



Advanced X-ray Imaging Satellite (AXIS)

High-resolution X-ray imaging for the 2030s

Further, Wider, Faster

FACT SHEET

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AXIS answers the big questions posed by the Astro2020 Decadal Survey

AXIS Deep
Extragalactic
Survey

The AXIS Science Pillars

Astro 2020 asks...

Why X-rays?

...AXIS answers

Why AXIS?

Pillar 1: "What seeds supermassive black holes and how do they grow?"

AXIS determines the origin of massive black holes

X-rays identify clean census of black holes in distant JWST galaxies

AXIS' PSF and large area enable imaging of distant, faint sources

Pillar 2: "How do gas, metals, and dust flow into, through, and out of galaxies?"

AXIS shows how supernovae and AGN transform galaxies

X-rays uniquely probe the million-degree gas that drives gas flows

High contrast imaging separates diffuse gas and bright sources

Pillar 3: "What powers the diversity of explosive phenomena across the electromagnetic spectrum?"

AXIS discovers explosive transients both near and distant

X-rays uniquely encode information on transient progenitors

AXIS enables transient alerts, TDMM surveys and fast followup

The Extragalactic Surveys will find >20,000 AGN over cosmic time,
>50x more than the Chandra Deep Field.

The Galactic Plane Survey will discover >1M new sources in crowded fields,
10x deeper and 5x wider than current best X-ray surveys.

AXIS is the Probe for the entire astronomical community

AXIS offers >68 Ms over 5 years to General Observers for investigations beyond what we can even imagine in 2023

AXIS sensitivity and spatial & spectral resolution impacts broad range of astrophysics, from photoevaporation of exoplanet atmospheres to X-ray reionization of the high-z Universe

AXIS' Transient Alert Monitor alerts the community in 10 minutes, and rapid response allows for a powerful GO Target of Opportunity program that addresses TDMM charge by Astro2020



AXIS is a huge leap forward

AXIS vs Chandra

- 5-10x larger effective area
- 6x better FoV-ave PSF

AXIS vs XMM-Newton

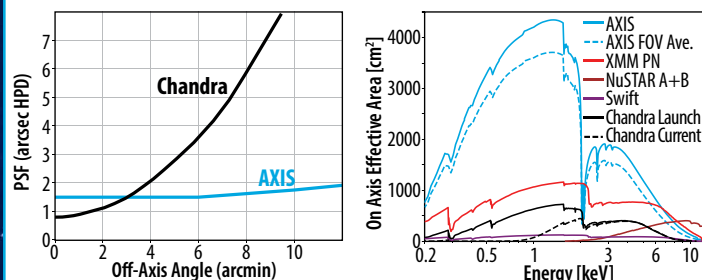
- 4x larger area below 2 keV
- 10x better PSF

AXIS vs Swift

- Same fast ToO Response Time
- 60x better sensitivity

AXIS vs NuSTAR

- Superior area below 8 keV
- 40x better PSF

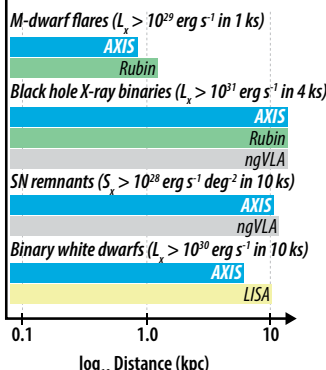


AXIS has 70x the survey grasp (FoV x area) at 1.6" than Chandra

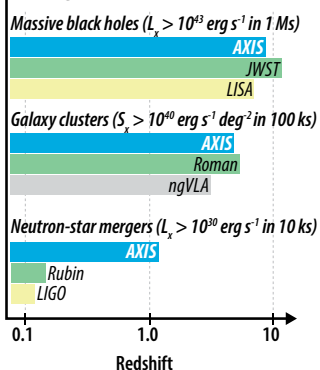
enabling surveys that probe further, wider, and faster

AXIS matches expanding horizons of the panchromatic facilities of the 2030s

Galactic



Extragalactic



X-rays peer into the central engine of JWST, LIGO, and LISA sources.
AXIS is the only X-ray mission that can match their horizons.

The AXIS team embeds IDEA from the outset

AXIS team values diversity, and embeds principals of inclusion, equity and access:

- Diverse team along multiple axes (gender, ethnicity, institution type and location)
- Early Career Researchers in leadership roles, paired with senior mentors for support
- Team guided by strong Code of Conduct, Statement of Values and DEIA training
- The AXIS Seminar Series engages the community and promotes early career speakers

