June 2009
- Mykonos, Greece, "Half a century of X-ray Astronomy", September 2012
- Chania, Greece, "Demographics and environment of AGN from multi-wavelength survey", September 2015
- Corfu. Greece, "Supermassive Black Holes: Environment and Evolution", June 2019

COMMUNITY SERVICES

- ✚ Member of the Science Working Group SWG2.2 "Understanding of the build-up of black holes and galaxies" of the ESA-L2 mission Athena X-ray Observatory (2015 – today)
- ✚ Member of science team of the Athena/WFI detector consortium.
- ✚ Member of the XMM-Newton review panel (2019 & 2020)
- ✚ Referee in scientific journals

PUBLIC OUTREACH & EDUCATION

- ✚ Participation with lectures and workshops in the educational activities of the NOA's visitor (e.g. [Space Cadet project 2021](#)).
- ✚ Participation in the actions of the [Tipping Point program](#) aiming to provide opportunities to Greek students to get in contact with scientists and their research.
- ✚ Guest speaker at Scientific events e.g. [TEDX Chania 2018](#) and the [Athens Science Festival 2019](#).
- ✚ Instructor in [Changing Landscapes - Dance & Science Lab](#).
- ✚ Editor in Pnevmatikos Scientific publications, S.A (e.g, "PHYSICS", HALLIDAY D., KRANE S., RESNICK R, 2009).

ADMINISTRATIVE & ORGANIZATIONAL EXPERIENCE

A. Conference Organization

I have successfully co-organized, a series of international conferences: a) "X-ray Surveys Rhodes", July 2007, b) "Half a century of X-ray Astronomy" Mykonos, September 2012, c) "Demographics and environment of AGN from multi-wavelength survey", September 2015, d) "Supermassive Black Holes: Environment and Evolution", June 2019, Rhodes

B. Advanced Summer School Organization

I have co-organized five X-ray Astronomy and AGN Advanced Summer schools (September 2006, September 2008, September 2010). These summer schools are addressed to postgraduate students and young postdoctoral researchers. Key note speakers included Professors and researchers from major international Institutes and Universities. (Prof. K. Nandra, Prof. M. Rowan-Robinson Dr. G. Chartas, Dr. L. Granato, Dr. A. Comastri.)

PUBLICATIONS

My research work comprises of 41 publications in international refereed journals most in the Monthly Notices of the Royal Astronomical Society, Astronomy & Astrophysics and the Astrophysical Journal and 26 non refereed publications (proceedings papers and catalogues). The refereed papers have more than 800 citations according to the NASA Astrophysics Data System (including self-citations). The full list of publications can be found [here](#).