ATHENA

THE ADVANCED TELESCOPE FOR HIGH ENERGY ASTROPHYSICS

www.the-athena-x-ray-observatory.eu

FACT SHEET

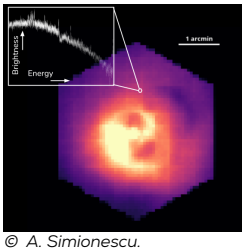
X-ray observatory mission selected by ESA
(Cosmic Vision programme)
The second large-class mission
Addresses the Hot and Energetic Universe scientific theme

SCIENCE THEME

THE HOT AND ENERGETIC UNIVERSE

The New*Athena* observatory will pursue three main scientific objectives

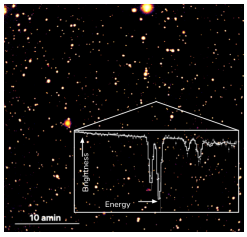
1.Determine how luminous matter assembles into the cosmic web we see today and how supernovae and super-massive black holes impact galaxy formation.



A NewAthena/X-IFU simulation of Perseus cluster with the Simulation of X-ray Telescopes (SIXTE) software: image of the core of the cluster and one single pixel spectrum (inset).

© A. Simionescu.

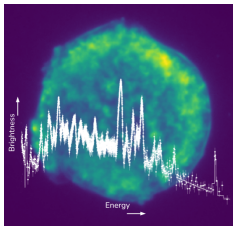
2. Perform the physics of accretion onto supermassive black holes, the launch of powerful outflows and their impact on the evolution of the surrounding environment, to establish how and when black holes form and grow together with their host galaxies.



Deep images, such as this NewAthena/WFI simulation, will reveal growing supermassive black holes out to the epoch of reionization. Inset: an example of a NewAthena/X-IFU spectrum of an Ultra Fast Outflow in an Active Galactic Nucleus at redshift 2.

© WFI Team & F.J. Carrera.

3. Provide world-class observing capabilities to advance high-energy astrophysics in the coming decades, exploring high-energy phenomena in all astrophysical contexts, including those yet to be discovered.



A NewAthena simulation of Tycho's supernova remnant. It combines a WFI image and an X-IFU spectrum obtained using SIXTE.

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MISSION

OBSERVE X-RAYS FROM ASTRONOMICAL SOURCES

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New*Athena* will be ESA's next flagship X-ray observatory, offering an unprecedented advance in X-ray sensitivity and spectral resolution over previous missions. It will address seminal science questions, driving advancements in X-ray astrophysics for decades. Designed to support the wider astronomical community, it will enable the study of astrophysical processes only observable in X-rays.

- Due to launch in the early 2030s with an Ariane 64 rocket.
- Halo orbit at 1st Sun-Earth Lagrangian Point.
- 5 years mission plus possible extensions.
- Proposal-driven observing program.
- Two complementary state-of-the-art instruments.
- 1 m^2 collecting area at 1 keV.

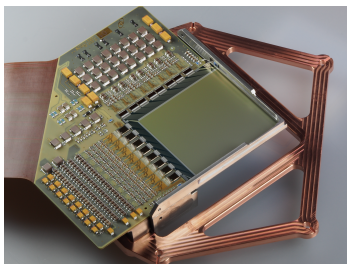
MIRROR

Large-aperture grazing-incidence telescope, utilising a novel high performance Silicon pore optics technology developed in Europe.

© Cosine.

WIDE FIELD IMAGER (WFI)

Sensitive wide field imaging and spectroscopy and high count-rate capability with a 40'x 40' field of view.



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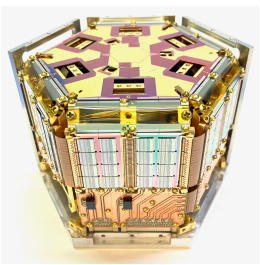
X-RAY INTEGRAL FIELD UNIT (X-IFU)

Spatially-resolved high-resolution X-ray spectroscopy over a field of view of 4 ' equivalent diameter.



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