



NewAthena Community e-Newsletter: special issue

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With this **special issue of the e-newsletter**, the NewAthena Science Study Team (NASST) and the *Athena* Community Office (ACO) are excited to provide the following update on the status of the NewAthena Study as well as on the plans for the scientific activities in support to the Adoption of NewAthena in the Science Program of the European Space Agency (ESA). **Adoption is planned for the first quarter of 2027.** The subsequent implementation phase should last ~9 years. The NASST is an advisory body appointed by ESA to provide scientific advice to the NewAthena Study. The ACO maintains the role to coordinate the NewAthena science community.

We hope this e-Newsletter will provide you with sufficient information to describe the status of NewAthena, and will stimulate your interest for, and engagement with the NewAthena process. Should you have any questions, suggestions or concerns do not hesitate to contact the NASST Chair ([Matteo Guainazzi](#)).

NewAthena Mission Profile

At their meeting of November 2023, the Science Program Committee (SPC) of ESA endorsed the NewAthena mission profile, recognizing its flagship nature according to the recommendations of the Science Redefinition Team chaired by prof. Mike Cruise.

NewAthena features a large mirror based on the Silicon Pore Optics (SPO) technology. The diameter of the mirror assembly is larger than 2 meters. The mirror will deliver a collecting area larger than 1 square meter at 1 keV as well as an on-axis angular resolution better than 9" (Half-Energy Width, HEW). Two instruments will be alternately illuminated by the focal beam:

- the **X-Ray Integral Field Unit** (X-IFU; led by CNES and IRAP) is a micro-calorimeter sensor operated in a cryogenic dewar at a temperature of 50 mK. The X-IFU is designed to enable non-dispersive spectroscopy with an energy resolution better than 4 eV at 7 keV over more than 1500 pixels, about 5" side each, covering a field-of-view with an equivalent diameter of 4'. In the 2-9 keV energy band, the X-IFU will be more sensitive to the detection of weak emission lines by a factor ~ 7 with respect to the XRISM/Resolve;
- the **Wide Field Imager** (WFI; led by MPE) will enable moderate-resolution spectroscopy of celestial sources over a large 40'x40' field-of-view, with a grasp exceeding that of eROSITA by a factor ~ 2 . The gradual off-axis degradation of the mirror Point Spread Function enables a vignetting-averaged HEW better than 10" over the WFI field-of-view.

NewAthena retains the capability of delivering transformational science on a wide range of current astrophysical topics. NewAthena will be operated by ESA as an observatory open to the science community worldwide. The nominal science operations are planned to last 5 years. Subsequent extensions are possible.

NewAthena Study Status

In May 2024, ESA restarted the NewAthena industrial activities. Two Prime Contractors have been identified to study the spacecraft, the mirror assembly, and the module hosting the two instruments ("Payload Compartment" PLC). The main spacecraft innovation is a PLC partly open to space, enabling the external vessel of the X-IFU dewar to be operated at a cooler-than-room temperature of about 50 K. Key performance parameters for the instruments are derived from the science case of the mission endorsed by the SPC. Currently, the requirements and the interfaces between the spacecraft and the instruments are being consolidated by ESA, the Primes, the Instrument Consortia, and NASA (responsible for the provision of ~ 4 K cooler, the X-IFU microcalorimeters and associated front end multiplexing SQUIDs). This process should lead to freezing all key mission parameters at an "Intermediate Review" in May 2025. The same review will also constitute the first verification of the compatibility of the NewAthena costs with the level of resources of the ESA Science Program.

Scientific Activities during the Study Phase

The NewAthena Adoption will require the delivery of the Definition Assessment Report (a.k.a. the "Red Book"). This document constitutes a science-driven holistic description of the mission. Its core is an extensive summary of the NewAthena science case, covering the breadth of its transformational scientific objectives. The Red Book shall be submitted by the NASST to ESA by the **end of August 2026**. As for similar undertakings, the NASST seeks **support from the whole science community in the preparation of the Red Book**, which will constitute the key reference on the NewAthena science case for the years to come. We warmly welcome new or complementary approaches to the NewAthena scientific objectives, quantitative predictions of NewAthena observations and experiments. Your work will constitute the backbone of the Red Book!

How can you contribute to the definition of a compelling science case of NewAthena in preparation for the mission Adoption?

1. By confirming **your commitment to support NewAthena** and the scientific activities during the Study phase in the framework of a **renewed and restructured NewAthena science community**. At the beginning of 2025 the ACO will issue an open call to the whole science community worldwide to **join the NewAthena science community**.
2. By **contributing to an Astronomy & Astrophysics Special Issue** on the NewAthena science. Pending the successful completion of the Intermediate Review, the NASST and the ACO will issue a call for A&A papers to be published concurrently and in support of the Red Book. The Table-of-Content of this A&A Special Issue should be defined by the end of 2025. **Manuscripts should be prepared during the first half of 2026**.
3. By **advertising the NewAthena science in your future papers, conference presentations, and seminars**. The ACO has prepared [a set of standard materials on the NewAthena scientific performance and the science case](#). It is also maintaining a [gallery of graphical products](#). You are warmly encouraged to use them, as well as to contribute by sharing your own ideas and simulations.

On behalf of the ACO and the NASST: Didier Barret (X-IFU Principal Investigator), Francisco J. Carrera (ACO Director), Matteo Guainazzi (ESA Study Scientist), Kirpal Nandra (WFI Principal Investigator).



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