OPERATION STATUS AND INITIAL RESULTS OF X-RAY IMAGING AND SPECTROSCOPY MISSION (XRISM)



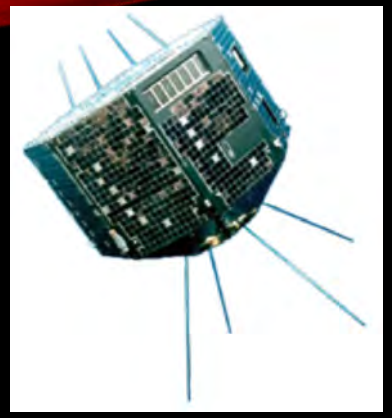
M. S. Tashiro: Saitama Univ. XRISM PI

©JAXA

HISTORY OF JAPAN'S X-RAY OBSERVATORIES

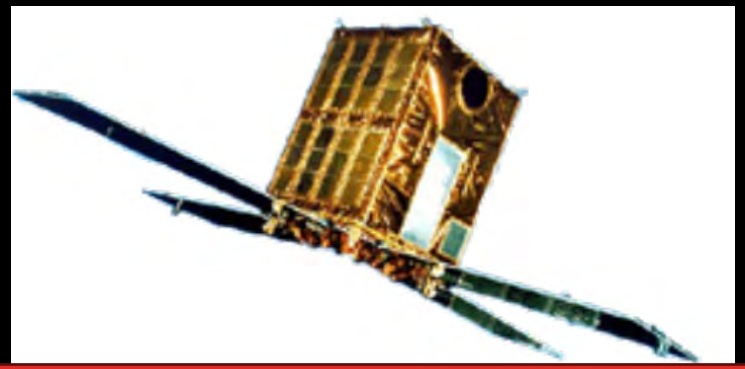
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XRISM X-Ray Imaging and Spectroscopy Mission



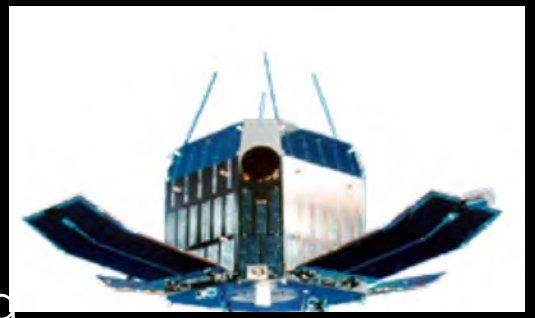
Hakucho
1979-1985
Sudare (modulated) collimeter
X-ray bursts …

Ginga
1987-1991
JP-GB joint Large Area PC
SN1987A, BHB, galaxies

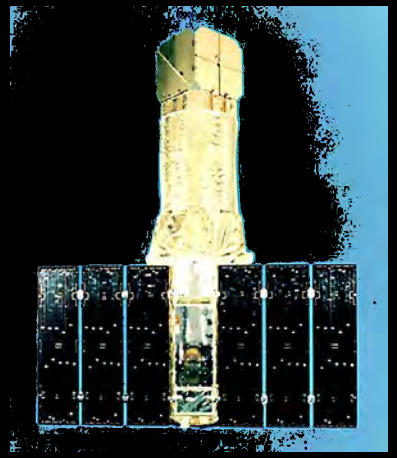




ASATRO-E(2000)
→EII "Suzaku"
2005-2015
JP-NASA: CCD, HXD, micro-calorimeter
→ wideband spectroscopy



Tenma
1983-1988
Gas scintillation proportional counter → high resolution spectroscopy: Galactic ridge emission …



ASCA
1993-2001
JP-NASA Imaging spectrometers (GSPC/CCD)
Galactic, and extra-Galactic sources

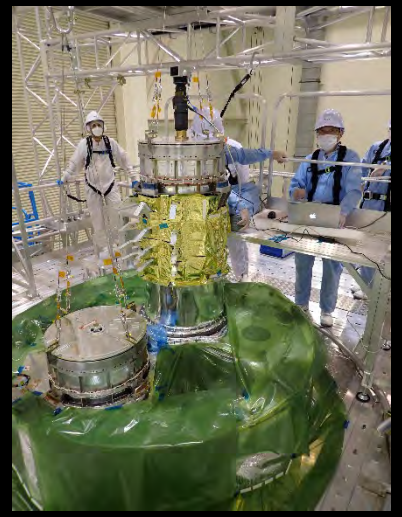


Hitomi
2016
JP-NASA-ESA: CCD, micro-calorimeter, HXI, SGD

XRISM HISTORY: PFT(2021～2023)



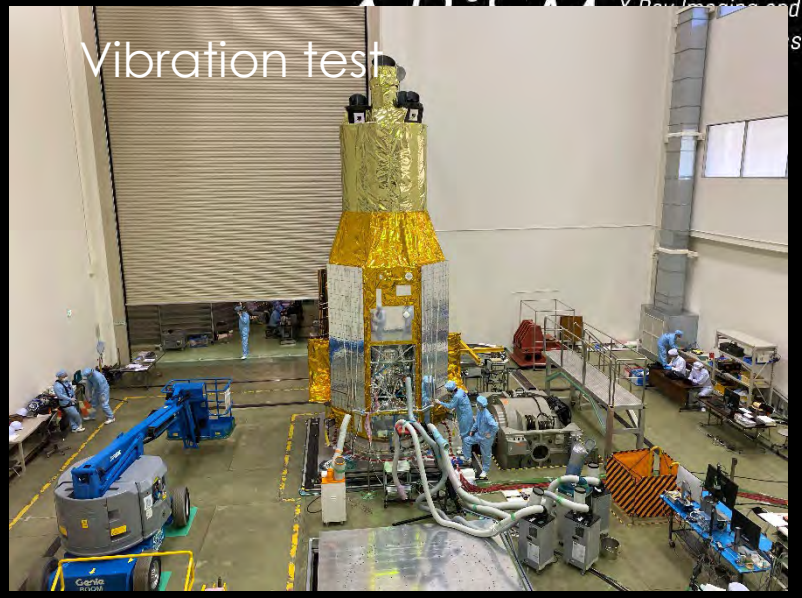
Resolve-SXS Sub system tests



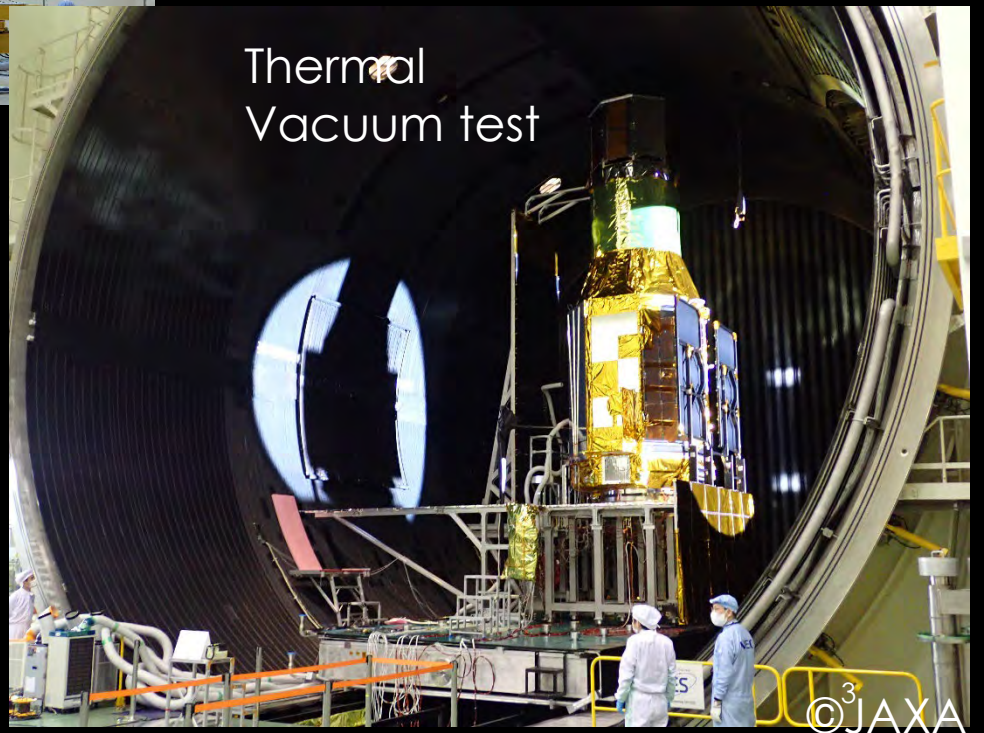
XMA installation



Accoustic test



Vibration test



Thermal Vacuum test



Resolve-SXS installation



Xtend-SXI installation

©JAXA

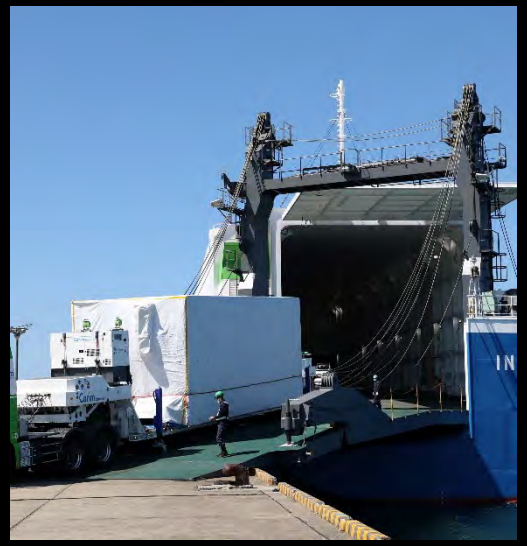
XRISM HISTORY: LAUNCH OPERATION (2023 MARCH~SEPTEMBER)

XRISM X-Ray Imaging and Spectroscopy Mission

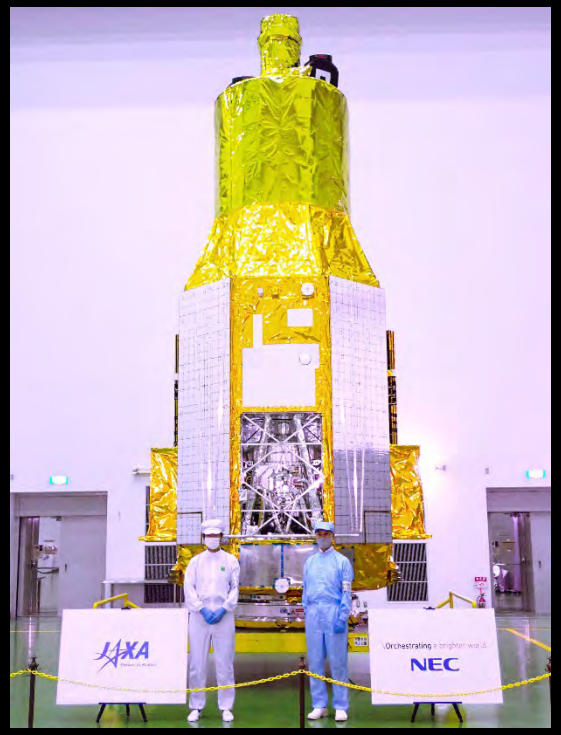
2023-03-14 completion review
2023-03-15 deliver to TNSC
~~2023-05-12 launch~~
Countermeasures for the H3 LV failure

2023-07-12 resume LS operation
2023-07-21 press conference
2023-07-22 STA2 → SFA
2023-08-11 SFA → VAB

2023-08-24 LRR
2023-08-26 launch delay (weather)
2023-08-27 roll out to LP
2023-08-28 launch delay (weather)



Landing Tanegashima Island



Press conference

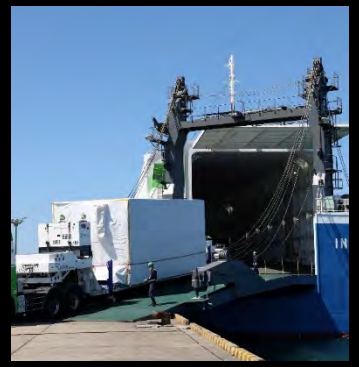


Roll out → LP

©JAXA

LAUNCHED FROM TNSC 2023-09-07 JST

XRISM X-Ray Imaging and Spectroscopy Mission





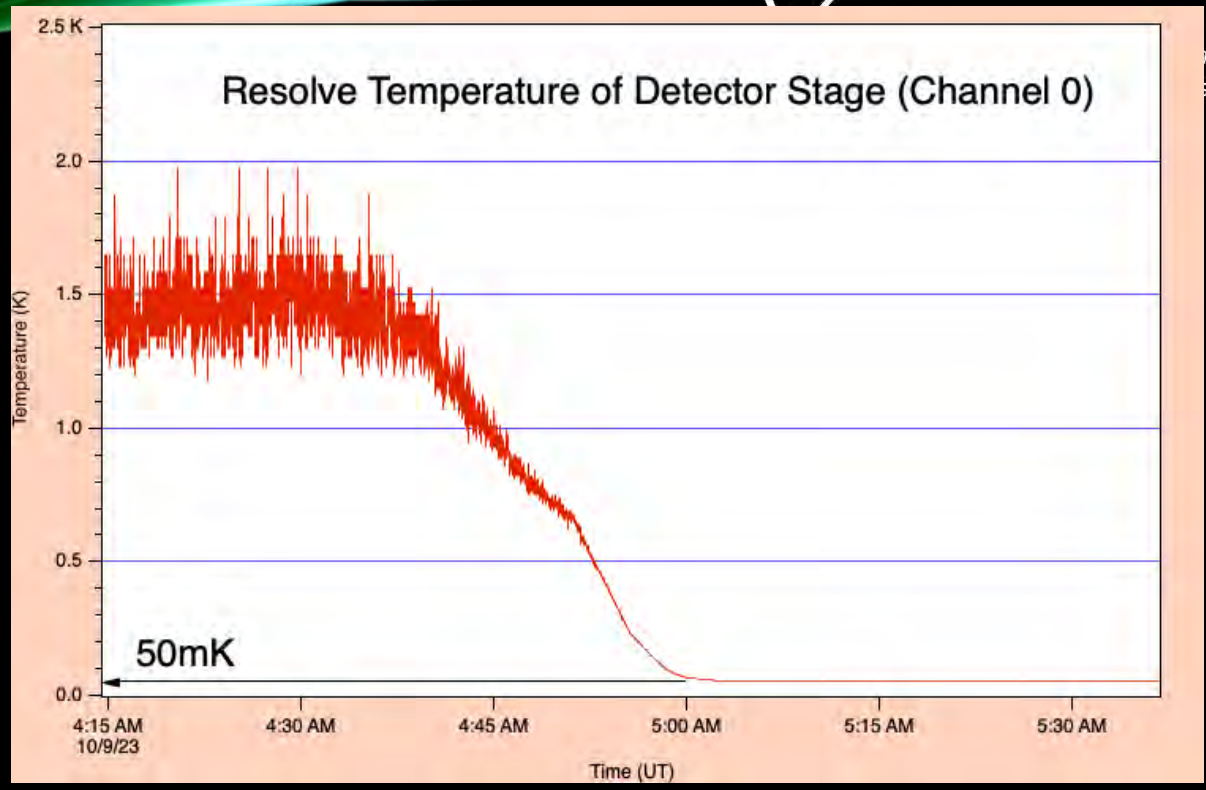


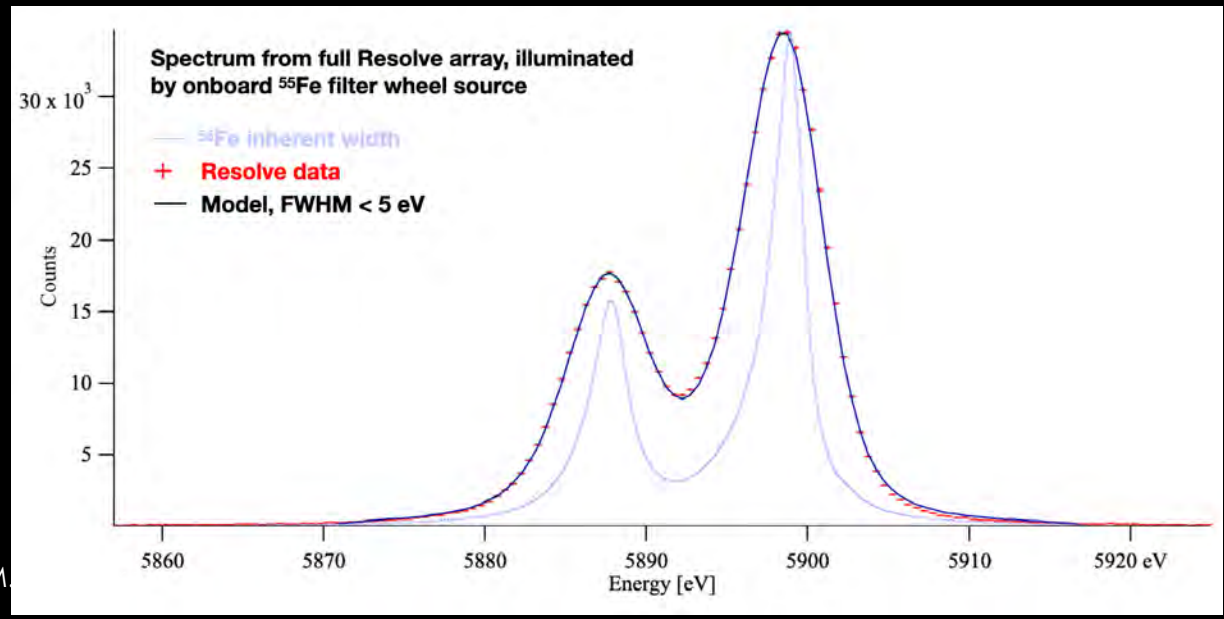


©JAXA

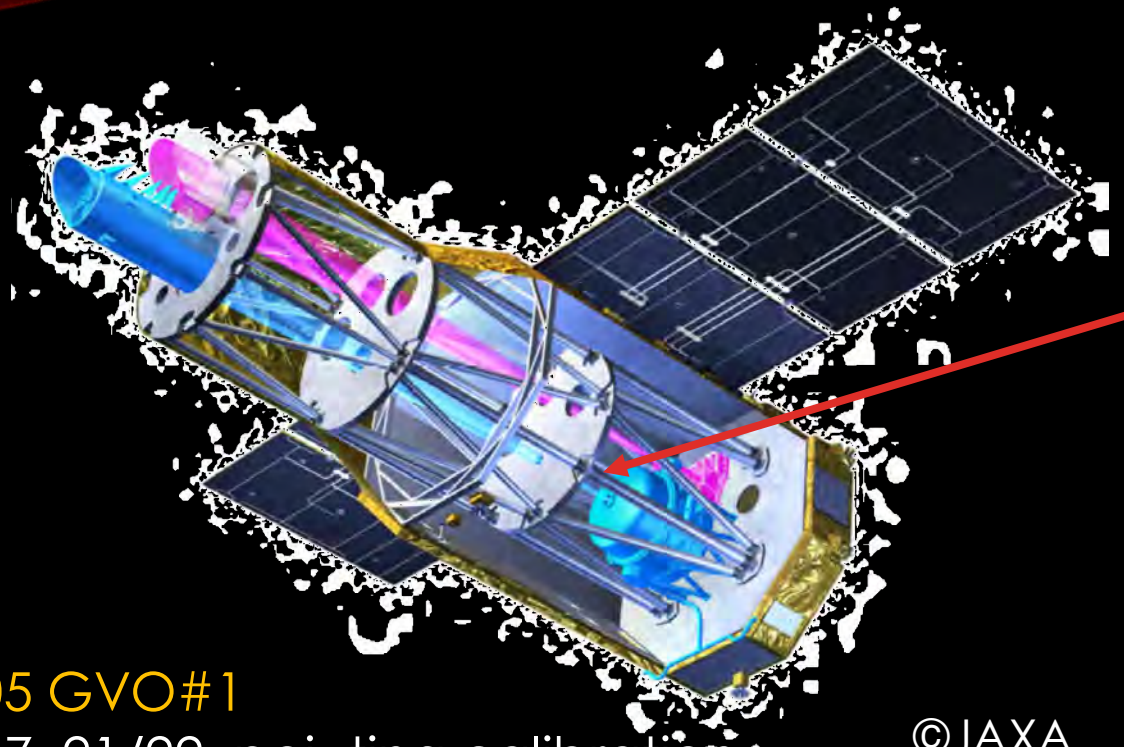
COMMISSIONING

- 9/11-10/6 Bus commissioning
  - GPSR, DHS, DR function check
  - Autonomous function check
  - Conformance check with ground stations
- 9/13-10/6 AOCS commissioning
  - STT, IRU, MTQ
  - Triaxial control (9/21)
  - Slew tests (9/27-29)
  - STT/IRU alignment check (10/1-6)
- Resolve
  - 10/7-11 CSI start up → 50 mK
  - 10/11-13 FW function check
  - 10/13-22 pointing position (FL1)
  - 10/23-30 MXS start-up
- Xtend
  - 10/17-22 commissioning
  - 11/2-3 window/ burst mode

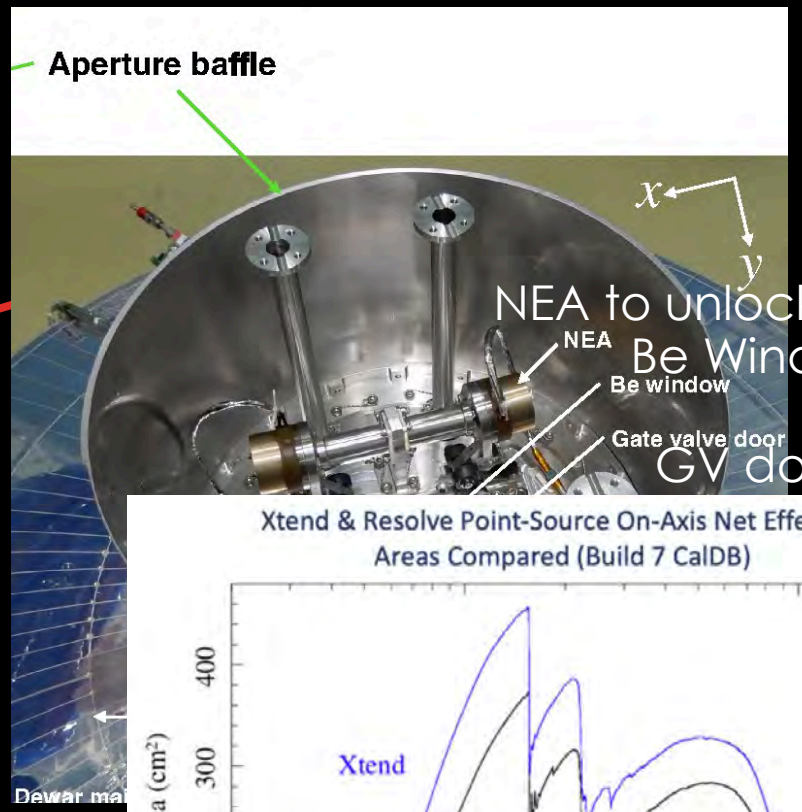


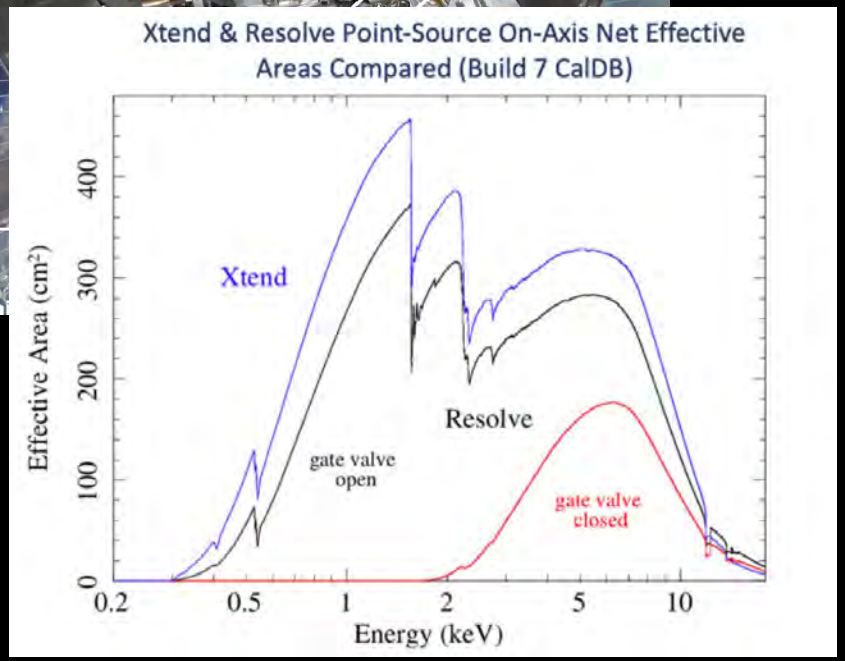


RESOLVE GATE VALVE ISSUE



©JAXA

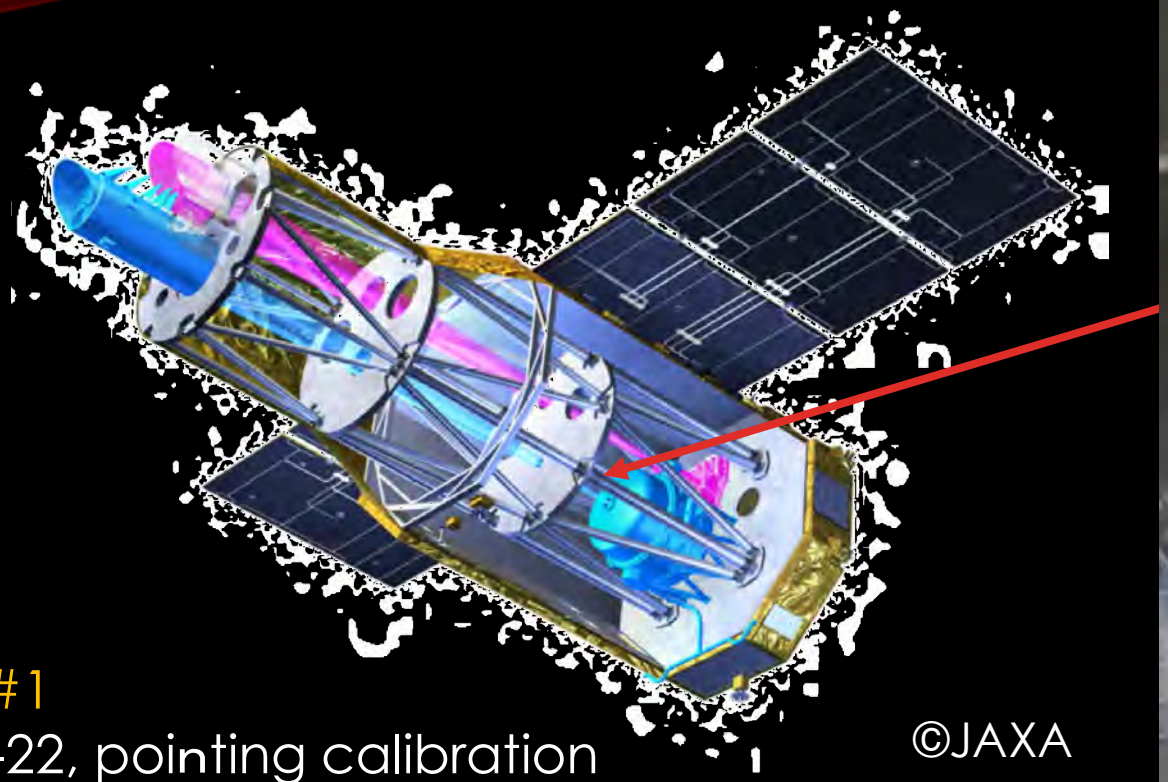




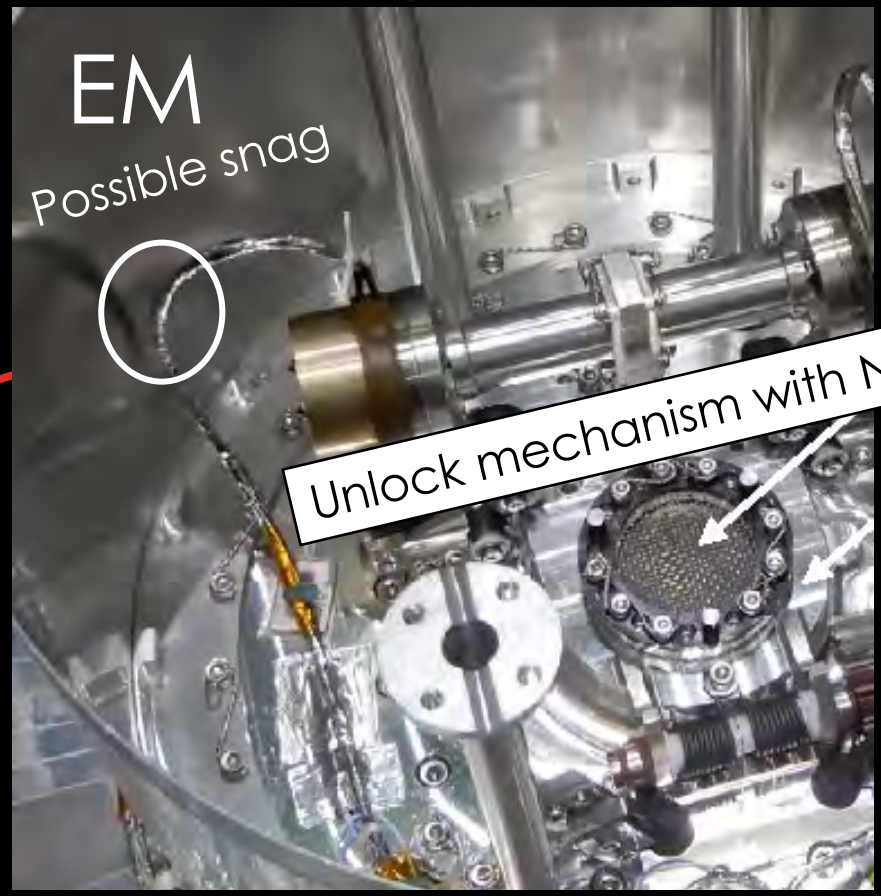
- 2023-11-04/05 GVO#1
- 2023-11-16/17, 21/22, pointing calibration
- 2023-11-30 ---12-02 pointing calibration
- 2023-11-19 GVO#2

RESOLVE GATE VALVE ISSUE

XRISM X-Ray Imaging and Spectroscopy Mission



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Ishisaki et al. JATIS 11 (4) 042023 (2025)

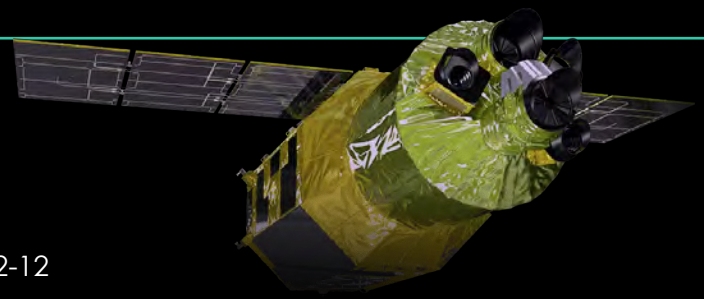
- 11/4-5 GVO#1
- 11/16-17, 21-22, pointing calibration
- 11/30-12/2 pointing calibration
- 11/19 GVO#2
- 12/4- FL2
- 2023-12/19 -- 12/24 GVO#3 (warm up by heater + mechanical cooler vibration)
- (PV & GO cycle-1)
- 2025-09-01-23 GVO#4 (warm up/cool down + 2 mechanical coolers vibration w/ phase scan)

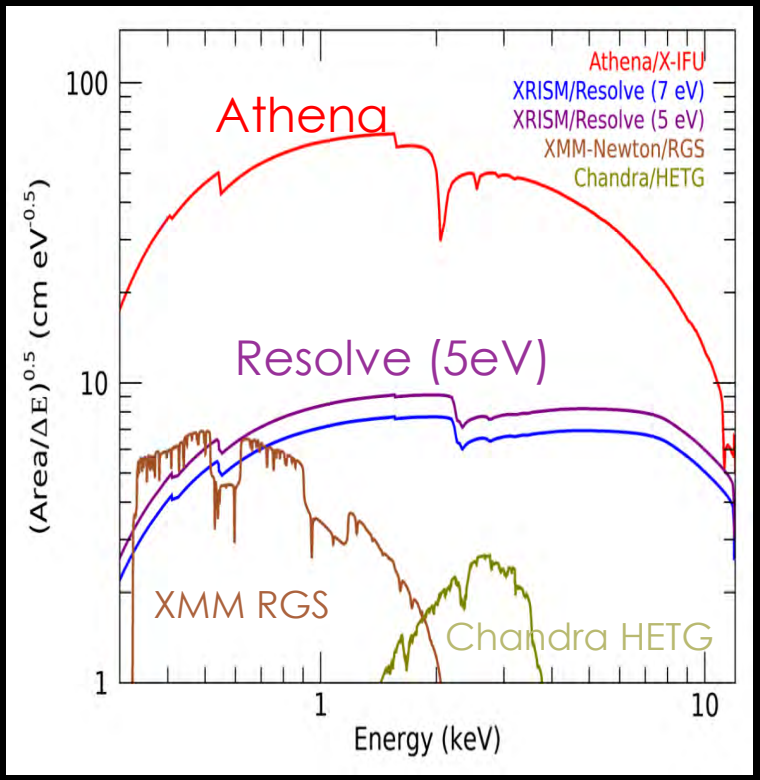
ONBOARD INSTRUMENTS & PERFORMANCE

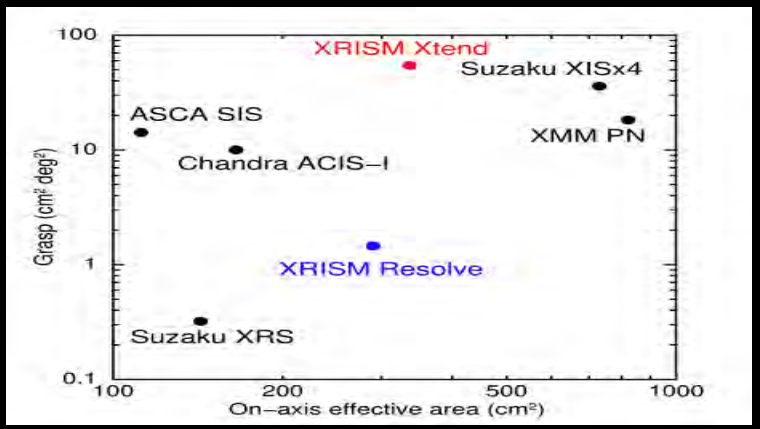
XRISM X-Ray Imaging and Spectroscopy Mission

- XMA + X-ray micro-calorimeter → precise spectroscopy
- XMA + X-ray CCD → wide FOV

Requirements (achieved)	FOV (arcmin) /pix	Image resolution (HPD arcmin)	ΔE (FWHM @6 keV)	Time resolution	Band
Resolve (XMA + Xray μCal)	3.1 / 6 x 6 pix	~ 1.3	4.5 eV	80μs (H-res)	(0.3) 1.7 – 12 keV
Xtend (XMA + Xray CCD)	38 / 1280 x 1280 pix	~ 1.5	~180 eV at BOL	4 s (full-win) 0.5s (1/8 win)	0.4 – 13 keV





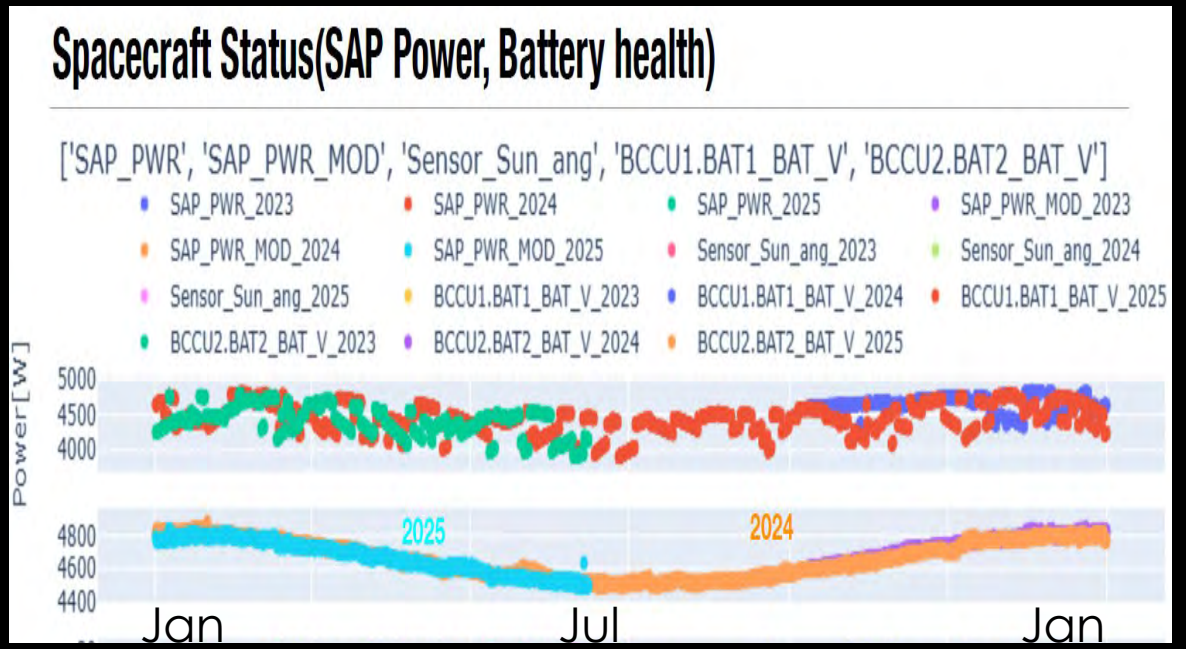


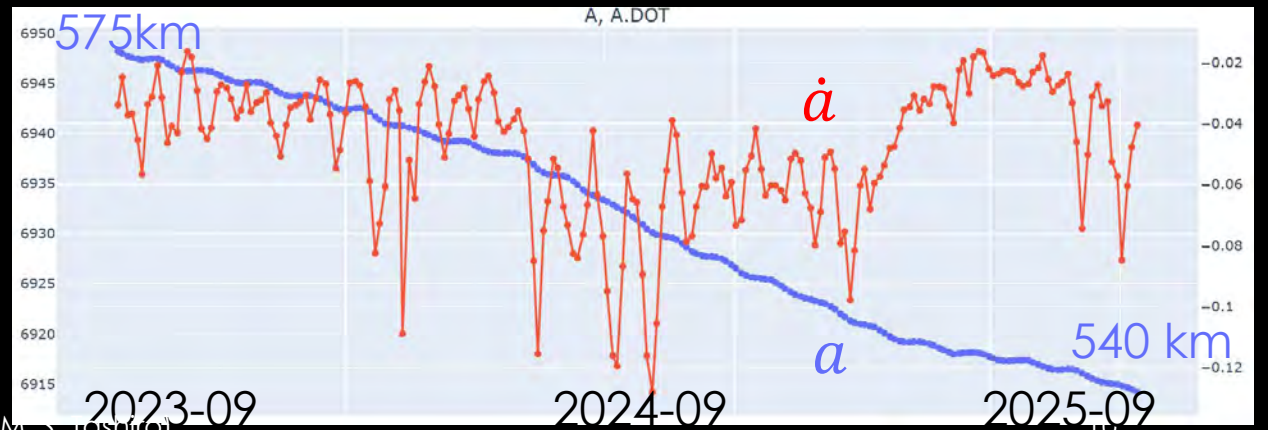
SPACECRAFT AND INSTRUMENTS STATUS

- Bus: No problem within the expected range
  - ✓ Power supply: No degradation (seasonal variation only)
  - ✓ Battery: No degradation
  - ✓ GPSR (time assign. and orbit det.): No problem
  - ✓ Attitude control system: Stable. No FDIR issued.
  - ✓ Orbit altitude (a): 575 → 540 km. High enough to survive the next solar activity cycle (~11 yrs.)
- Mission instruments
  - Resolve:
    - ✓ No degradation in performance

    Expected Lq-He lifetime: ~2029

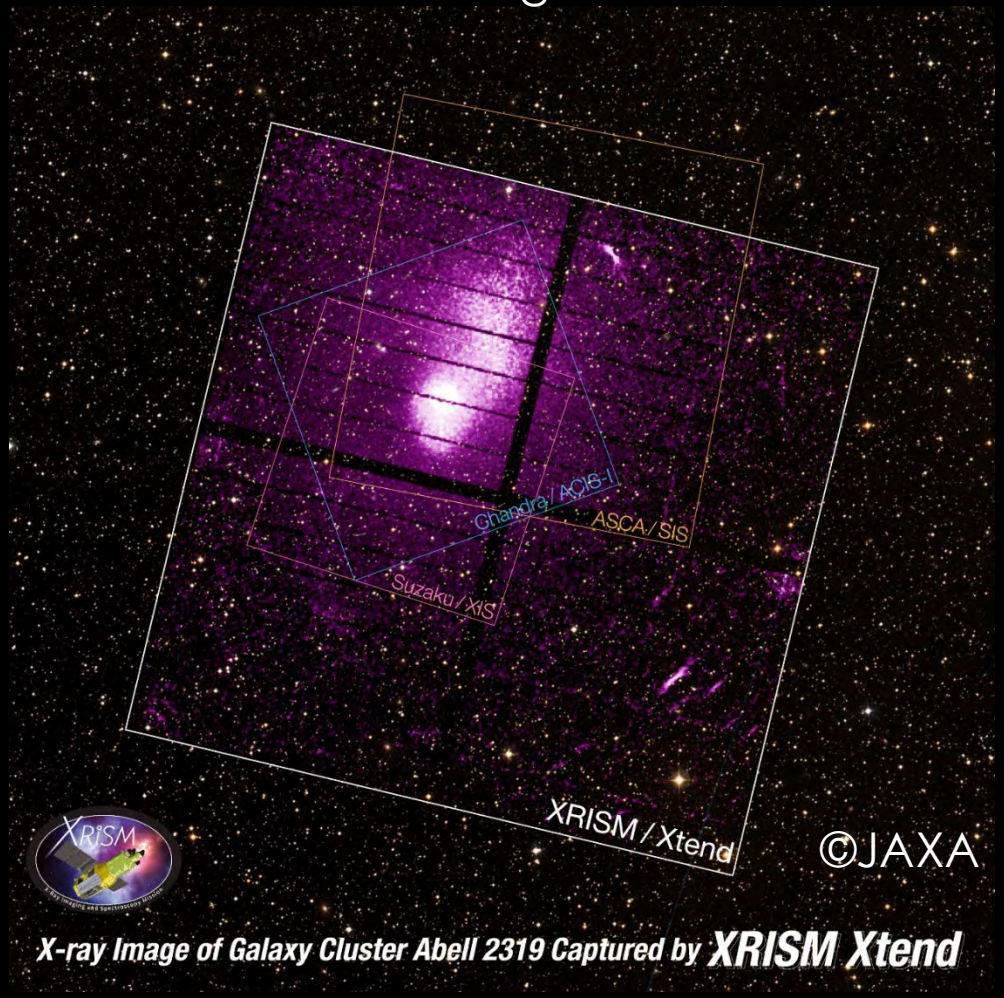
    → transition to cryogen-free mode
  - Xtend
    - ✓ No light leakage
    - ✓ No degradation





FIRST LIGHTS

Cluster of galaxies Abell 2319

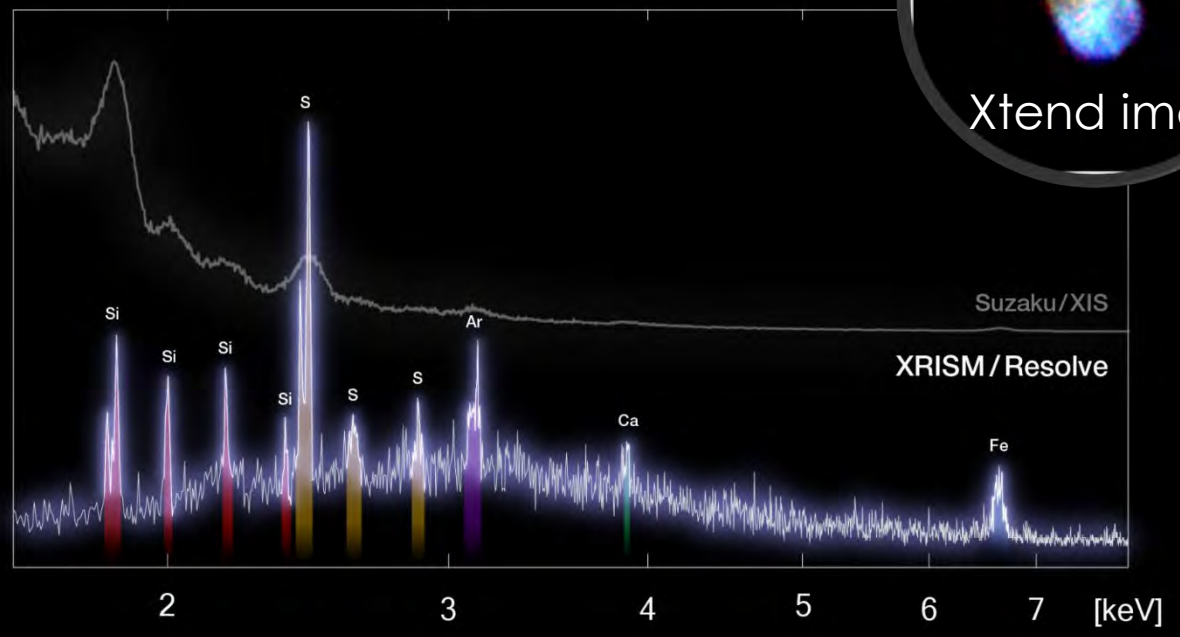


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Supernova remnant N132D



Xtend image



Resolve spectrum

XRISM X-Ray Imaging and Spectroscopy Mission

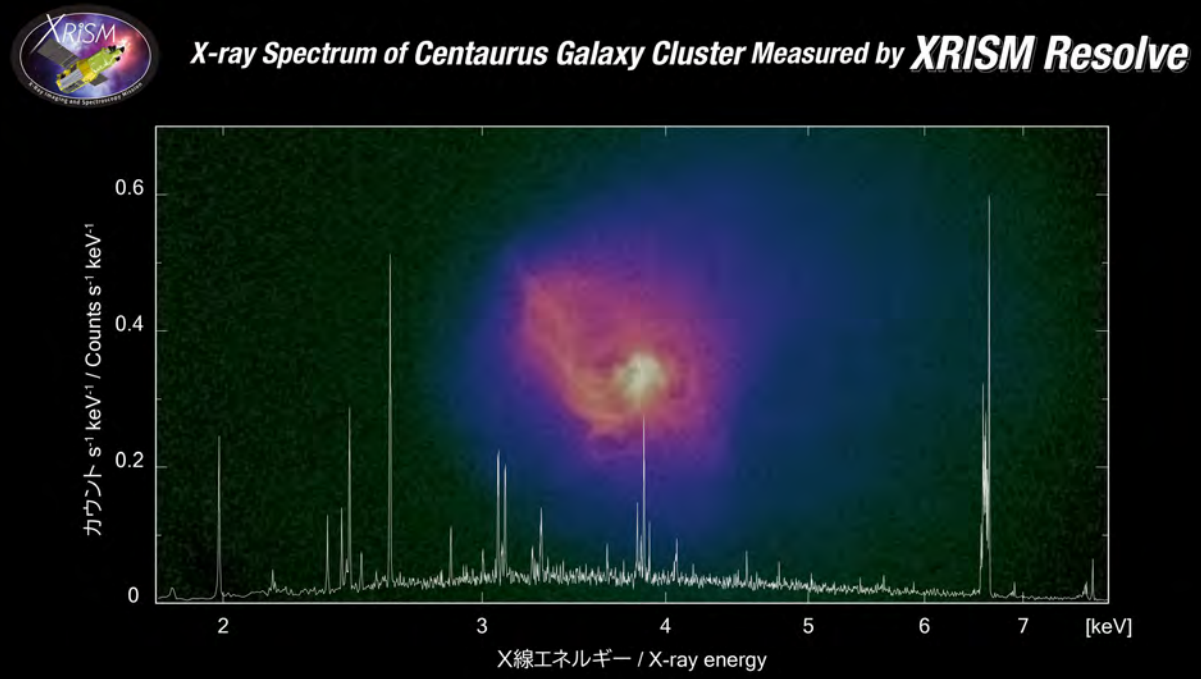
SCIENCE HIGHLIHTS
3 NATURE PAPERS
+ 1 TOO QUICKLOOK

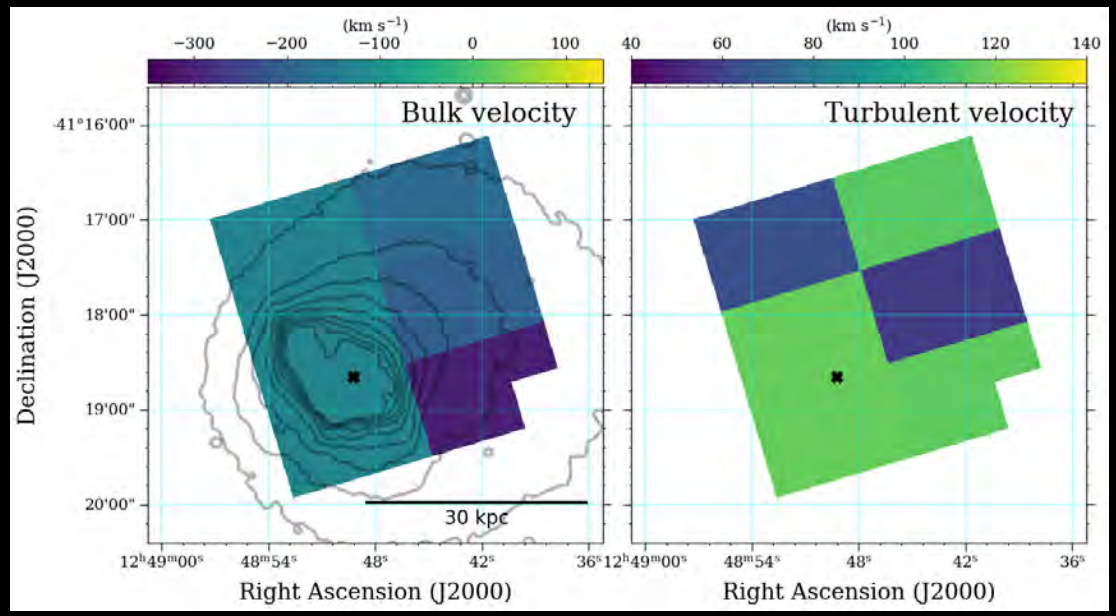
CENTAURUS CLUSTER

"THE BULK MOTION OF GAS IN THE CORE OF THE CENTAURUS GALAXY CLUSTER"
NATURE, VOLUME 638, ISSUE 8050, PP. 365-369

- the hot gas flows along the line of sight relative to the central galaxy, with velocities from 130 km s-1 to 310 km s-1 within about 30 kpc of the centre.
- This indicates bulk flow consistent with core gas sloshing.
- GO program to serve as an observatory for the community

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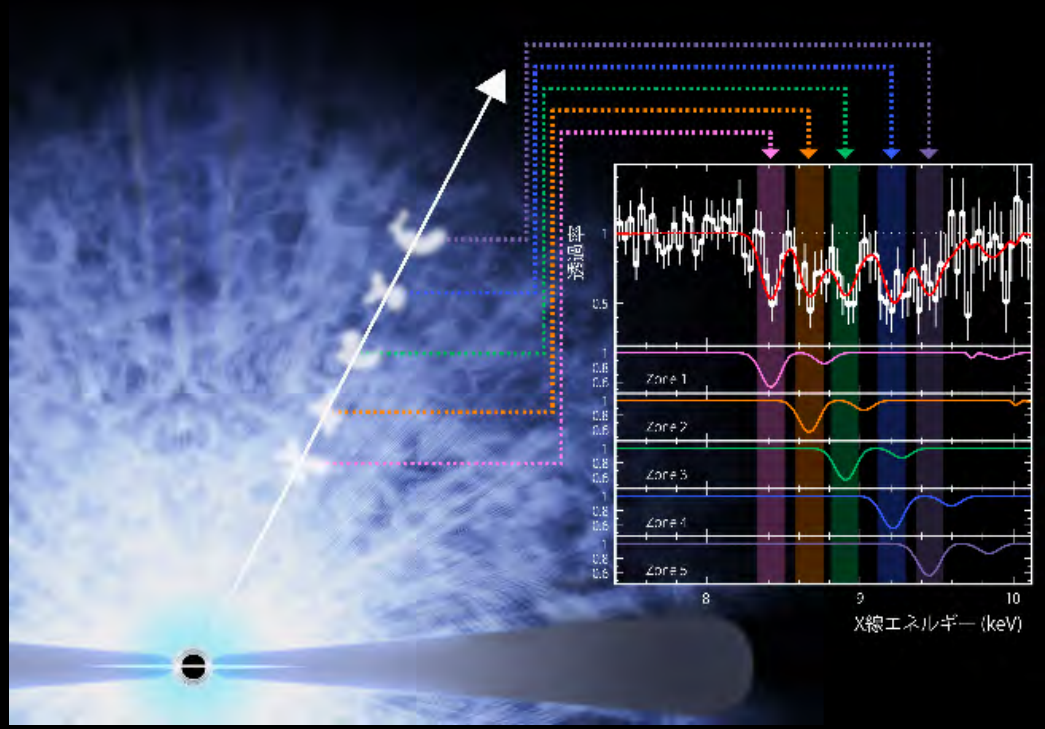


PDS 456:
"STRUCTURED IONIZED WINDS SHOOTING OUT FROM A QUASAR AT RELATIVISTIC SPEEDS"

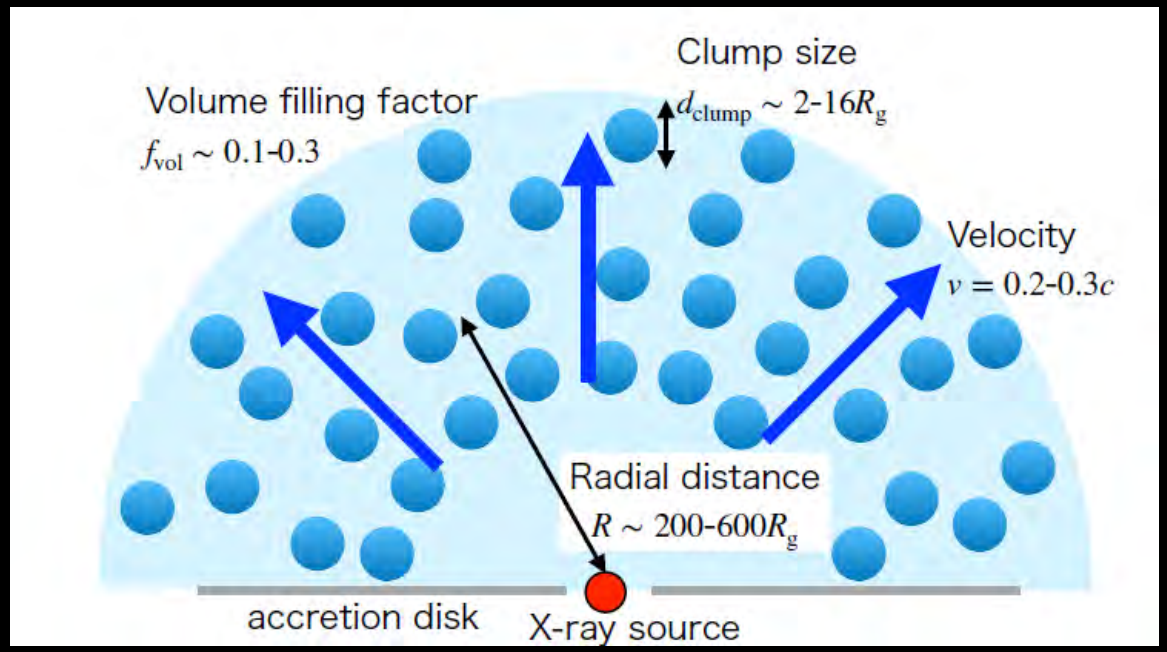
NATURE, VOLUME 641, ISSUE 8065, PP. 1132-1136, MAY 2025

XRISM X-Ray Imaging and Spectroscopy Mission

- XRISM/Resolve discovers 5 discrete clumps outflowing 0.2-0.3 c.
- The mass outflow rate is estimated to be 60–300 $M_{\odot}/\mathrm{yr}$ (> L_{Edd})



©JAXA

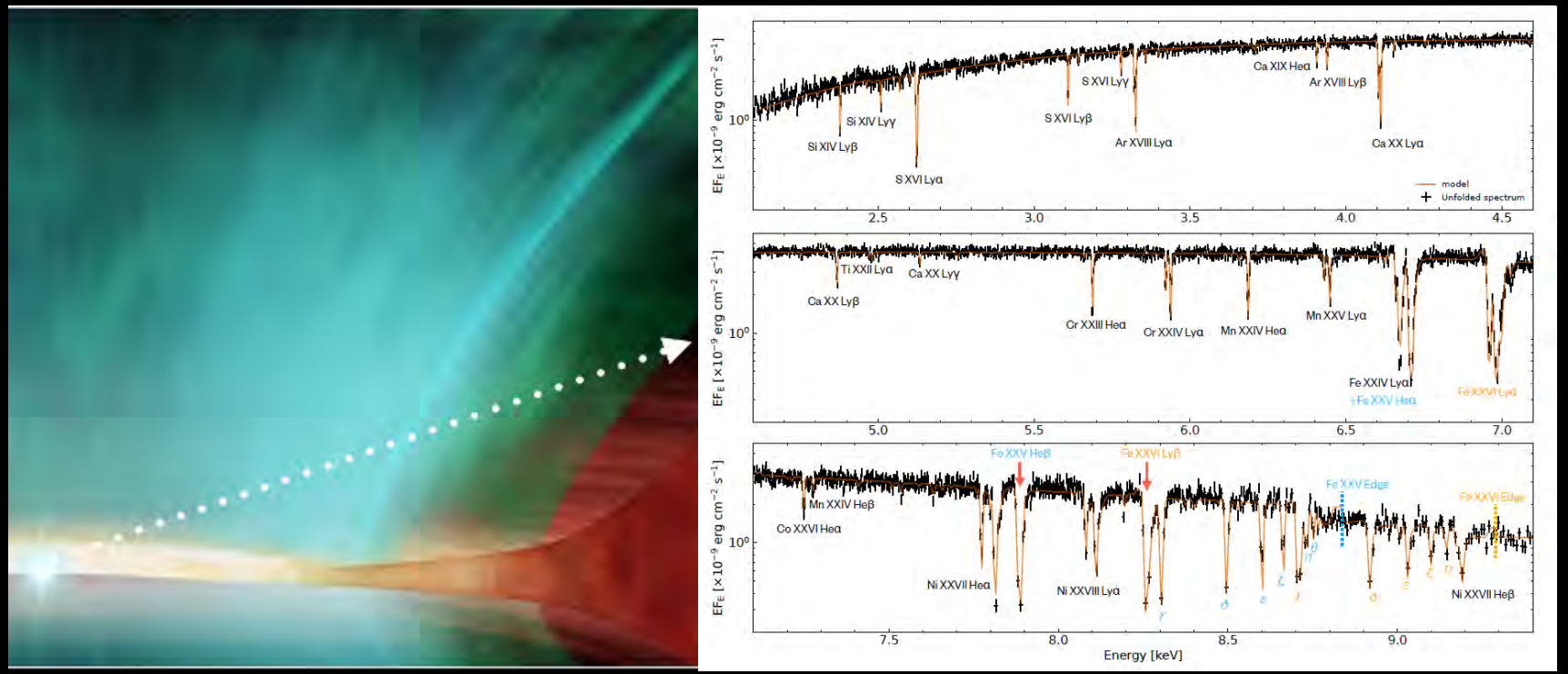


GX 13+1: "STRATIFIED WIND FROM A SUPER-EDDINGTON X-RAY BINARY IS SLOWER THAN EXPECTED"

XRISM X-Ray Imaging and Spectroscopy Mission

NATURE, VOLUME 646, ISSUE 8083, PP. 57-61, OCT 2025

- GX 13+1 reveals the densest winds ever seen in absorption lines.
- The wind is extremely slow, consistent with the thermal-radiative winds launched by X-ray irradiation of the "outer" disk.
- New constraints on the origin of winds BHB, also highlights the very different origin required SMBH UFO.

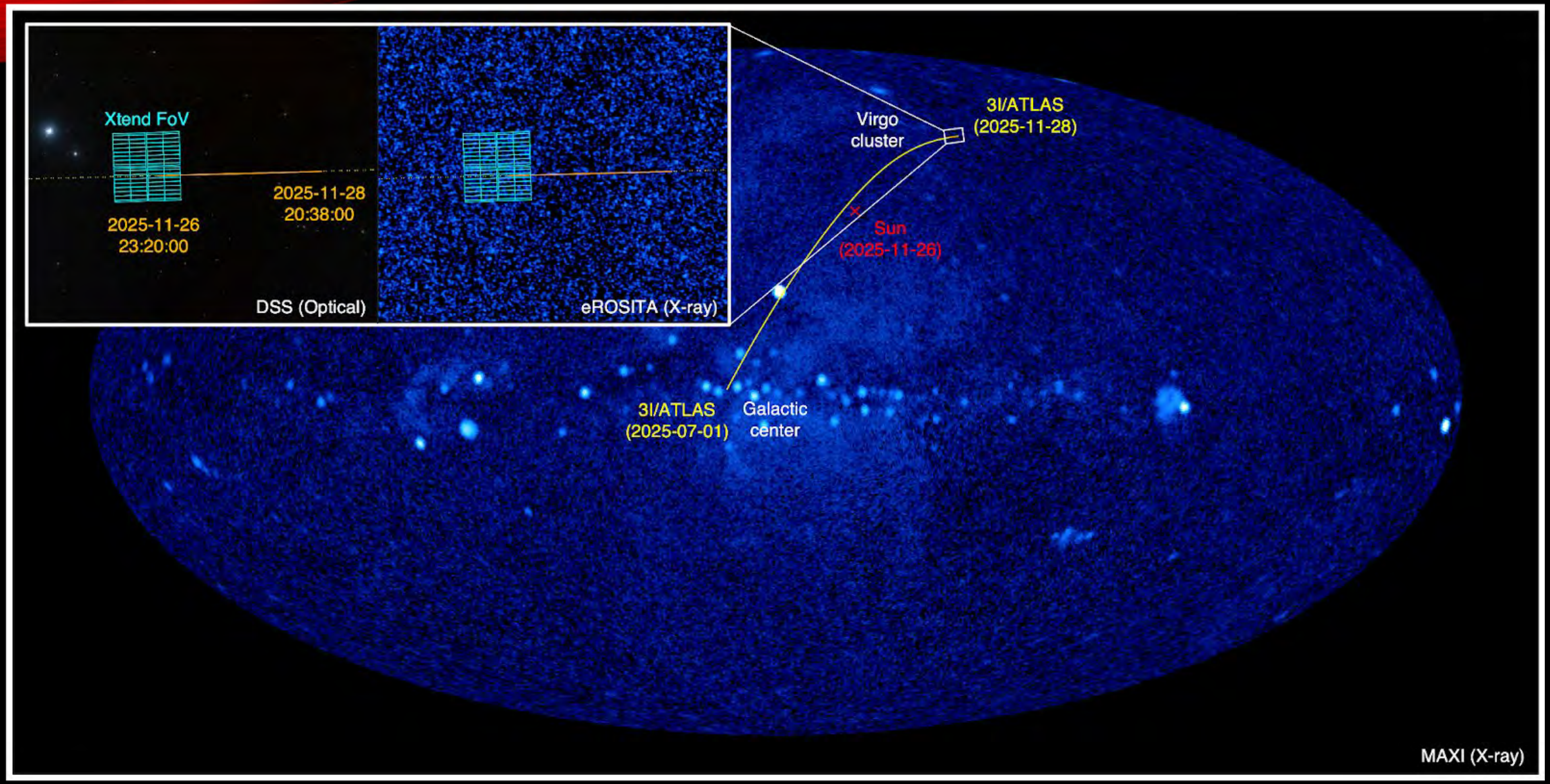


- Two other nature papers were accepted, and will be published in early next year.

3I/ATLAS

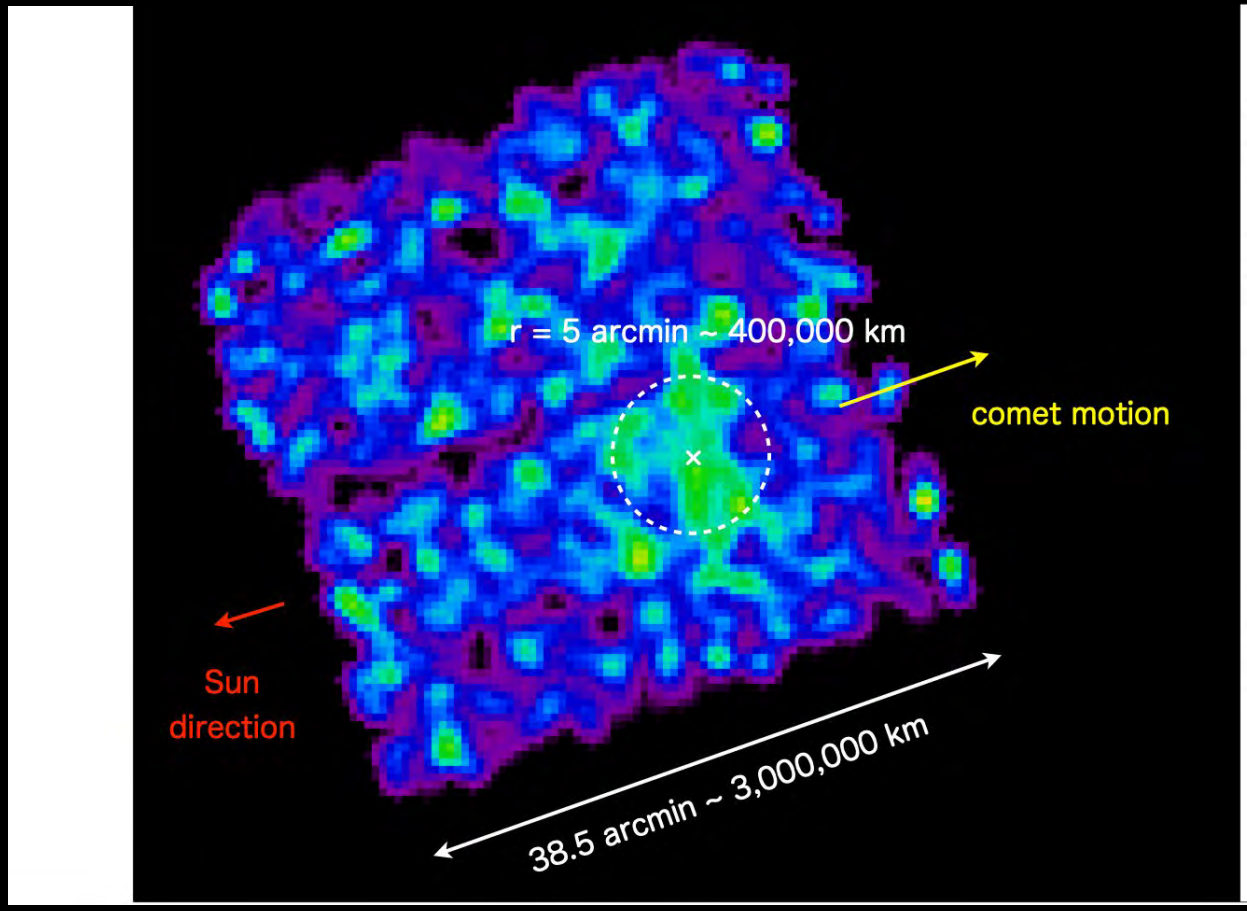
XRISM X-Ray Imaging and Spectroscopy Mission

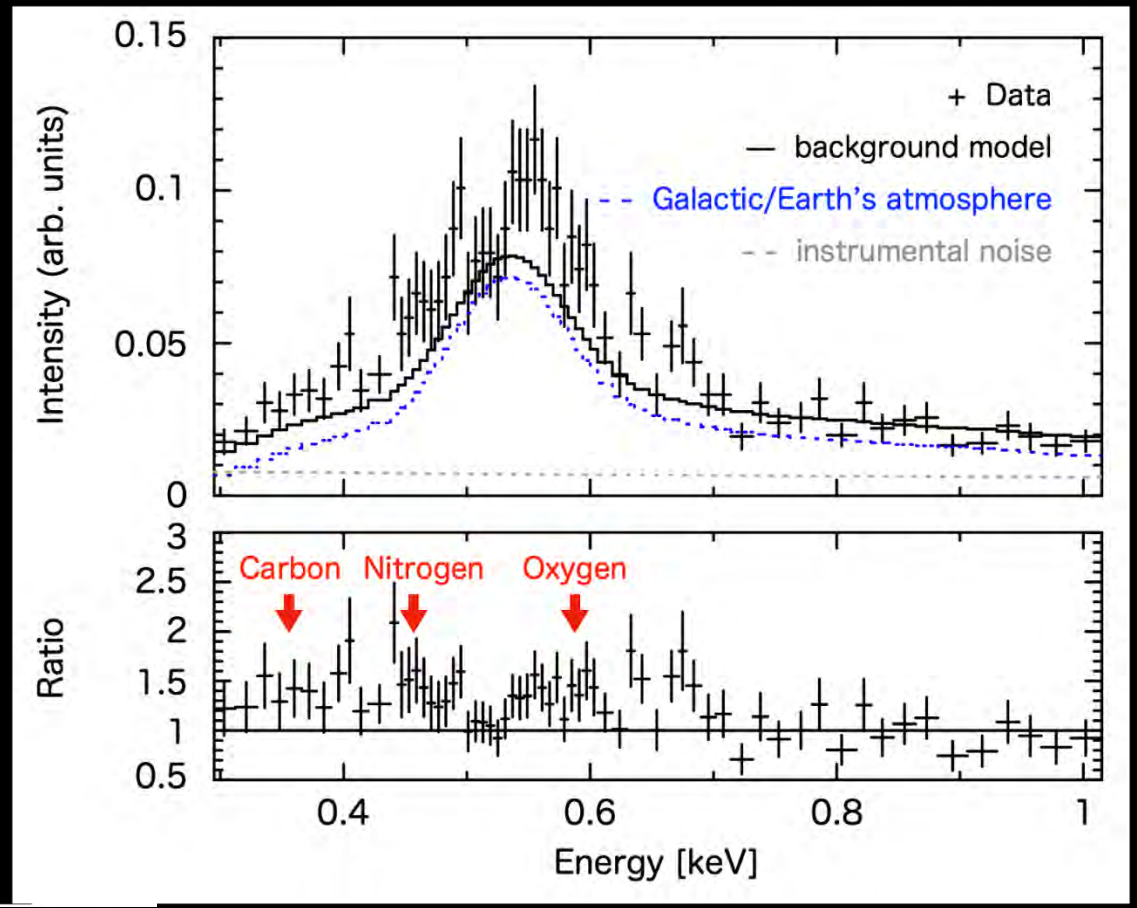
©JAXA



3I/ATLAS

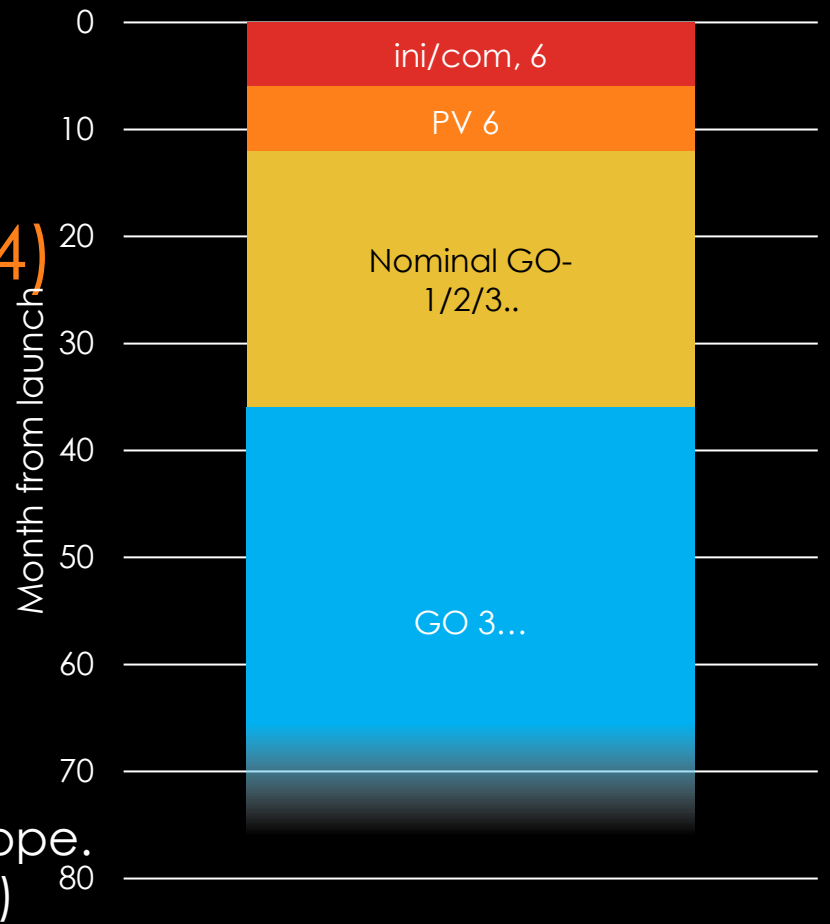
©JAXA





OBSERVATION PHASES

- ✓commissioning (launch + 6 months)
- Nominal operation (launch + 3 years)
  - ✓Performance verification (~Aug. 2024)
  - Guest observations
    - ✓Cycle-1 (Sep. 2024-Aug. 2025)
    - Cycle-2 (Nov. 2025-May. 2026)
    - Cycle-3 (Jun. 2026-May. 2027)



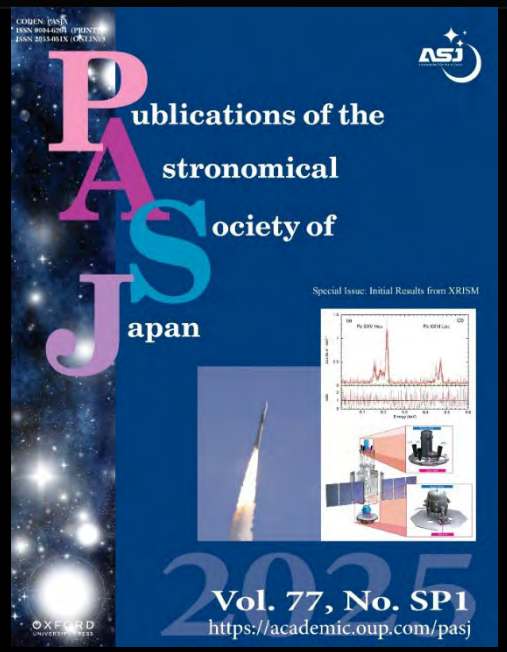
JAXA is accepting proposals from outside North America or Europe.
(At least one co-I belonging to a Japanese institute is required.)

ENJOY THE NEW WORLD WITH XRISM

XRISM X-Ray Imaging and Spectroscopy Mission

See also special issues;

- **PASJ vol. 77, September 2025**
  Special Issue: Initial Results from XRISM
- **JATIS vol. 11, October 2025**
  Includes special section on XRISM instrum





XRISM International Conference
Oct. 21-25 , 2025 in Kyoto

