



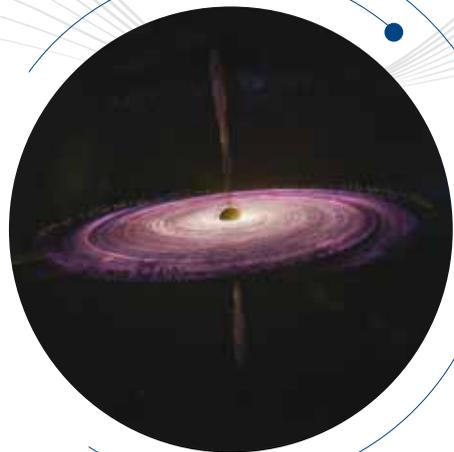
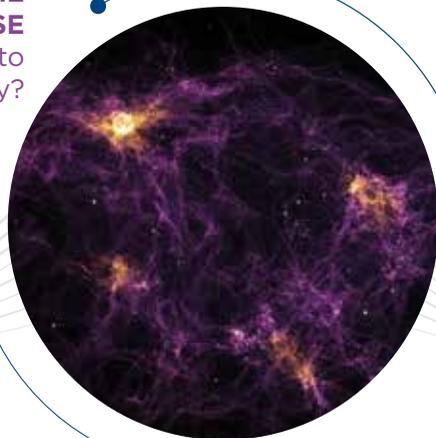
# UNVEILING THE SECRETS OF THE HOT AND ENERGETIC UNIVERSE

The X-IFU is a scientific instrument that will be placed at the focal point of the European Space Agency's Athena space telescope. It will observe the Universe with X-ray eyes, in an energy range that is only accessible from space.

Its main scientific goals are to better understand:

### THE FORMATION AND THE EVOLUTION OF THE UNIVERSE

How does ordinary matter assemble into the large-scale structures we see today?



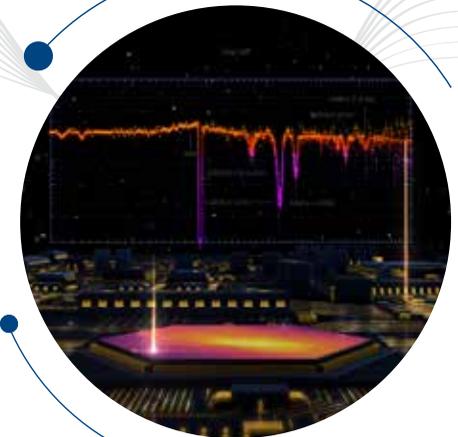
### BLACK HOLES

How do black holes grow and shape the Universe?



The X-IFU will accurately measure the energy of the X-rays that are collected by the Athena mirror and directed to its focal point. The X-IFU uses microcalorimeters: highly sensitive heat sensors capable of measuring the tiny amount of heat released when an X-ray is absorbed.

The high-precision measurements of these energies allow us to explore the regions from which the X-rays are emitted. We can then learn about the hot gas trapped in clusters of galaxies, or we can probe how matter falls into gigantic black holes, hidden in the most massive galaxies.



### The hot and energetic Universe

Clusters of galaxies are the most massive objects in the Universe. They contain hundreds of galaxies, themselves filled with hundreds of billions of stars. At the heart of most galaxies resides a black hole. It can reach up to a billion times the mass of the sun. This is the hot and energetic Universe.



### X-rays

X-rays are electromagnetic waves produced by energetic phenomena. The hot gas embedding clusters of galaxies, matter falling onto a black hole, or exploding stars are all powerful sources of X-rays. By studying X-rays, we can better understand the physical processes responsible for their emission.



The instrument will be built by an international consortium, coordinated in France by IRAP, the research institute in astrophysics and planetology, and CNES, the French space agency. The consortium has a shared, ambitious goal: to provide the scientific community with a revolutionary instrument to unveil the secrets of the hot and energetic Universe!

**Where to find us:**



<http://x-ifu.irap.omp.eu>



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