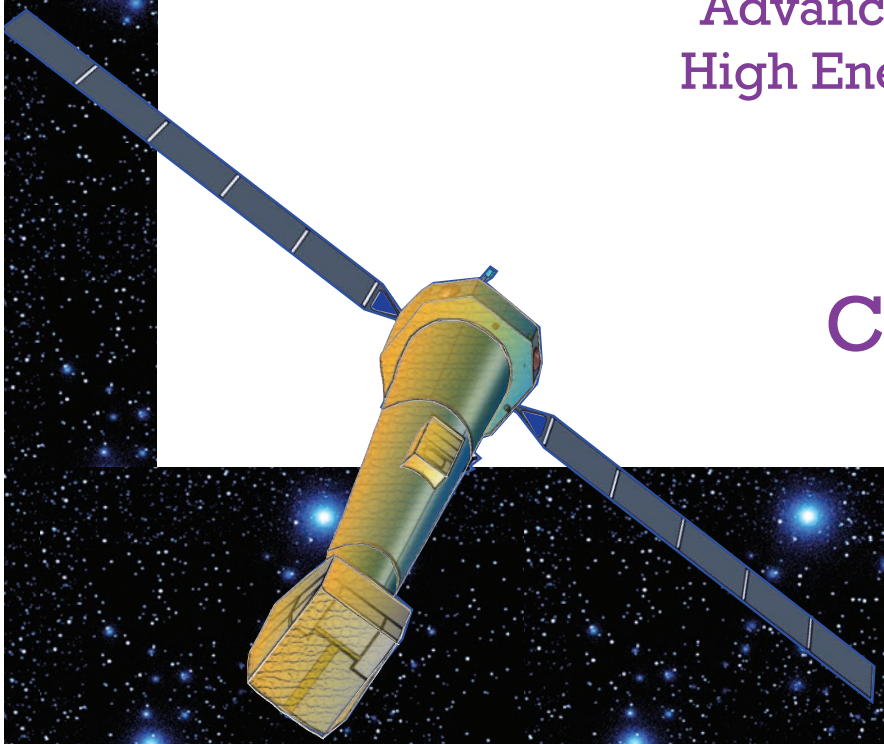
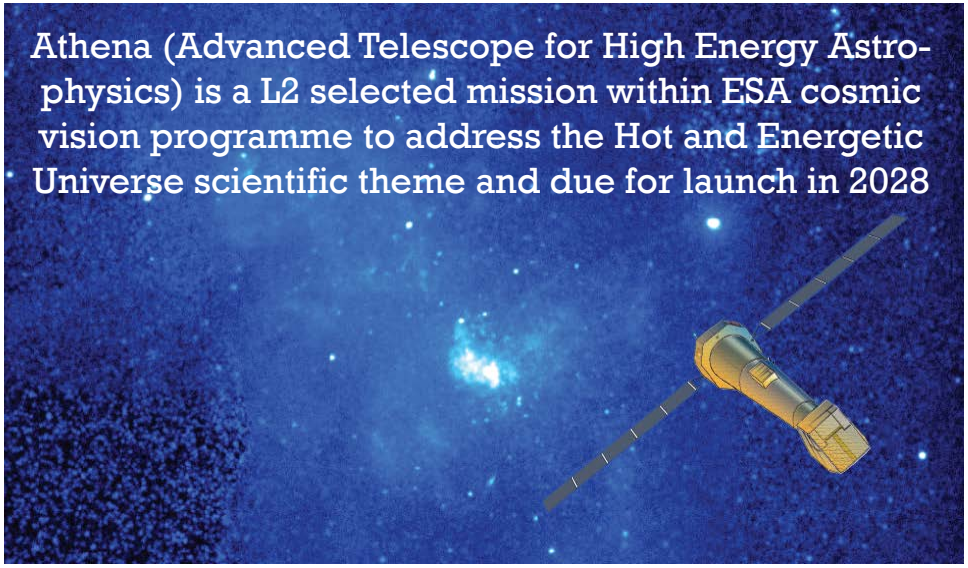
ATHENA

Advanced Telescope for
High Energy Astrophysics

2017
Calendar





INSTRUMENTATION

Athena will consist of a large-aperture X-ray telescope with two focal-plane instruments: the Wide Field Imager (WFI) providing sensitive wide field imaging and spectroscopy and high count-rate capability and the X-ray Integral Field Unit (X-IFU) delivering spatially resolved high-resolution X-ray spectroscopy

Athena will study how ordinary matter assembles into groups and clusters of galaxies, determine its chemical enrichment across cosmic time, and characterise the missing baryons residing in intergalactic filamentary structures

As an observatory, Athena will offer vital information on high-energy phenomena on all classes of astrophysical objects, from solar system bodies to the most distant objects known

Athena will study the physics of accretion into compact objects, find the earliest accreting supermassive black holes and trace their growth even when in very obscured environments, and show how they influence the evolution of galaxies and clusters through feedback processes

Athena will have a fast target of opportunity observational capability, enabling studies of transient phenomena

With its unparalleled capabilities, Athena will be a truly transformational observatory, operating in synergy with other large space-based observatories in the late 2020s (ALMA, E-ELT, SKA, etc)

2017

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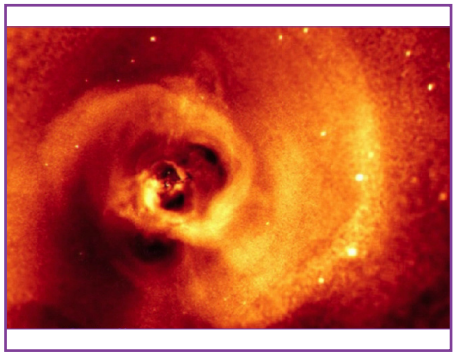

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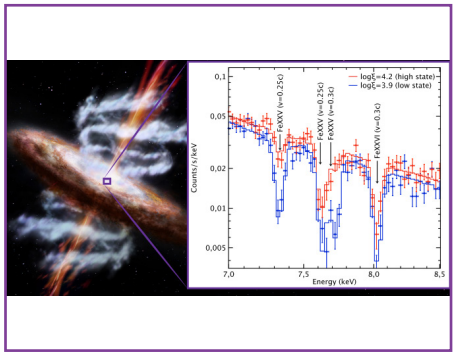

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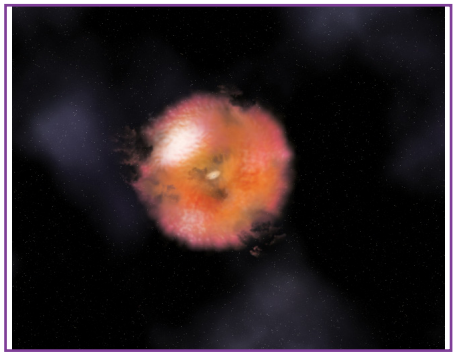
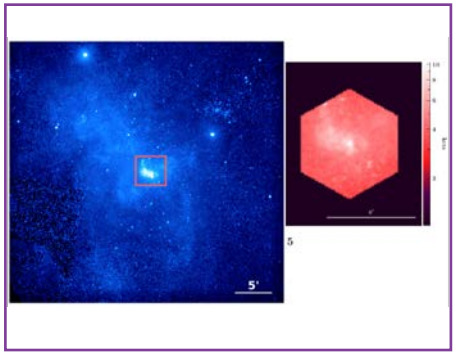
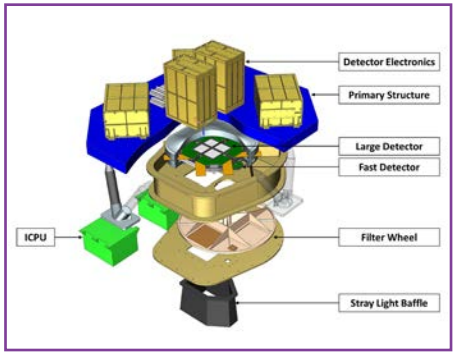


April



May

June



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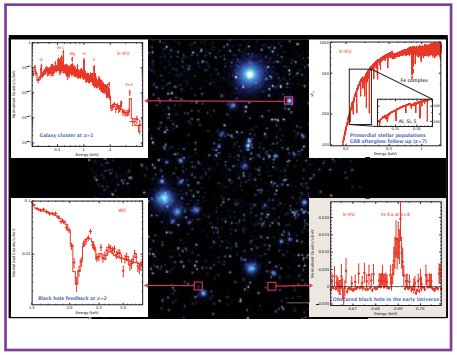

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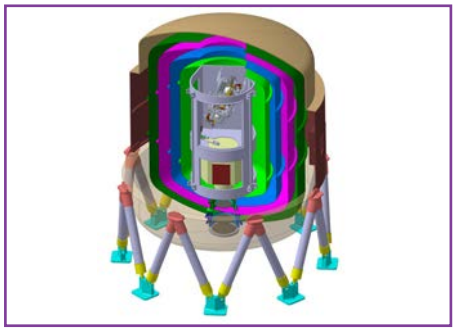

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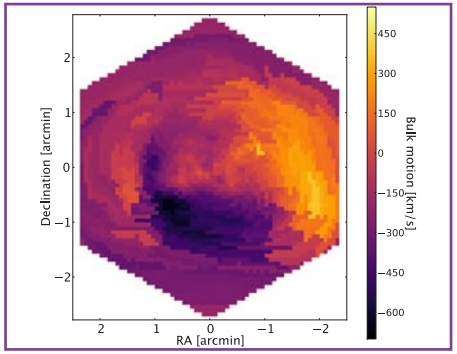

October

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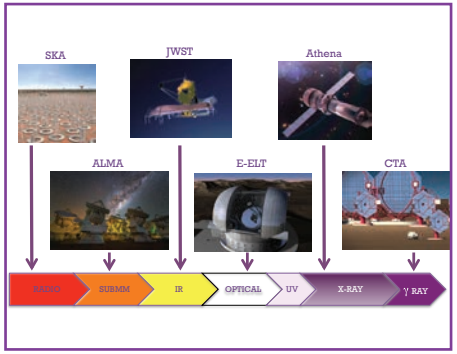

December

Artistic impression of the Athena satellite observing the center of the Milky Way. The Athena instruments will be: the Wide Field Imager (WFI) providing sensitive wide field of view imaging and low-resolution spectroscopy and the X-ray Integral Field Unit (X-IFU) delivering spatially resolved high-resolution X-ray spectroscopy.
Credit: Athena team.

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ATHENA

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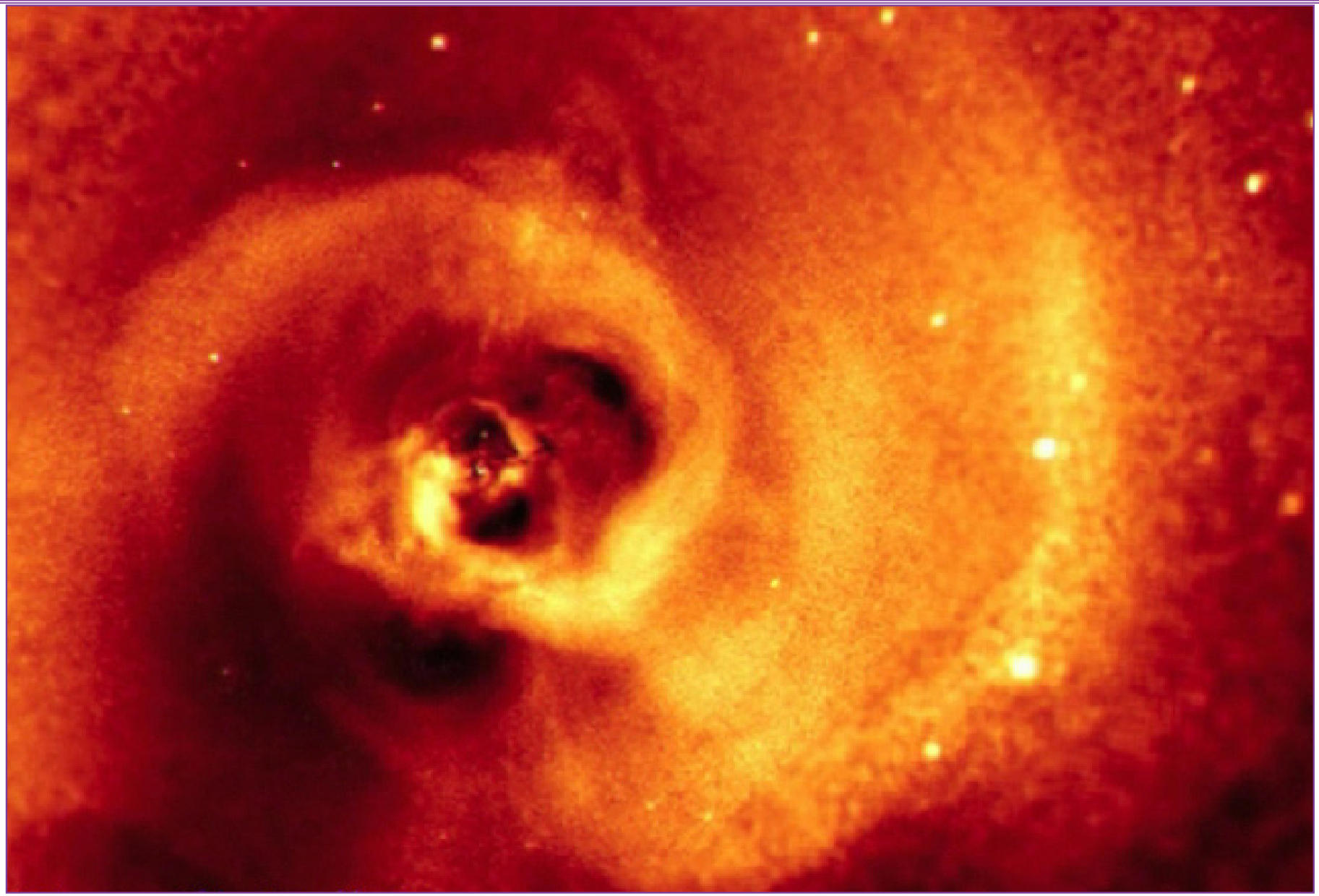
NOTES:

Athena catching the beauty of the Perseus cluster of galaxies. It is one of the most massive structures in the known universe, containing thousands of galaxies immersed in a vast cloud of multimillion degree gas.
Credit: Athena team, based on a Chandra image matched to the angular resolution of Athena.



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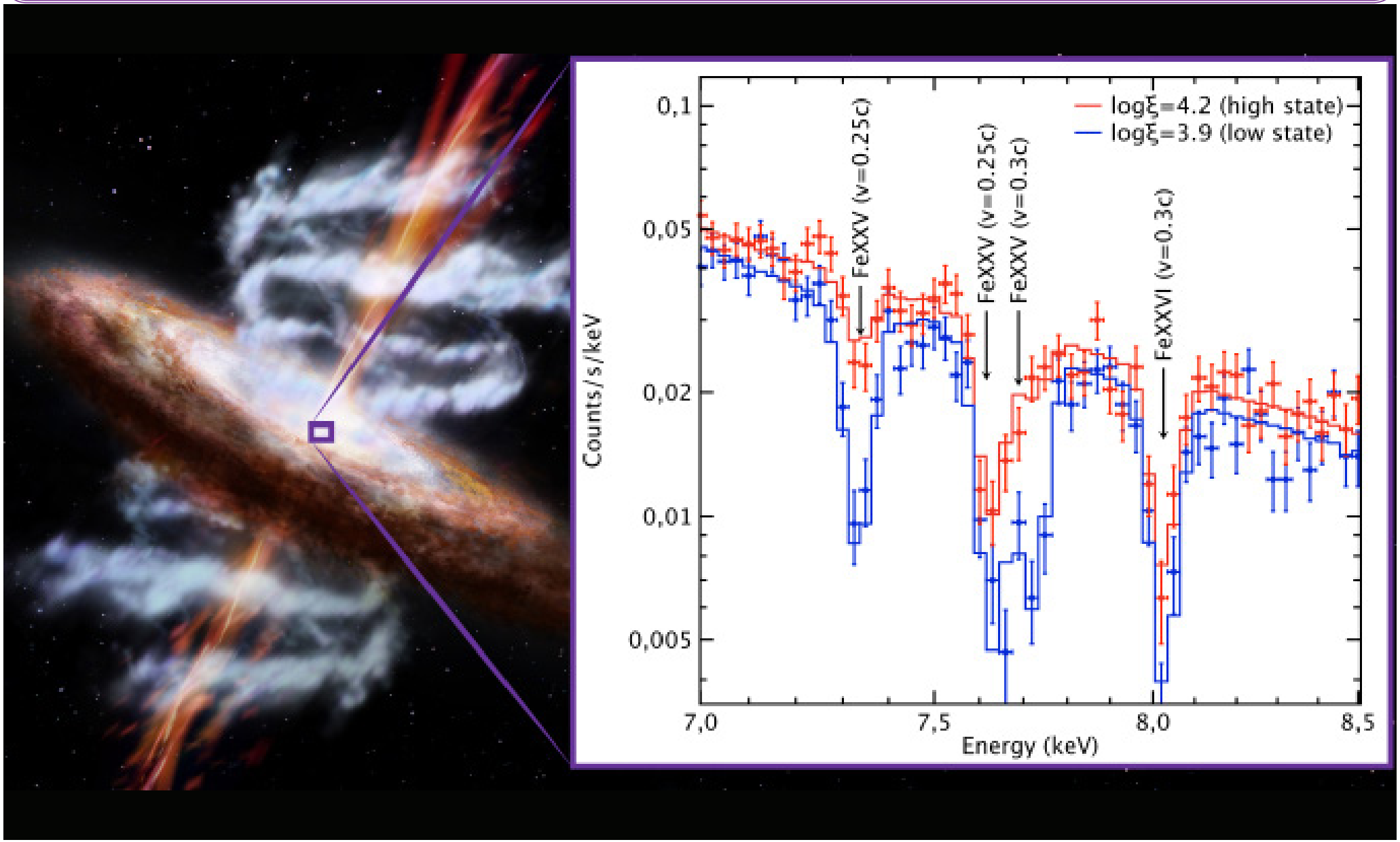
Notes:

A system showing two types of X-ray winds. Left: Pictorial representation of the energy released by the SMBH at the center of a galaxy (surrounded by an accretion disc), via collimated (in orange-red) and uncollimated (white) winds. Right: Simulations of Athena X-IFU spectra resulting from two types of so-called "ultra fast outflows" with higher velocity, higher ionization than those winds, seen only above 6 keV. Credit: ESA/AOES Medialab.



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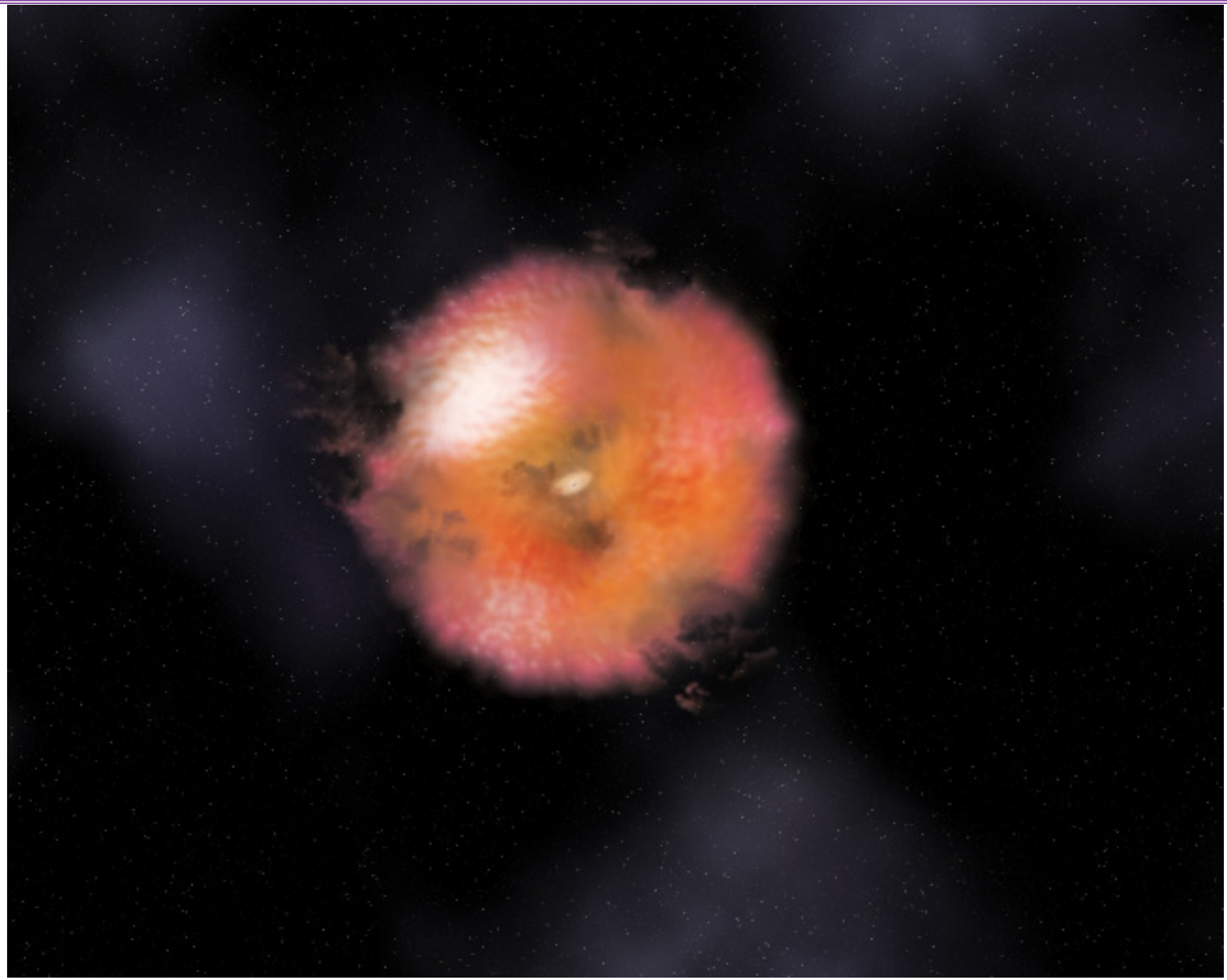
Notes:

Artistic impression of material falling into a supermassive black hole in the centre of a galaxy (not to scale).
Credit: NASA/Aurore Simonnet, Sonoma State University.



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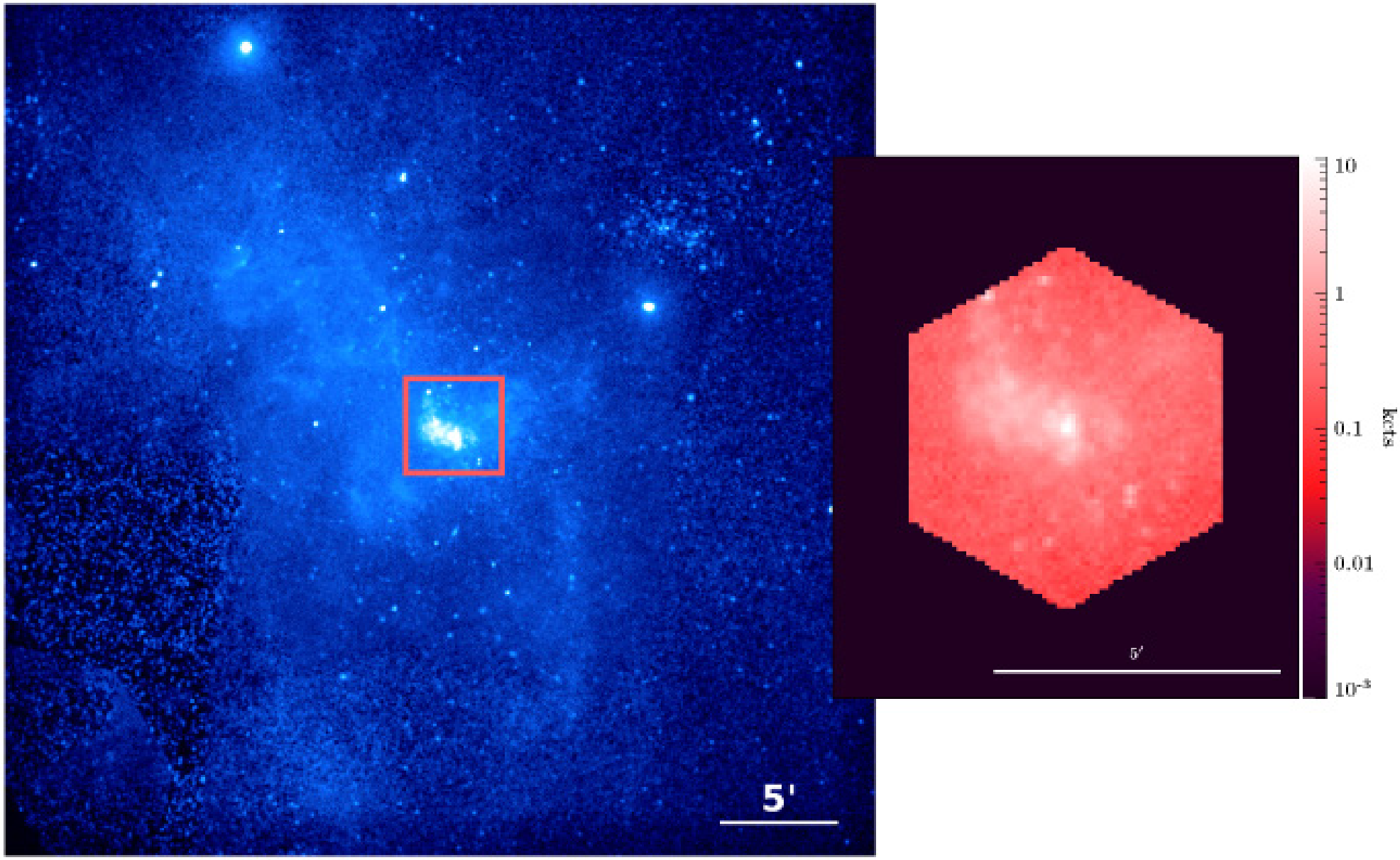
NOTES:

Galactic Center Region: SIXTE simulations of 100ks-long staring observations with Wide Field Imager (left) and X-ray Integral Field Unit (right).
Credit: Athena Team.



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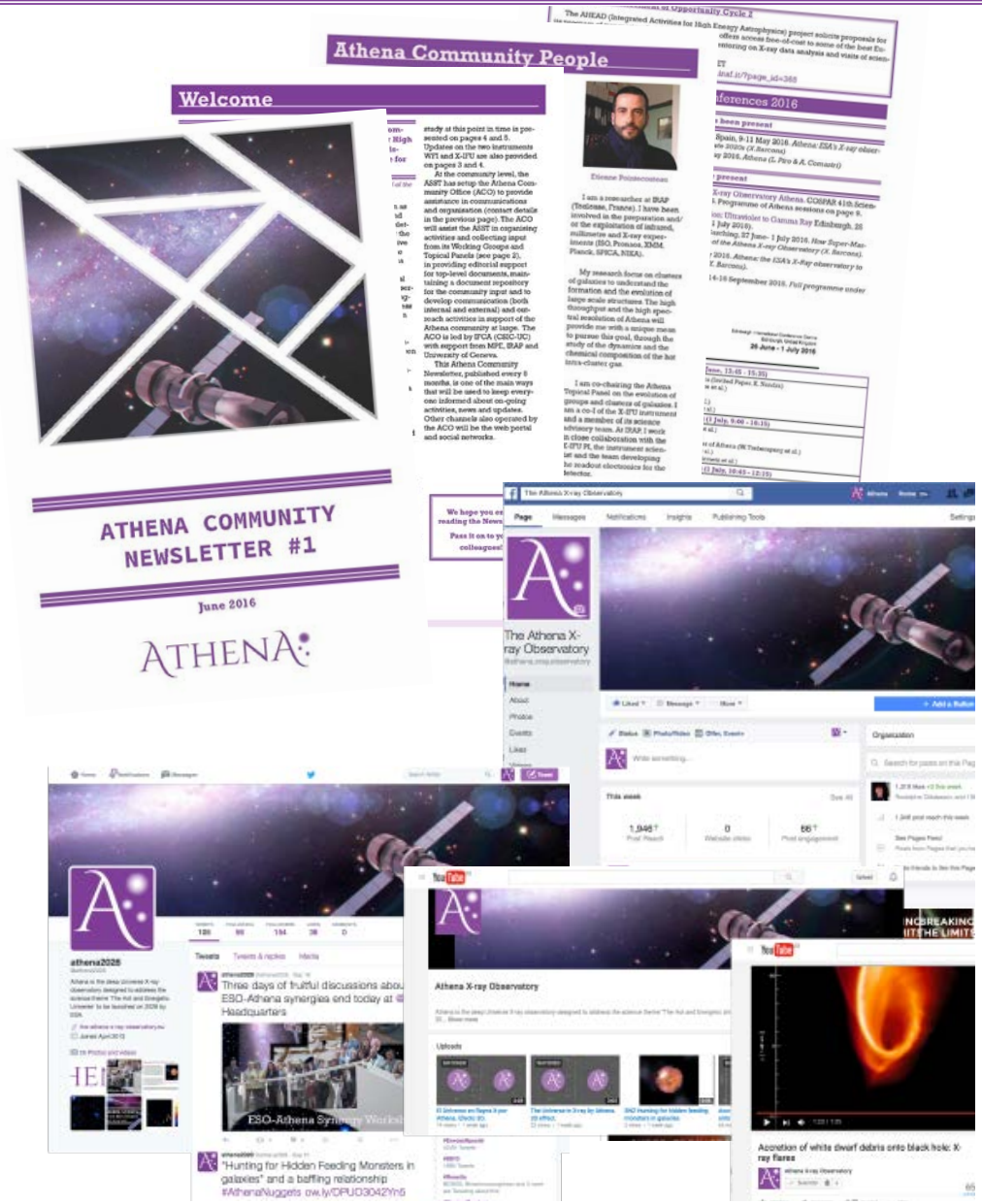
Notes:

Already a year with ACO and its activities supporting the Athena Community and public outreaching.
Happy Birthday ACO!
Credit: ACO Team.



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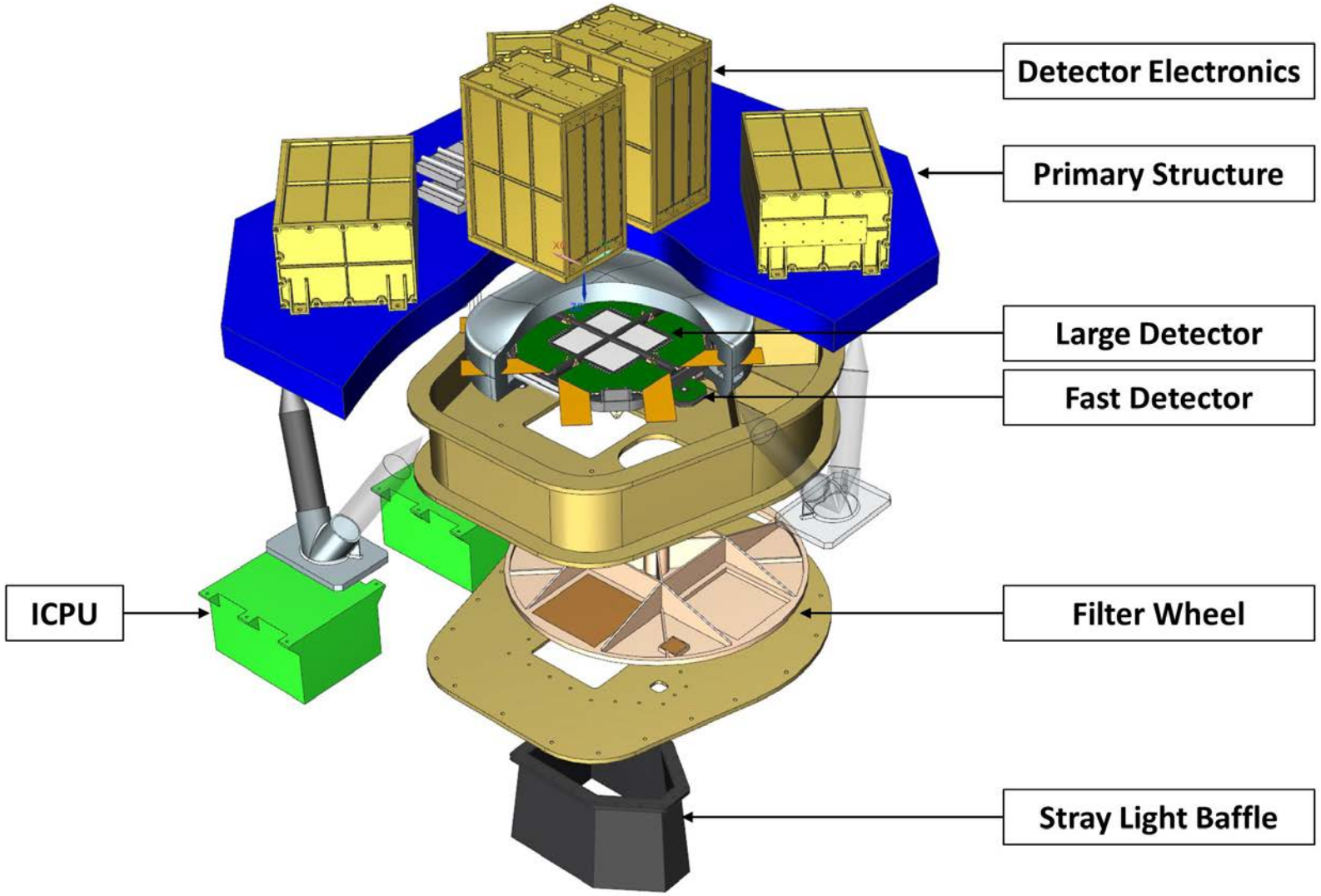
Notes:

Drawing of the Wide Field Imager with its main subsystems. X-ray photons are measured in either the 40'x40' Large Detector or the bright-source optimized Fast Detector.
Credit: WFI team.



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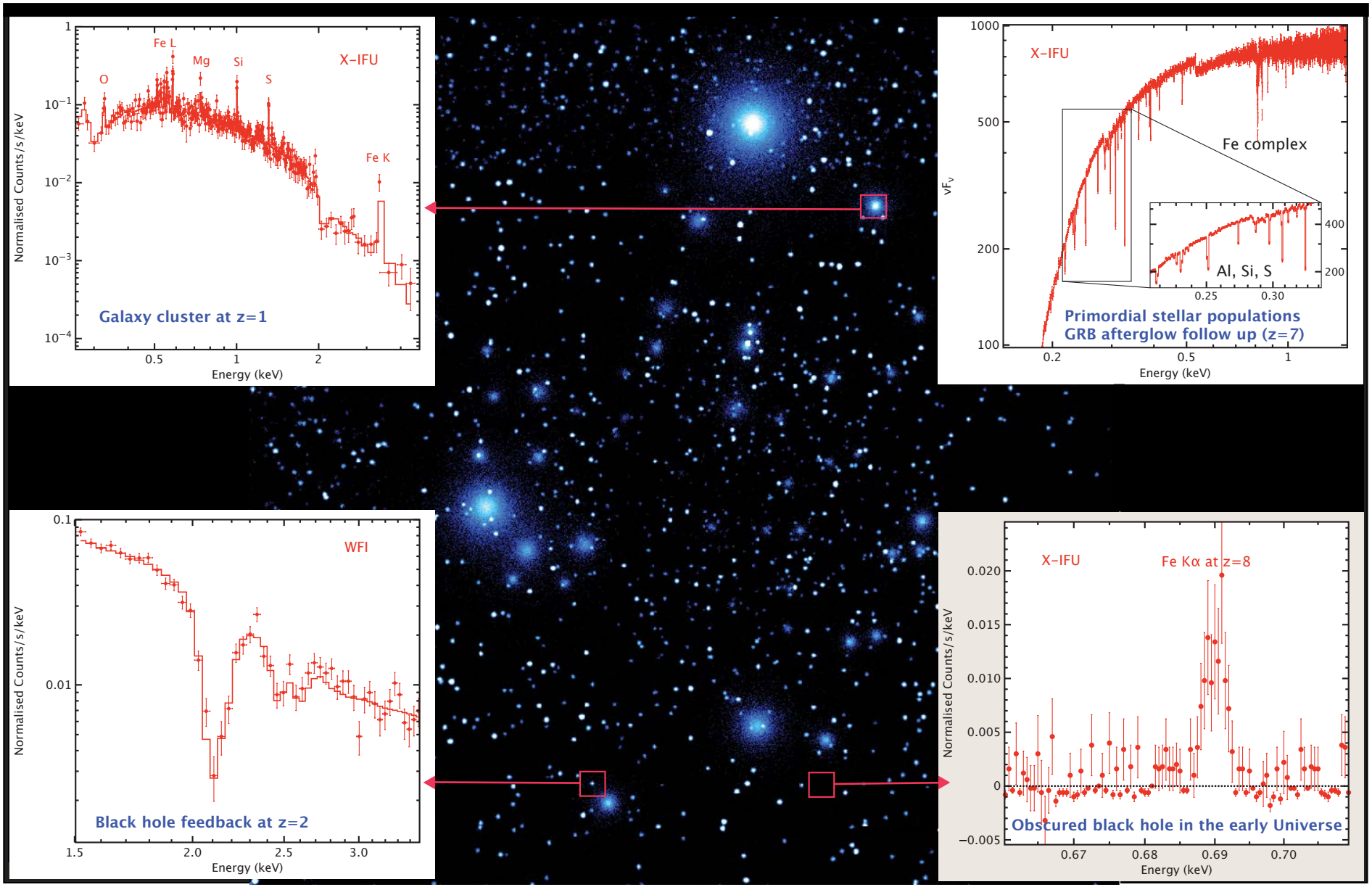
NOTES:

Athena looking into the deep Universe with its Wide Field Imager. A simulation based in a Chandra X-ray observatory real image of a region of the sky which lies in the Fornax constellation. This region is populated by over 2,000 X-ray sources, many of them are Active Galactic Nuclei lying farther than 9 billion light years away.
Credit: Athena team.



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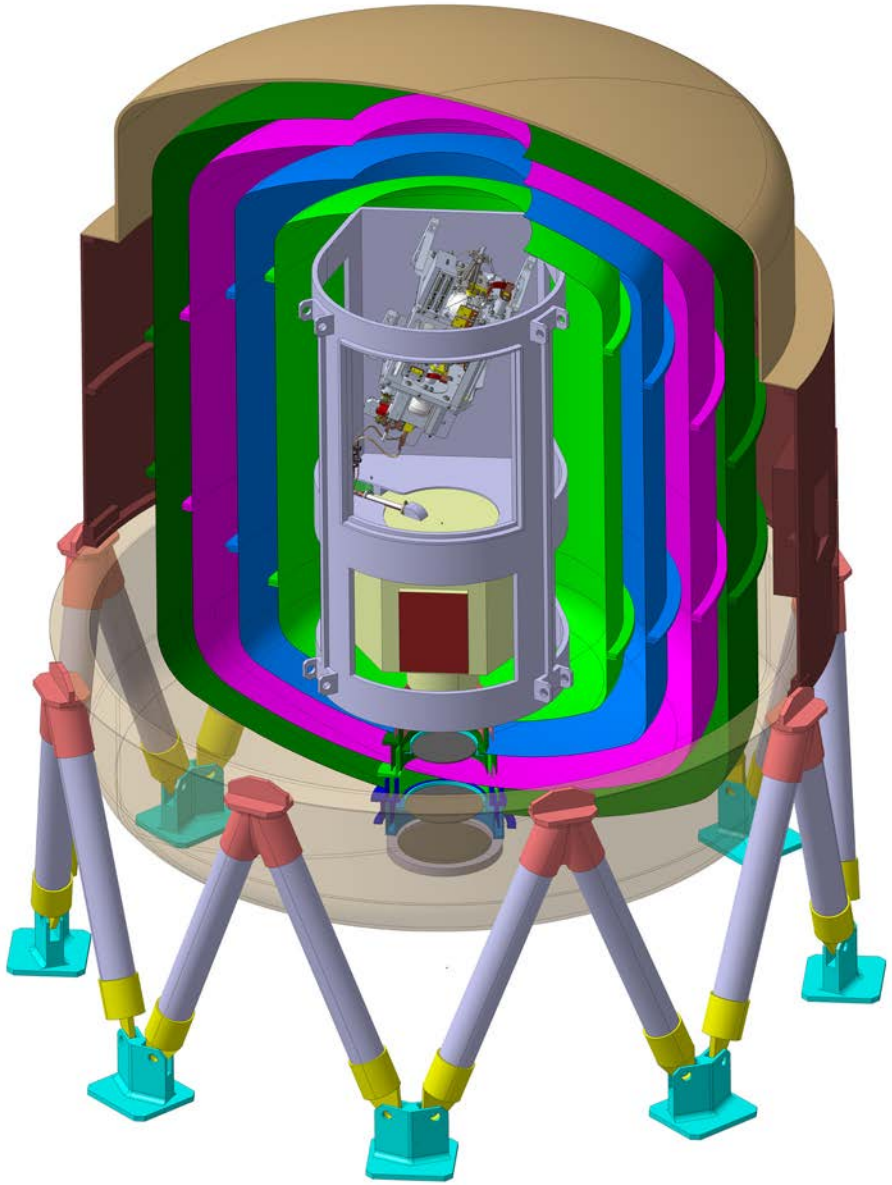
NOTES:

Exploded view of the X-ray Integral Field Unit Dewar assembly highlighting the Sorption-Adiabatic Demagnetization Refrigerator at the top, the cold finger linked to the focal plane assembly below, the aperture cylinder, cooling shields in different colors and the supporting struts at the bottom.
Credit: CNES.



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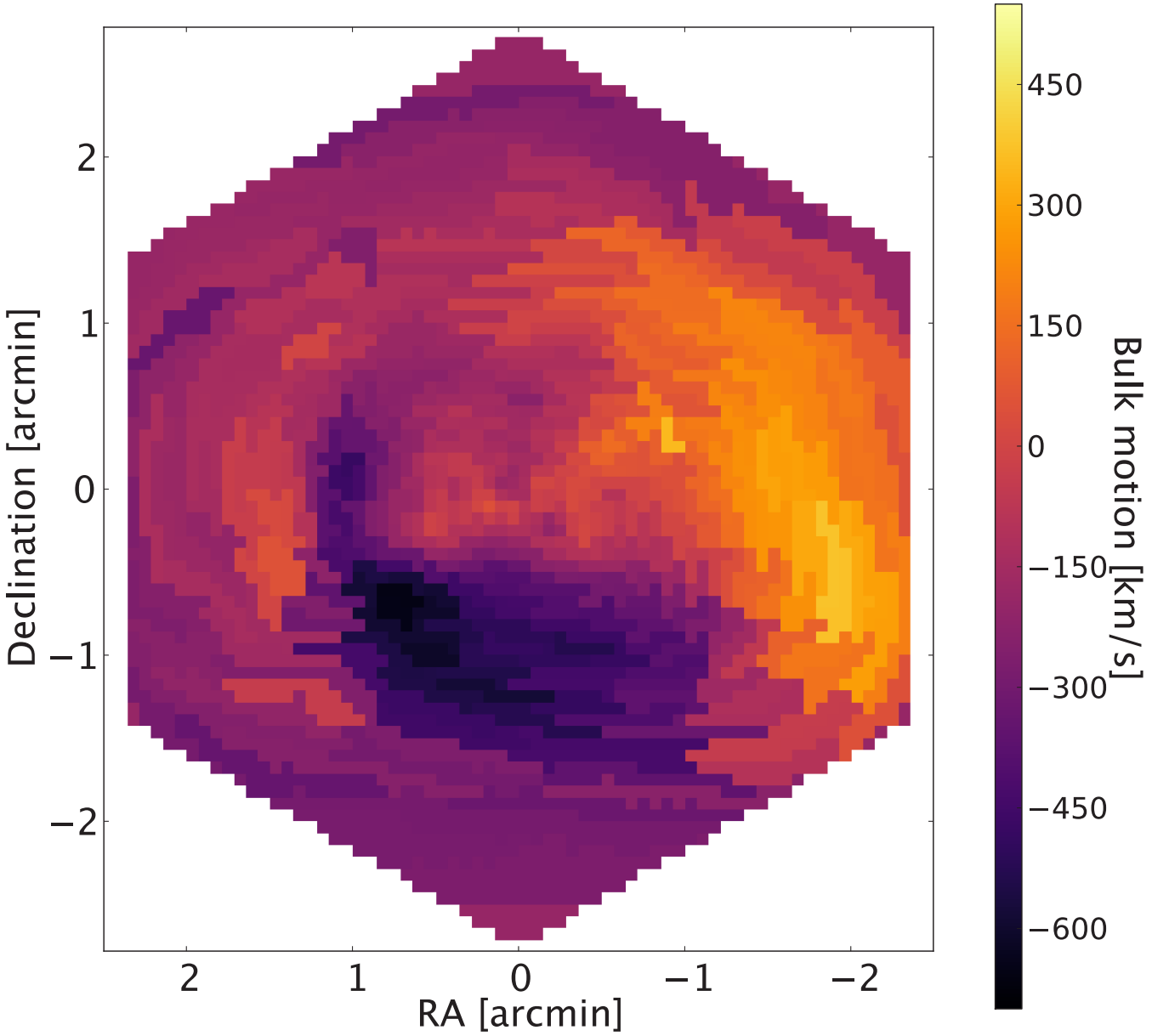
NOTES:

Example of bulk motion mapping of the hot gas in galaxy clusters that will be possible with the Athena X-ray Field Unit (X-IFU) instrument. Figure reproduced from left panel of Fig 2 in Barret et al. 2016, Proc. SPIE. 9905, Space Telescopes and Instrumentation 2016: Ultraviolet to Gamma Ray, 99052F.
Credit: P. Peille, E. Pointecouteau, V. Biffi, E. Rasia, K. Dolag, S. Borgani, J. Wilms.



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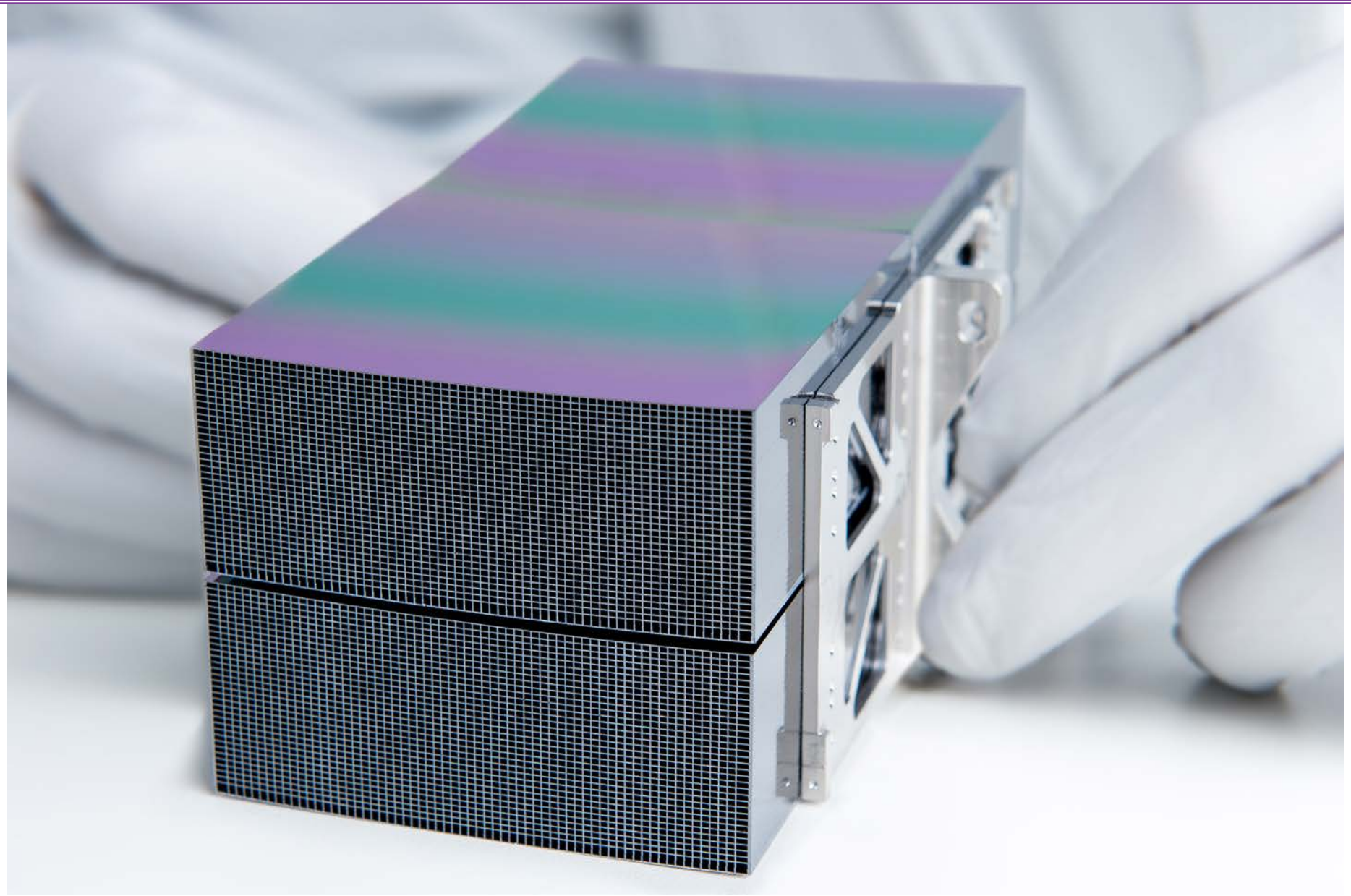
NOTES:

Silicon Pore Optics mirror modules (one of them is shown in the picture) are made of super polished Si wafer plates. The plates are bent and stacked to the correct shape and then mounted in between two Invar brackets.
Credit: Cosine Research/ESA



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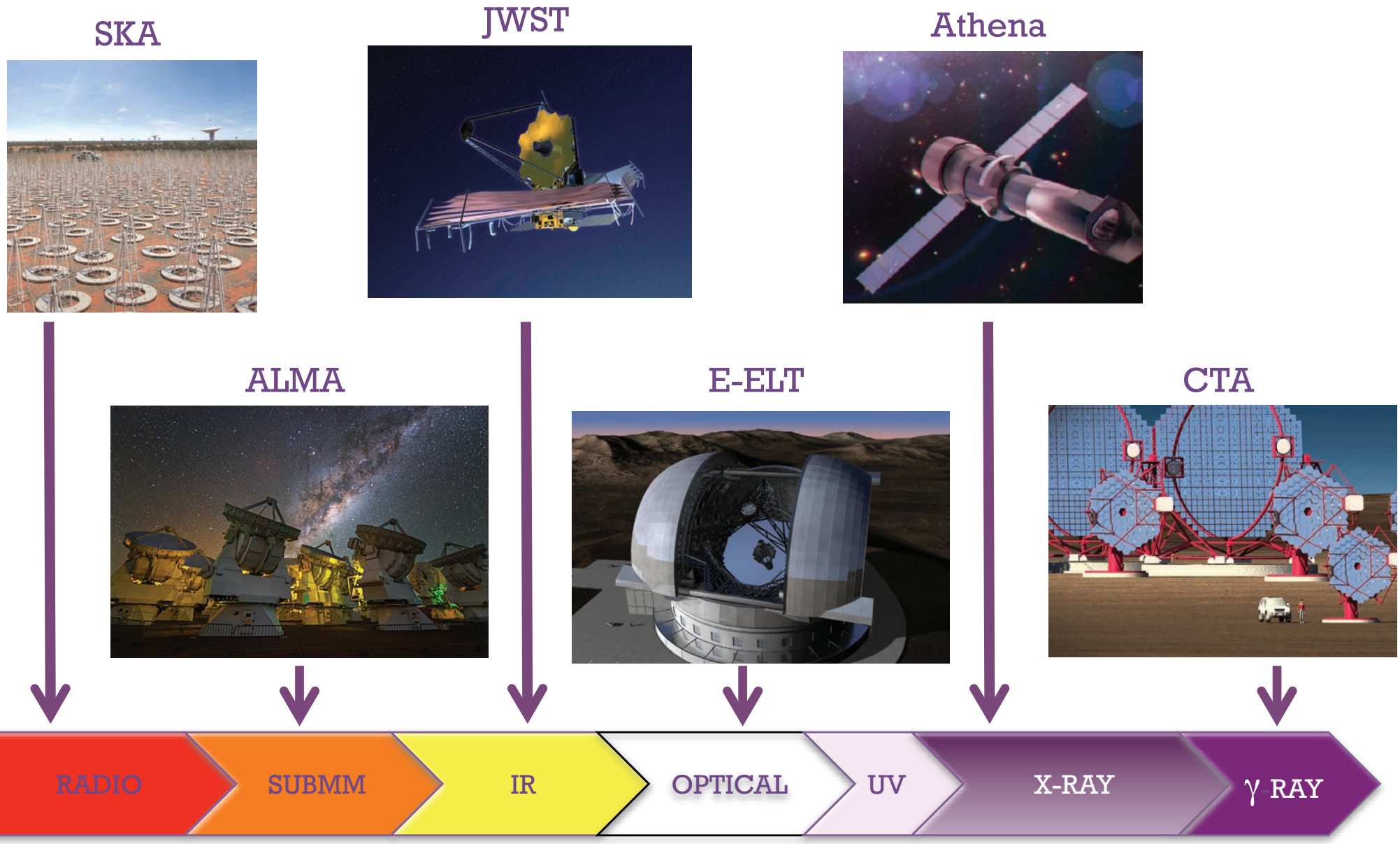
Notes:

Major astronomical facilities of the observational landscape coexisting with the Athena mission.
Credit: SKA, ESO, NASA, CTA, Athena Team.



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NOTES:

Athena Community Office


Xavier Barcons (IFCA)


Didier Barret (IRAP)


Enrico Bozzo (UniGe)


Francisco Carrera (IFCA)


María Teresa Ceballos (IFCA)


Sara Gómez (IFCA)

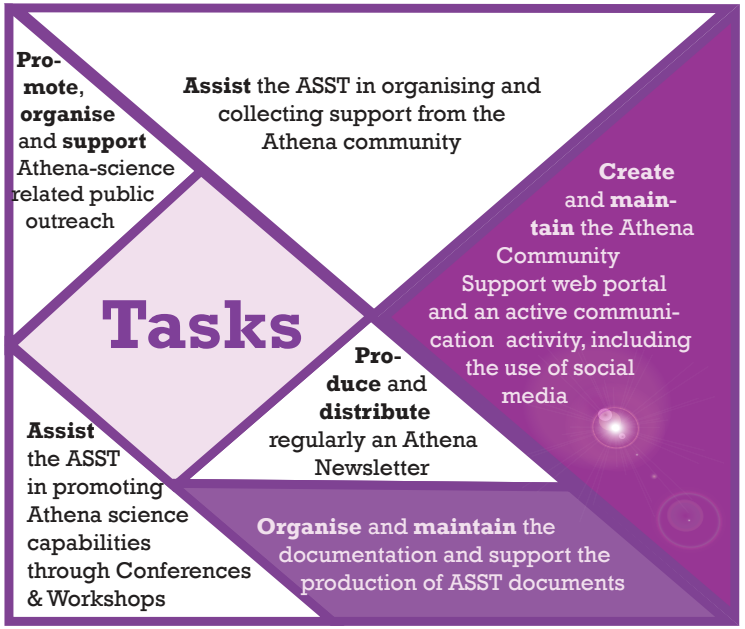

Silvia Martínez (IFCA)


Pilar Monterde (IFCA)


Arne Rau (MPE)

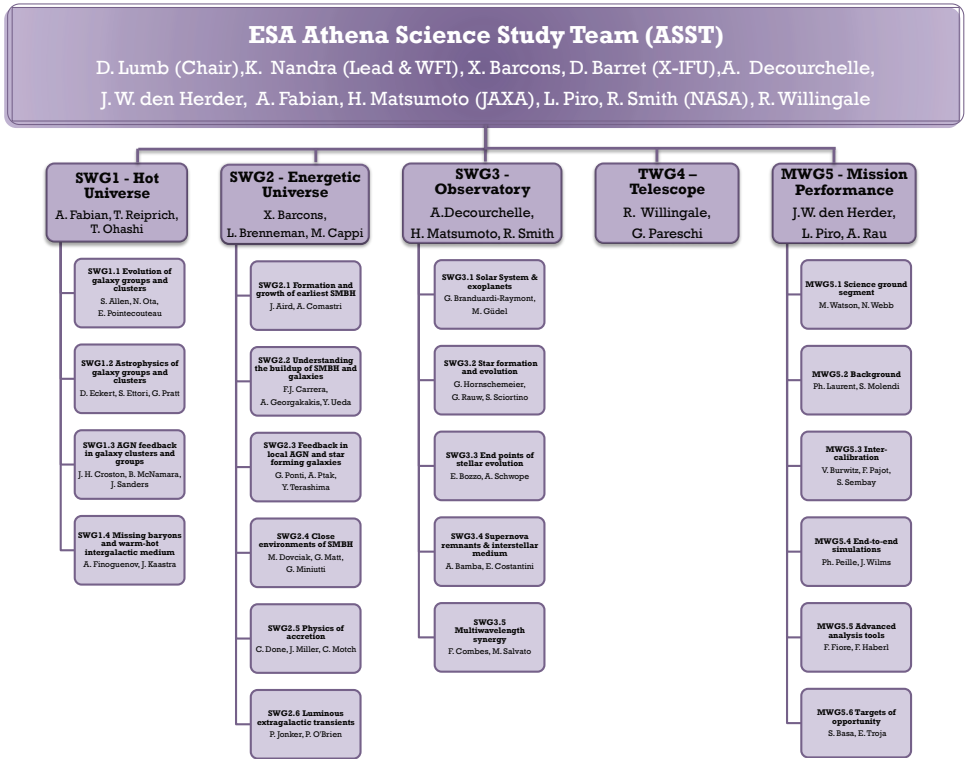
ACO

ESA´s Athena Science Study Team (ASST) established the Athena Community Office (ACO) in order to obtain support in performing its tasks assigned by ESA, specially as "focal point for the interests of the broad scientific community"



The Athena Community

The Athena Community is an immense resource containing most of the critical scientific and technical knowledge needed to bring Athena to success. Currently, more than 800 scientists support Athena , in a defined structure (see below) of 5 Working Groups, dealing with general aspects of the project such as: The Hot Universe, The Energetic Universe, Observatory Science, Telescope and Mission Performance. Most of them are organised in Topical Panels (e.g. SWG1.3, MPG5.2, etc)



ATHENA · IFCA Instituto de Física de Cantabria · CSIC · UC Universidad de Cantabria

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Instituto de Física de Cantabria (CSIC-UC)
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Athena X-ray Observatory