ATHENA

THE ADVANCED TELESCOPE FOR HIGH ENERGY ASTROPHYSICS

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

FACT SHEET

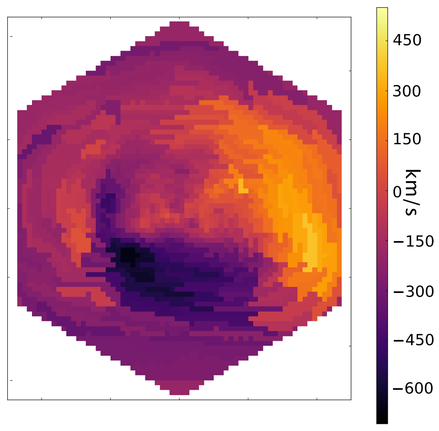
X-ray observatory mission selected by ESA (Cosmic Vision programme)
The second large-class mission
Addresses the Hot and Energetic Universe scientific theme

SCIENCE THEME

THE HOT AND ENERGETIC UNIVERSE

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

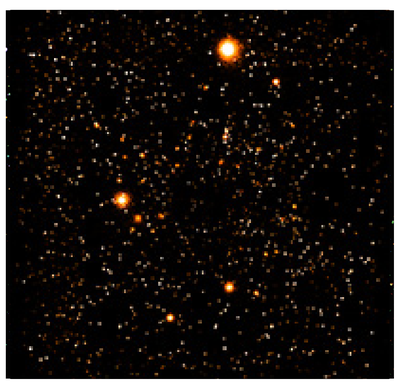
1. Determine how and when large-scale structures formed in the Universe and track their evolution from the formation epoch to the present day.



Simulation of the bulk motion map of the hot gas in a galaxy cluster at z=0.1 with the Athena X-ray Integral Field Unit instrument.

Credit: X-IFU Team (E. Cucchetti, IRAP).

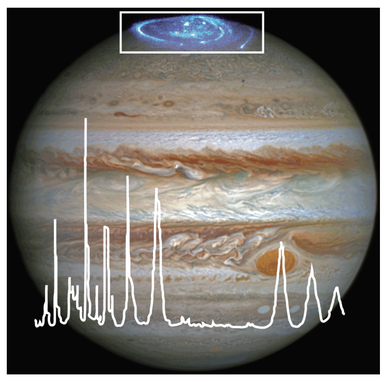
2. Perform a complete census of black hole growth in the Universe, determine the physical processes responsible for that growth and its influence on larger scales, and trace these and other energetic and transient phenomena to the earliest cosmic epochs.



Deep Athena WFI images such as this simulation, will reveal growing supermassive black holes out to the edge of the observable Universe

Credit: WFI Team.

3. Provide a unique contribution to astrophysics in the 2030s by exploring high energy phenomena in all astrophysical contexts, including those yet to be discovered.



Jupiter's aurora (blue glow at the pole) imaged by Chandra and simulated Athena X-IFU spectrum (white line) superposed to an optical image of the planet.

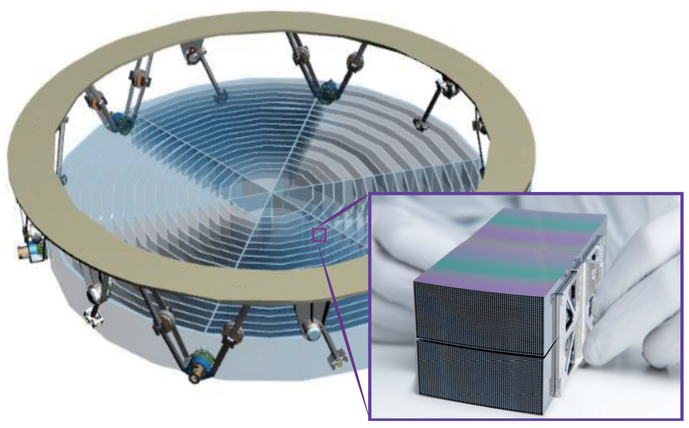
Credit: NASA/ESA, and J. Nichols (Leicester Univ.) Spect.: G. Branduardi-Raymont (UCL).

Athena will be ESA's next large X-ray observatory offering breakthrough capabilities in spatially-resolved high-resolution spectroscopy and deep wide-field spectral imaging greatly exceeding current facilities.

- Due to launch in the early 2030s with an Ariane 64 rocket.
- Halo orbit at 1st Sun-Earth Lagrangian Point (L1).
- 4 year baseline mission plus possible extensions.
- Proposal-driven observing program.
- Two complementary state-of-the-art instruments.
- ≥ 1.4 m^2 collecting area at 1 keV.

MIRROR

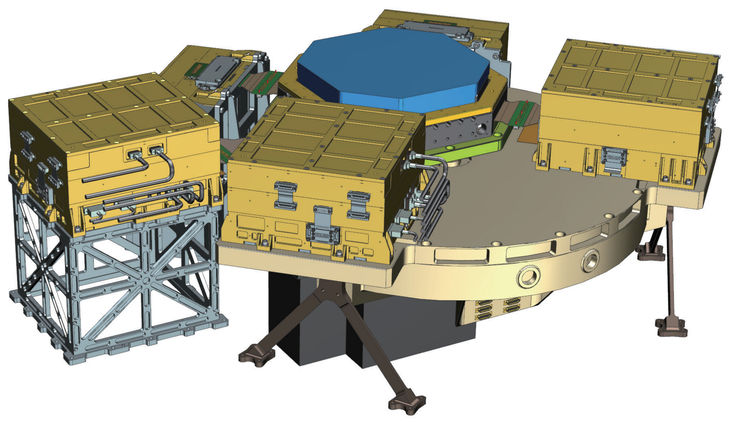
Large-aperture grazing-incidence telescope, utilising a novel high-performance Silicon pore optics technology developed in Europe.



Credit: Cosine and ESA.

WIDE FIELD IMAGER (WFI)

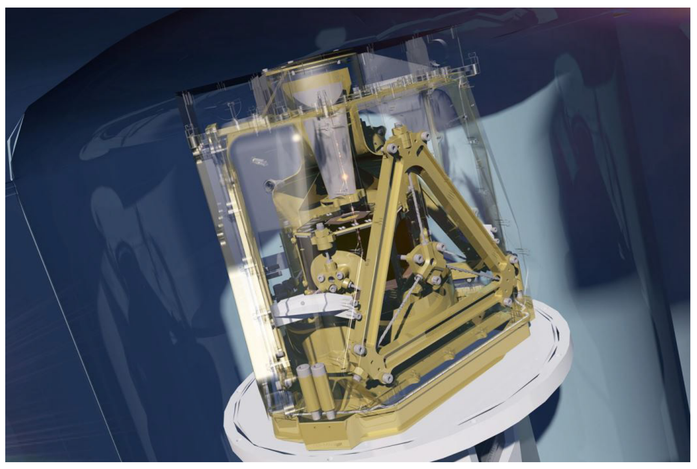
Providing sensitive wide field imaging and spectroscopy and high count-rate capability with a 40'x 40' field of view.



Credit: WFI Team.

X-RAY INTEGRAL FIELD UNIT (X-IFU)

Delivering spatially-resolved high-resolution X-ray spectroscopy over a field of view of 5 ' equivalent diameter.



Credit: IRAP/CNRS/UT3/CNES/SRON/NASA GSFC/Fab&Fab.

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